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F-M Motorparts Limited

Company Number 1073619

Strategic Report for the year ended 31 December 2018

The directors of F-M Motorparts Limited ("the Company") present the strategic report for the year ended 31 December 2018.

Strategy

The Company is a member of a large multi-national group. The strategy of the group is determined by the high-level group management.

The strategy is designed to create sustainable profitable growth by leveraging existing and developing new competitive advantages. This strategy consists of the following primary elements:

- Invest in world-class distribution and online capabilities to meet the delivery expectations of customers by enhancing the distribution footprint, improving distribution capabilities, strengthening delivery performance and engaging end customers;
- Leverage the strength of aftermarket leading brand positions, product portfolio and range, marketing and selling expertise, and distribution and logistics capabilities.

Review of the business

The Company is engaged in the manufacture and distribution of automotive components for original equipment ("OE") manufacturers and aftermarket outlets. In addition, the Company is an investment holding company.

The Company considers turnover and operational EBITDA to be its key financial performance indicators. EBITDA is a non-GAAP measure defined to exclude impairment charges, restructuring costs, corporation tax expense, income from shares in group undertakings, interest expense and income, depreciation and amortisation.

Turnover for the year was £89,271,925 compared with £79,901,747 in 2017, an increase of £9,370,178.

EBITDA for the year was £4,328,783 compared with £5,958,163 in the previous year.

Following a review of the carrying value of investments, no provisions were required against the Company's investments (2017: Charge £6,823,841).

Calculation of representative non-financial KPIs is not appropriate at this legal entity level given the global structure of the overall group.

The directors consider that the year end financial position of the Company was satisfactory.

Tenneco acquisition

On 1 October 2018, Tenneco Inc. acquired Federal-Mogul LLC, the lead company of the Federal-Mogul Group and became the Company's ultimate holding company. The change in ownership has had no impact on the Company or its subsidiaries.

Principal risks and uncertainties

The principal risks and uncertainties that the Company faces are:

Adverse conditions in the automotive market

The revenues of the Company's operations are closely tied to global OE vehicle sales, production levels, and independent aftermarket parts replacement activity. The OE market is characterised by short-term volatility, with overall expected long-term growth in global vehicle sales and production. Automotive production in the local markets served by the Company can be affected by macro-economic factors such as interest rates, fuel prices, consumer confidence and employment trends. A variation in the level of vehicle production would not only affect sales to OE customers but, depending on the reasons for the change, could impact demand from aftermarket customers. The Company's results of operations and financial position could be adversely affected if the Company fails to respond in a timely and appropriate manner to changes in the demand for its products.

Principal risks and uncertainties (continued)

Competitiveness of automotive industry

The Company operates in an extremely competitive industry, driven by global vehicle production volumes and part replacement trends. Business is typically awarded to the supplier offering the most favourable combination of cost, quality, technology and service. In addition, customers continue to require periodic price reductions that require the Company to continually assess, redefine and improve its operations, products and manufacturing capabilities to maintain and improve profitability. The Company's management continues to develop and execute initiatives to meet the challenges of the industry, however, there can be no assurance that the Company will be able to compete effectively in the automotive market.

Brexit

The United Kingdom referendum vote to leave the European Union naturally introduced new uncertainties into an already challenging marketplace. In the short-term, this has led to economic uncertainty. However, until the actual arrangements for the United Kingdom leaving the European Union are decided upon the Company cannot ascertain the effect of those arrangements on the Company's operations. At this point the Company has no reason to think that the going concern assumption will be affected.

Currency fluctuations

The Company is exposed to a risk of gain or loss from changes in foreign exchange rates whenever the Company enters into a purchase, sales or intra-group loan agreement in a currency other than sterling. The Company is a member of a multi-national group and it is group policy not to hedge currency exposure whether it is on intra-group transactions or third party transactions.

New Technologies

Increased fuel economy and decreased vehicle emissions are of great importance to OEMs as legislators and customers continue to demand more efficient and cleaner operating vehicles. Increasingly stringent fuel economy standards and environmental regulations are driving OEMs to focus on new technologies including downsized, higher output and turbocharged petrol engines, diesel and turbocharged diesel, bio-mass and hybrid diesel applications and hybrid, electric and alternative energy engines. Also, vehicle safety continues to receive industry attention by OEMs since customers view safety as a fundamental driver in consumer purchasing decisions and legislation looks on improved vehicle safety as a public health issue. The Company strives to ensure that its products meet the requirements of these new technologies and continually develops leading edge technologies, both in respect of product and process, to allow the Company to remain competitive and to continually strive for market leadership.

Raw material cost fluctuations

In recent periods there have been significant fluctuations in the prices of raw materials and energy which have had and may continue to have an unfavourable impact on the Company's business. Competitive and marketing pressures may limit the Company's ability to pass some of the material cost increases on to the Company's customers. Furthermore, the Company's customers are generally not obligated to accept price increases that the Company may desire to pass along to them. This inability to pass on price increases to customers when material prices increase rapidly or to a significantly higher than historic levels could adversely affect the Company's operating margins and cash flow, possibly resulting in lower operating income and profitability.

Treasury Policies

Financial Instruments

The Company's financial instruments comprise cash at bank, balances with group undertakings and trade debtors and creditors arising from normal operations. These financial instruments are used to fund the Company's operations. It is Company policy that no trading in financial instruments be undertaken.

Interest Rate Risk

There are no bank borrowings so interest rate risk arises only from those intra-group loans which bear interest. Loans carry interest at a floating rate since the rate is linked to bank base rate. However, no specific action is taken to hedge the corresponding interest rate exposure since there is minimal risk to the Group as a whole.

Foreign currency risk

As a member of a multi-national group, the Company does not hedge currency exposure. It is not considered appropriate to do so in connection with intra-group loans or intra-group trading and exposure to risk relating to third party export sales is mitigated by the level of purchases from overseas suppliers denominated in the same currency. Foreign currency is held for only short periods, the general policy being to convert all cash transactions to sterling as soon as possible.

Credit Risk

The Company's objective is to reduce the risk of financial loss due to a counterparty's failure to honour its obligations. This is achieved by each operating division being responsible for assessing the credit risk associated with accepting production schedules from customers and for managing shipments and receivables within pre-determined credit limits. Similarly, in respect of intra-group loans resulting from Federal-Mogul Group's policy to use cash surpluses in one area of the business to meet funding requirements in another, credit risk is assessed by a central treasury department.

Liquidity Risk

The Company aims to mitigate liquidity risk by managing cash generation by its operations. Formal approval procedures apply within each operating unit in respect of capital expenditure and cash flow is managed through regular forecasting and management review of operating results at all levels of the company.

On behalf of the Board

E. J. Milner
Director
Date: 10 September 2019

F-M Motorparts Limited

Company Number 1073619

Directors' Report for the year ended 31 December 2018

The directors of F-M Motorparts Limited ("the Company") present their annual report for the year ended 31 December 2018 together with the audited financial statements for the year.

Results and dividends

The profit for the year after tax was £15,512,827 (2017: loss £3,385,232). The Company made provisions against investments of £nil (2017: Charge £6,823,841).

The directors do not propose a dividend (2017: £nil).

Principal activities

The Company's principal activity is the manufacture and distribution of automotive components for original equipment ("OE") manufacturers and aftermarket outlets. In addition, it is an investment holding company.

Looking ahead

The Company will continue its strive to meet changing customer requirements to ensure that it wins new business arising from OE customers' new vehicle programmes. In addition, it will ensure that its selling, marketing and distribution activities grow with and support any developments and new opportunities within the aftermarket business.

The Company will also continue its attempts to obtain efficiencies in relation to both the operating processes and also the costs associated with those processes.

Research and development

The research and development activities of the Company are directed principally towards the development of new products and to improving the performance and effectiveness of existing products. In 2018 expenditure amounted to £1,652,536 (2017: £2,007,926).

Directors

The following served as directors of F-M Motorparts Limited during the year:

E. J. Milner
K Power, resigned 31 July 2019

Employees and employment policies

The Company has approximately 500 employees located in the UK.

It is the Company's policy to provide equal opportunities to all employees. The Company provides appropriate training at all levels and is committed to helping employees to develop their full potential by gaining relevant skills and experience.

Full and fair consideration is given to applications for employment made by disabled persons. Employees who become disabled will be retained in employment wherever possible and, where necessary, appropriate retraining will be provided.

The Company places considerable emphasis on regular and effective communications with employees on matters of concern to them. The Company involves and consults employees on matters concerning its performance.

Directors Indemnities

The Company maintained throughout the year and at the date of approval of the financial statements, liability insurance for its directors and officers, this is a qualifying provision for the purposes of the Companies Act 2006.

Disclosure of information to auditors

In accordance with s.418(2) of the Companies Act 2006 the directors:

- are not aware of any relevant audit information of which the Company's auditors are unaware; and
- have taken all the steps that they ought to have taken as a director in order to make themselves aware of any relevant audit information and to establish that the Company's auditors are aware of that information.

On behalf of the Board

E. J. Milner
Director
Date: 10 September 2019

F-M Motorparts Limited

Statement of directors' responsibilities

The directors are responsible for preparing the Strategic Report and Directors' Report and financial statements in accordance with applicable law and regulations.

Company law requires the directors to prepare financial statements for each financial year. Under that law the directors have elected to prepare the financial statements in accordance with United Kingdom Generally Accepted Accounting Practice (United Kingdom Accounting Standards and applicable law), including FRS102 'The Financial Reporting Standard applicable in the UK and Republic of Ireland'. Under company law the directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the Company and of the profit or loss of the Company for that period. In preparing those financial statements, the directors are required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether applicable UK Accounting Standards have been followed, subject to any material departures disclosed and explained in the financial statements;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Company will continue in business.

The directors are responsible for keeping adequate accounting records that are sufficient to show and explain the Company's transactions and disclose with reasonable accuracy at any time the financial position of the Company and enable them to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the Company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF F-M MOTORPARTS LIMITED

Opinion

We have audited the financial statements of F-M Motorparts Limited (the 'Company') for the year ended 31 December 2018, which comprise the Profit and loss account, the Balance sheet, the Statement of changes in equity and Notes to the financial statements, including a summary of significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including Financial Reporting Standard 102 'The Financial Reporting Standard applicable in the UK and Republic of Ireland' (United Kingdom Generally Accepted Accounting Practice).

In our opinion, the financial statements:

- give a true and fair view of the state of the Company's affairs as at 31 December 2018 and of its profit for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the 'Auditor's responsibilities for the audit of the financial statements' section of our report. We are independent of the Company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions relating to going concern

We have nothing to report in respect of the following matters in relation to which the ISAs (UK) require us to report to you where:

- the directors' use of the going concern basis of accounting in the preparation of the financial statements is not appropriate; or
- the directors have not disclosed in the financial statements any identified material uncertainties that may cast significant doubt about the Company's ability to continue to adopt the going concern basis of accounting for a period of at least twelve months from the date when the financial statements are authorised for issue.

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF F-M MOTORPARTS LIMITED (CONTINUED)

Other information

The directors are responsible for the other information. The other information comprises the information included in the Strategic Report and Directors' Report, other than the financial statements and our auditor's report thereon. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the Strategic Report and the Directors' Report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the Strategic Report and the Directors' Report have been prepared in accordance with applicable legal requirements.

Matter on which we are required to report under the Companies Act 2006

In the light of the knowledge and understanding of the Company and its environment obtained in the course of the audit, we have not identified material misstatements in the Strategic Report or the Directors' Report.

Matters on which we are required to report by exception

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or
- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit.

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF F-M MOTORPARTS LIMITED (CONTINUED)

Responsibilities of directors for the financial statements

As explained more fully in the Statement of directors' responsibilities set out on page 6, the directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the Company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at: www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditor's report.

Use of our report

This report is made solely to the Company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the Company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Company and the Company's members as a body, for our audit work, for this report, or for the opinions we have formed.

Grant Thornton UK LLP

Stuart Muskett
Senior Statutory Auditor
for and on behalf of Grant Thornton UK LLP
Statutory Auditor, Chartered Accountants
Manchester
'3 September 2019

F-M Motorparts Limited

Profit and loss account for the year ended 31 December 2018

	Notes	2018 £	2017 £
Total Turnover	5	89,271,925	79,901,747
Cost of sales		(82,072,094)	(70,904,089)
Gross profit		7,199,831	8,997,658
Other operating expenses	6(a)	(13,291,552)	(12,534,118)
Other operating income	6(b)	23,271,718	4,236,507
Provisions against fixed asset investments	6(c)	-	(6,823,841)
Operating profit/(loss) on ordinary activities		17,179,997	(6,123,794)
Income from shares in group undertakings		643,364	797,615
Interest receivable	7	494,040	412,866
Profit/(loss) on ordinary activities before taxation	6(d)	18,317,401	(4,913,313)
Tax on profit/(loss) on ordinary activities	8	(2,804,574)	1,528,081
Profit/(loss) on ordinary activities after taxation		15,512,827	(3,385,232)
Profit/(loss) attributable to shareholders		15,512,827	(3,385,232)

The results above all relate to continuing operations.

F-M Motorparts Limited

Balance sheet as at 31 December 2018

	Notes	2018	2017
		£	£
Fixed assets			
Intangible fixed assets	13	26,806,500	28,048,500
Tangible fixed assets	14	25,361,269	23,665,256
Investments	15	31,921,579	31,898,503
		84,089,348	83,612,259
Current assets			
Stocks	16	8,688,863	8,427,643
Debtors falling due within one year	17	30,561,134	26,531,967
Debtors falling due after more than one year	17	-	1,786,000
		30,561,134	28,317,967
Cash at bank and in hand		3,950,269	5,357,675
		43,200,266	42,103,285
Creditors: Amounts falling due within one year	18	(19,745,074)	(16,261,485)
Net current assets		23,455,192	25,841,800
Total assets less current liabilities		107,544,540	109,454,059
Creditors: Amounts falling due after more than one year	19	(322,590)	-
Net assets		107,221,950	109,454,059
Capital and reserves:			
Called up share capital	20	73,783,877	73,783,877
Share premium account	21	11,166,543	11,166,543
Profit and loss account	21	22,271,530	24,503,639
Shareholders' funds – equity		107,221,950	109,454,059

The financial statements on pages 10 to 25 were approved by the Board on 10 September 2019 and signed on its behalf by:

E.J.Milner
Director

Statement of changes in equity

	Note	Called-up share capital £	Share premium account £	Profit and loss account £	Total £
At 1 January 2017		73,783,767	11,166,543	27,888,871	112,839,291
Comprehensive income for the year					
Loss for the year		-	-	(3,385,232)	(3,385,232)
Total comprehensive income for the year		**-**	**-**	**(3,385,232)**	**(3,385,232)**
At 31 December 2017		**73,783,877**	**11,166,543**	**24,503,639**	**109,454,059**
Comprehensive income for the year					
Profit for the year		-	-	15,512,827	15,512,827
Total comprehensive income for the year		**-**	**-**	**15,512,827**	**15,512,827**
Contributions by and distributions to owners					
Dividends paid	9	-	-	(17,744,936)	(17,744,936)
Total transactions with owners		**-**	**-**	**(17,744, 936)**	**(17,744,936)**
At 31 December 2018		**73,783,877**	**11,166,543**	**22,271,530**	**107,221,950**

1. Company Information

F-M Motorparts Limited is a limited liability company incorporated in England and Wales. Its registered office is at Manchester International Office Centre, Styal Road, Manchester M22 5TN.

2. Basis of preparation

These financial statements have been prepared in accordance with applicable United Kingdom accounting standards including Financial Reporting Standard 102, "The Financial Reporting Standard applicable in the United Kingdom and Republic of Ireland" ("FRS102") and with the Companies Act 2006. The financial statements have been prepared on the historical cost basis.

The financial statements are presented in Sterling (£), the Company's functional currency.

Until 30 September 2018, the Company's ultimate parent undertaking was Icahn Enterprises L.P., and from 1 October 2018 its ultimate parent has been Tenneco Inc. Both Icahn Enterprises L.P. and Tenneco Inc are incorporated in the USA and listed on the New York Stock Exchange. The Company was included in the consolidated financial statements of Icahn Enterprises L.P. until 30 September 2018 and in the consolidated financial statements of Tenneco Inc since 1 October 2018. Consolidated financial statements of the ultimate parent entities are available from their websites www.ielp.com and www.tenneco.com respectively. Consequently, the Company has taken advantage of the exemption from preparing a cash flow statement under the terms of FRS102.

As stated above, the Company and all of its subsidiary undertakings are included in the consolidated financial statements of Icahn Enterprises L.P. to 30 September 2018 and in the consolidated financial statements of Tenneco Inc from 1 October 2018. The ultimate parent company accounts are drawn up to the same date in the same financial year and in accordance with the provisions of the Seventh Directive (83/349/EEC) or in a manner equivalent to consolidated accounts and consolidated annual reports so drawn up. Accordingly, the Company, in accordance with the exemption in s.401 of the Companies Act, has not prepared consolidated financial statements. The financial statements therefore contain information about F-M Motorparts Limited as an individual company and not as a group.

3. Significant judgements and estimates

The most significant judgements made in the preparation of these financial statements are as follows:

Brands

The brands were acquired for £31,050,000 as part of the purchase of the Motorparts business of Federal-Mogul Limited in 2015. This value was calculated by a third party professional valuer using 25 years of forecasted cash flows and it was considered to be an appropriate transfer value.

As the value of the brands was calculated using 25 years of forecast cash flows it was therefore considered appropriate to amortise the brands over this number of years.

The carrying value of the brands is reviewed annually to determine whether there has been any permanent impairment in value and any such reductions in value will be taken to the profit and loss account.

3. Significant judgements and estimates (continued)

Impairment review of fixed asset investments

The carrying value of investments has been compared to their value in use and an impairment charge recorded where individual investments are considered to be impaired, or where a previous impairment loss has reversed, a credit has been recorded.

The value in use is derived from discounted future cash flow projections using nominal discount rates consistent with each applicable global industry sector. A material adjustment could occur if the actual cash flows were significantly different from those used in the impairment review.

As at 31st December 2018 the carrying amounts of the fixed asset investments are:

Subsidiary Undertakings-Shares	£26,804,537
Associated Undertakings-Shares	£5,117,042

Deferred tax assets

The judgement made in relation to deferred tax assets is that they are recognised to the extent that they will be recoverable out of future taxable profits based on forecasts for the next three years.

4. Principal accounting policies

The principal accounting policies of the Company have remained unchanged from the prior year and are set out below:

Business acquisitions

The cost of businesses acquired from fellow group companies is measured at the aggregate of the fair value of internally generated brands (not previously capitalised) plus book carrying value of the other net assets transferred.

Tangible assets

Tangible fixed assets are stated at cost / valuation less accumulated depreciation and accumulated impairment losses.

Depreciation is provided on cost or the revalued amount, as applicable, to write tangible fixed assets, other than freehold land and construction in progress, down to their estimated residual values on a straight line basis as follows:

- Freehold buildings, 2.5% per annum.
- Leasehold buildings are assumed to have a life equal to the period of the lease, but with a maximum of 40 years.
- Plant and machinery, at rates ranging from 7% to 33% per annum.

The assets' residual values, useful lives and depreciation methods are reviewed, and adjusted prospectively if appropriate.

The carrying values of tangible fixed assets are reviewed for impairment when events or changes in circumstances indicate the carrying value may not be recoverable.

4. Principal accounting policies (continued)

Intangible fixed assets

Intangible assets are measured at cost less accumulated amortisation and any accumulated impairment losses.

Brands

Purchased brands are capitalised at cost and amortised evenly over the period of time considered in order to evaluate the present value of the expected income streams from the sale of branded products and therefore determine the purchase cost.

Investments

Fixed asset investments are stated at cost less provision for any impairment.

Impairment of assets

At each reporting date fixed assets are reviewed to determine whether there is any indication that those assets have suffered an impairment loss. If there is an indication of possible impairment, the recoverable amount of any affected asset is estimated and compared with its carrying amount. If the estimated recoverable amount is lower, the carrying amount is reduced to its estimated recoverable amount and an impairment loss is recognised immediately in profit or loss.

If an impairment loss subsequently reverses, the carrying amount of the asset is increased to the revised estimate of its recoverable amount, but not in excess of the amount that would have been determined had no impairment loss been recognised for the asset in prior years. A reversal of an impairment loss is recognised immediately in profit or loss.

Stocks

Stocks are stated at the lower of original cost and net realisable value on a first-in first-out basis. Cost comprises materials, labour and an allocation of attributable overhead expenses. Net realisable value is the price at which stocks can be sold in the normal course of business after allowing for the costs of realisation.

Debtors

Short term debtors are measured at transaction price, less any impairment.

4. Principal accounting policies (continued)

Creditors

Short term creditors are measured at the transaction price.

Taxation

Current tax is recognised for the amount of income tax payable in respect of the taxable profit for the current or past reporting periods using the tax rates and laws that have been enacted or substantively enacted by the reporting date.

Deferred tax is recognised in respect of all timing differences at the reporting date, except as otherwise indicated.

Deferred tax assets are only recognised to the extent that it is probable that they will be recovered against the reversal of deferred tax liabilities or other future taxable profits.

If and when all conditions for retaining tax allowances for the cost of a fixed asset have been met, the deferred tax is reversed.

A deferred tax liability or asset is recognised for the additional tax that will be paid or avoided in respect of assets and liabilities that are recognised in a business combination. The amount attributed to goodwill is adjusted by the amount of deferred tax recognised.

Deferred tax is calculated using the tax rates and laws that have been enacted or substantively enacted by the reporting date that are expected to apply to the reversal of the timing difference.

With the exception of changes arising on the initial recognition of a business combination, the tax expense (income) is presented either in profit or loss, other comprehensive income or equity depending on the transaction that resulted in the tax expense (income).

Deferred tax liabilities are presented within provisions for liabilities and deferred tax assets within debtors.

Deferred tax assets and deferred tax liabilities are offset only if:

- the group has a legally enforceable right to set off current tax assets against current tax liabilities, and,
- the deferred tax assets and deferred tax liabilities relate to income taxes levied by the same taxation authority on either the same taxable entity or different taxable entities which intend either to settle current tax liabilities and assets on a net basis, or to realise the assets and settle the liabilities simultaneously.

Foreign currencies

Transactions in foreign currency are recorded at the rate ruling at the date of transaction. At the end of each reporting period monetary items denominated in foreign currencies are retranslated at the rate prevailing at that date. Exchange differences are recognised in the profit and loss account in the period in which they arise.

4. Principal accounting policies (continued)

Leasing

Rentals payable under operating leases are charged to the profit and loss account on a straight line basis over the lease term.

The aggregate benefit of lease incentives are recognised as a reduction to the expense recognised over the lease term on a straight line basis.

Pensions Costs

The Company operates a defined contribution scheme in the form of a stakeholder plan. Contributions to this scheme are recognised in the profit and loss account in the period in which they become payable.

Further information on pension arrangements is set out in Note 11 to the accounts.

Revenue Recognition

Revenue is recognised to the extent that the Company obtains the right to consideration in exchange for its performance. Revenue is measured at the fair value of the consideration received or receivable, excluding discounts, rebates, VAT and other sales taxes or duty. The following criteria must also be met before revenue is recognised:

Sale of goods

Revenue from the sale of goods is recognised when the significant risks and rewards of ownership of the goods have passed to the buyer, usually on dispatch of the goods.

Royalty income

Revenue is recognised as royalties accrue.

Interest income

Revenue is recognised as interest accrues.

5. Turnover

Turnover, analysed geographically between markets, was as follows:

	2018 £	2017 £
UK	32,122,194	26,691,045
Europe, Middle East and Africa	47,676,419	44,578,898
North America	464,781	114,204
Rest of world	9,008,531	8,517,600
	89,271,925	79,901,747

Turnover arises on the sale of a range of automotive components which represent a single stream of turnover. Accordingly, no further disclosure is deemed necessary.

6. Analysis of results

(a) Other operating expenses	2018 £	2017 £
Distribution costs	4,655,442	4,554,915
Administrative expenses	8,636,110	7,979,203
Other operating expenses	13,291,552	12,534,118

(b) Other operating income	2018 £	2017 £
Royalty income	5,326,120	4,206,358
Other income	17,945,598	30,149
	23,271,718	4,236,507

Operating profit includes a charge of £442,296 (2017: £75,650) in respect of redundancy and rationalisation costs. All of this charge was included in other operating expenses. Other income includes a gain of £17,840,460 (2017: £nil) on the sale to a 3rd party of Know-how and intellectual property rights in relation to certain of the Company's products.

(c) Provisions against fixed asset investments

Following an impairment review of the Company's investments it was decided that no provisions were required (2017: charge £6,823,841).

(d) Profit/(loss) before taxation is stated after charging/(crediting):	2018 £	2017 £
Auditor's remuneration		
- Audit of company financial statements	76,230	76,230
Research and development	1,652,536	2,007,926
R&D expenditure credits	(198,304)	-
Amortisation of intangible assets	1,242,000	1,242,000
Depreciation of tangible fixed assets		
- owned assets	3,304,950	3,940,465
Operating lease rentals	529,569	507,988
Loss on foreign exchange movements	126,836	572,447

The auditors of the Company also received audit fees for auditing the accounts of the Company's overseas subsidiary undertakings of £53,352 (2017: £43,146).

7. Interest receivable	2018 £	2017 £
Interest receivable on group loans	476,770	621,714
Interest payable on group loans	-	(52,433)
Interest receivable on bank deposits	237,203	276,412
Interest payable on bank accounts	(232,363)	(437,668)
Other interest receivable	12,430	4,841
	494,040	412,866

8. Tax on profit/(loss) on ordinary activities

(a) Analysis of tax charge/(credit) in the year

The tax charge/(credit) is based on the profit/(loss) for the year and represents:	2018 £	2017 £
Current Tax:		
UK corporation tax on profits for the period	375,057	-
Foreign tax relief/other relief	(176,753)	-
	198,304	-
Foreign tax suffered	218,904	135,503
Total current tax	417,208	135,503
Deferred tax (note 22):		
Origination and reversal of timings differences	2,617,526	(2,121,346)
Adjustment in respect of previous periods	-	210,146
Effect of changes in tax rates	(230,160)	247,616
Total deferred tax	2,387,366	(1,663,584)
Tax on profit/(loss) on ordinary activities	2,804,574	(1,528,081)

(b) Factors affecting tax credit for year

The tax assessed on the profit/(loss) on ordinary activities for the year is lower (2017: lower) than the standard rate of corporation tax in the UK of 19% (2017: 19.25%). The differences are explained below:

	2018 £	2017 £
Profit/(loss) on ordinary activities before taxation	18,317,401	(4,913,313)
Profit/(loss) on ordinary activities before taxation multiplied by the standard rate of corporation tax in the UK of 19% (2017: 19.25%)	3,480,306	(945,644)
Effect of:		
Group relief surrendered for nil payment	(94,076)	(199,306)
Gains/rollover relief	962,621	-
Movement on deferred tax not recognised	1,105,359	(2,378,809)
Foreign tax	42,151	135,503
Non-deductible expenses	251,288	1,555,927
Income not taxable	(2,712,915)	(153,514)
Tax rate changes	(230,160)	247,616
Adjustment from previous periods	-	210,146
Tax charge/(credit) on profit/(loss) on ordinary activities (Note 8(a))	2,804,574	(1,528,081)

(c) Factors that may affect future tax charges

The Company has losses carried forward of £83,921,775 (2017: £90,616,735).

The Company has unrestricted capital losses available to carry forward of £nil (2017: £5,066,427).

No deferred tax is recognised on the unremitted earnings of overseas subsidiaries, associates and joint ventures.

No deferred tax has been provided for tax that may become payable if re-valued assets were disposed of at their re-valued amounts.

The Finance Act 2017 included changes which affect future tax charges. The rate of corporation tax will reduce to 17% from 1 April 2020. The rate changes will impact the amount of future cash tax payments made by the Company.

9. Dividends

	2018 £	2017 £
Paid during year	17,744,936	-

10. Employees

Monthly average number of employees	2018 No.	2017 No.
Manufacturing	378	332
Selling and Marketing	14	16
Research and Development	26	30
Administrative	132	124
	550	502

Employment costs	2018 £	2017 £
Wages and salaries	18,869,141	17,297,287
Social security costs	2,135,577	2,061,878
Net pension charge (Note 11)	2,233,464	2,072,979
Redundancy payments	338,535	75,650
	23,576,717	21,507,794

11. Pensions commitments

	2018 £	2017 £
Defined contribution scheme	2,233,464	2,072,979

The Company operates a defined contribution scheme in the form of a stakeholder plan.

As at 31 December 2018 outstanding employer contributions of £182,161 (2017: £162,260) were included in Creditors – Amounts falling due within one year.

There are no other significant post-employment benefits.

12. Directors' emoluments

The directors of the Company have not received any emoluments in respect of their services as a director of the Company (2017: £nil).

13. Intangible fixed assets	Brands £
Cost	
At 1 January 2018	31,050,000
At 31 December 2018	31,050,000
Amortisation	
At 1 January 2018	3,001,500
Charge in year	1,242,000
At 31 December 2018	4,243,500
Net book value	
At 31 December 2018	26,806,500
At 31 December 2017	28,048,500

Brands

On 1 August 2015 the Company purchased the Motorparts business of Federal-Mogul Limited, including brands with a value of £31,050,000. These brands were capitalised at that cost and are amortised evenly over 25 years. The purchase price of the brands was calculated using 25 years of forecast cash flows and it is therefore considered appropriate to amortise the brands over this number of years.

However, the carrying value of the brands will be reviewed annually to determine whether there has been any impairment and any such reductions in value will be taken to the profit and loss account.

14. Tangible fixed assets

Cost	Land and buildings £	Plant and machinery £	Total £
At 1 January 2018	5,494,818	27,033,087	32,527,905
Additions	357,144	4,643,819	5,000,963
At 31 December 2018	5,851,962	31,676,906	37,528,868
Depreciation	£	£	£
At 1 January 2018	1,043,043	7,819,606	8,862,649
Charge for the year	229,780	3,075,170	3,304,950
At 31 December 2018	1,272,823	10,894,776	12,167,599
Net book value			
At 31 December 2018	4,579,139	20,782,130	25,361,269
At 31 December 2017	4,451,775	19,213,481	23,665,256

Included in the cost of fixed assets are building improvements of £100,552 (2017:£161,943) and plant and machinery in the course of construction £4,728,830 (2017: £2,436,446). Assets in the course of construction are not depreciated.

Net book value of land and buildings	2018 £	2017 £
Freehold land – not depreciated	1,598,126	1,598,126
Freehold buildings	2,981,013	2,853,649
	4,579,139	4,451,775

15. Fixed asset investments

	Subsidiary Undertakings Equity £	Associated Undertakings Equity £	Total £
Cost			
At 1 January 2018	32,682,526	6,039,818	38,722,344
Additions	23,076	-	23,076
Disposal on liquidation	-	(922,776)	(922,776)
At 31 December 2018	32,705,602	5,117,042	37,822,644
Provisions			
At 1 January 2018	(5,901,065)	(922,776)	(6,823,841)
Charge for year	-	-	-
Release on liquidation	-	922,776	922,776
At 31 December 2018	(5,901,065)	-	(5,901,065)
Net book value			
At 31 December 2018	26,804,537	5,117,042	31,921,579
At 31 December 2017	26,781,461	5,117,042	31,898,503

Details of the investments in which the Company holds 20% or more of the nominal value of any class of share capital are disclosed below.

Name of Company	Country of incorporation if outside Great Britain	Holding	Proportion of voting rights and shares held %	Nature of business
Federal-Mogul Friction Products S.A.	Spain	Subscribed shares	100	Friction Products
Federal-Mogul (Shanghai) Automotive Parts Co. Limited	China	Ordinary shares	100	Aftermarket
Federal-Mogul Friction Products Co. Ltd.	China	Ordinary shares	100	Friction Products
Federal-Mogul Motorparts Zhejiang Limited	China	Ordinary shares	100	Friction Products
Federal-Mogul Motorparts (Pinghu) Trading Limited	China	Ordinary shares	100	Friction Products
Federal-Mogul Friction Products Limited +		Ordinary shares	100	Friction Products
Federal-Mogul Aftermarket UK Limited +		Ordinary shares	100	Aftermarket
Payen International Limited+		Ordinary shares	100	Non-trading
K-B Autosys Co. Ltd.	South Korea	Common stock	33.61	Friction Products

+ These companies operate as a managing agent of F-M Motorparts Limited

In accordance with FRS102, the directors have compared the carrying value of investments to their value in use to the Company and recorded an impairment charge for any individual investments that they considered impaired, or where a previous investment loss has subsequently reversed, a credit has been recorded. No provision was required in the current year (2017: Charge £6,823,841).

The value in use has been derived from discounted cash flow projections using nominal discount rates consistent with each applicable global industry sector, ranging from 13.0% to 13.75% (2017: 11.0% to 15.75%) on a pre-tax basis. A long-term growth rate of 2.5% has been assumed for the majority of companies. The exception being those Motorparts companies operating in Asia where a growth rate of 8.25% (2017: 7%) is deemed to be appropriate.

16. Stocks	2018 £	2017 £
Raw materials	2,418,125	2,985,049
Work in progress	708,262	932,517
Finished goods	5,562,476	4,510,077
	8,688,863	8,427,643

Stock recognised in cost of sales during the year as an expense was £78,128,524 (2017: £70,400,349).
An impairment loss of £1,148,251 (2017: £1,340,114) was recognised in cost of sales during the year due to slow-moving, damaged and obsolete stock.

17. Debtors	2018 £	2017 £
Debtors falling due within one year		
Trade debtors	15,794,703	13,931,600
Amounts owed by fellow subsidiaries	13,884,790	11,402,716
Deferred tax asset (see Note 22)	104,218	705,584
Prepayments and accrued income	475,198	331,751
Other debtors	302,225	160,316
	30,561,134	26,531,967

An impairment loss of £392,585 (2017: £272,775) was recognised against trade debtors.

Debtors falling due after more than one year		
Deferred tax asset (see Note 22)	-	1,786,000
	-	1,786,000

Financial assets are held at amortised cost.

18. Creditors – Amounts falling due within one year	2018 £	2017 £
Trade creditors	8,799,602	8,880,697
Amounts owed to fellow subsidiaries	3,750,481	1,350,663
Payroll and other taxes, including social security	1,061,419	1,221,422
Accruals, deferred income and other creditors	6,133,572	4,808,703
	19,745,074	16,261,485

Financial liabilities are held at amortised cost.

19. Creditors – Amounts falling due after more than one year	2018 £	2017 £
Accruals, deferred income and other creditors	322,590	-
	322,590	-

20. Called up share capital

Ordinary shares of £1 each	Issued and fully paid No. of shares	Issued and fully paid £
At 1 January 2018	73,783,877	73,783,877
At 31 December 2018	73,783,877	73,783,877

21. Reserves

Called up share capital

This represents the nominal value of shares that have been issued.

Share premium account

This includes any premiums received on issue of share capital. Any transaction costs associated with the issuing of shares are deducted from the share premium.

Profit and loss account

This includes all current and prior period retained profits and losses.

22. Deferred Taxation

Deferred tax asset	2018 £	2017 £
Tax losses	-	2,464,000
Other timing differences	104,218	27,584
Deferred tax asset	104,218	2,491,584

Unprovided assets	2018 £	2017 £
Decelerated capital allowances	2,378,156	1,706,627
Losses	14,266,702	12,940,844
Other timing differences	16,496	14,925
Capital losses	-	861,293
	16,661,354	15,523,689

Based on management judgement, the deferred tax asset has been recognised to the extent that it is anticipated to be recoverable out of future taxable profits based on projections for the next three years.

23. Commitments and contingent liabilities	2018 £	2017 £
Future capital expenditure – contracts placed	-	512,686
The Company's future minimum operating lease payments are as follows:		
- within one year	312,742	405,864
- between one and five years	448,547	775,518
- later than five years	-	-
	761,289	1,181,382

Contingent liabilities also exist in respect of cross-guarantees given by the Company and its UK subsidiaries to support some of the Group's UK banking facilities amounting to £nil (2017: £nil).

24. Related Party Transactions

The Company has taken advantage of the exemption in FRS102, para 33.1A, not to disclose transactions with other group companies which meet the criteria that all subsidiary undertakings which are party to the transactions are wholly-owned.

K-B Autosys Co. Limited does not qualify as a related company as the Company has no directors on its board and has no influence over its operating and financial policies.

There are no other material related party transactions.

25. Post Balance Sheet Events

In February 2019, one of the Company's subsidiaries settled its loan liabilities to the Company with a cash payment amounting to £7,208,219. In August 2019, the Company paid a dividend of £5,000,000 to its immediate parent undertaking, Federal-Mogul Motorparts (Netherlands) BV.

26. Parent and ultimate parent company

The Company's immediate parent company is Federal-Mogul Motorparts (Netherlands) B.V., a company registered in the Netherlands. The ultimate parent company and controlling party is Tenneco Inc registered in the USA. The group accounts of Tenneco Inc are the smallest and largest group accounts in which the Company is included. Accounts of this company may be obtained from www.tenneco.com .

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)

☑ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2018

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

Commission file number 1-12387

TENNECO INC.

(Exact name of registrant as specified in its charter)

Delaware	**76-0515284**
(State or other jurisdiction of incorporation or organization)	(I R S Employer Identification No.)
500 North Field Drive Lake Forest, IL	**60045**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: (847) 482-5000

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	**Name of each Exchange on which registered**
Class A Voting Common Stock, par value $.01 per share	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☑ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☑

Note — Checking the box above will not relieve any registrant required to file reports pursuant to Section 13 or 15(d) of the Exchange Act from their obligations under those Sections.

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☑ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☑ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☑

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or emerging growth company. See the definitions of "large accelerated filer," "accelerated filer", "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☑	Accelerated filer ☐
Non-accelerated filer ☐	Smaller reporting company ☐
	Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act) Yes ☐ No ☑

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant as of June 30, 2018, computed by reference to the price at which the registrant's common stock was last sold on the New York Stock Exchange on June 30, 2018, was approximately $2.2 billion .

The number of shares of Class A Voting Common Stock, par value $0.01 per share. 57,126,127 shares outstanding as of March 11, 2019 . The number of shares of Class B Non-Voting Common Stock, par value $0.01 per share: 23,793,669 shares outstanding as of March 11, 2019

Documents Incorporated by Reference:

Document	**Part of the Form 10-K into which incorporated**
Portions of Tenneco Inc.'s Definitive Proxy Statement for the Annual Meeting of Stockholders to be held May 15, 2019	Part III

CAUTIONARY STATEMENT FOR PURPOSES OF THE "SAFE HARBOR" PROVISIONS OF THE PRIVATE SECURITIES LITIGATION REFORM ACT OF 1995

This report contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 concerning, among other things, our prospects and business strategies. These forward-looking statements are included in various sections of this report. The words "may," "will," "believe," "should," "could," "plan," "expect," "anticipate," "estimate," and similar expressions (and variations thereof), identify these forward-looking statements. Although we believe that the expectations reflected in these forward-looking statements are based on reasonable assumptions, these expectations may not prove to be correct. Because these forward-looking statements are also subject to risks and uncertainties, actual results may differ materially from the expectations expressed in the forward-looking statements. Important factors that could cause actual results to differ materially from the expectations reflected in the forward-looking statements include:

- general economic, business and market conditions;
- our ability to source and procure needed materials, components and other products and services in accordance with customer demand and at competitive prices;
- the cost and outcome of existing and any future claims, legal proceedings or investigations, including, but not limited to, any of the foregoing arising in connection with the ongoing global antitrust investigation, product performance, product safety or intellectual property rights;
- changes in consumer demand, prices and our ability to have our products included on top selling vehicles, including any shifts in consumer preferences away from historically higher margin products for our customers and us, to other lower margin vehicles, for which we may or may not have supply arrangements, and the cyclical nature of the global vehicle industry, including the performance of the global aftermarket sector and the impact of vehicle parts' longer product lives;
- changes in consumer demand for our OE or aftermarket products, or changes in automotive and commercial vehicle manufacturers' production rates and their actual and forecasted requirements for our products, due to difficult economic conditions and/or regulatory or legal changes affecting internal combustion engines and/or aftermarket products;
- our dependence on certain large customers, including the loss of any of our large original equipment manufacturer ("OE") customers (on whom we depend for a substantial portion of our revenues), or the loss of market shares by these customers if we are unable to achieve increased sales to other OE customers or any change in customer demand due to delays in the adoption or enforcement of worldwide emissions regulations;
- new technologies that reduce the demand for certain of our products or otherwise render them obsolete;
- our ability to introduce new products and technologies that satisfy customers' needs in a timely fashion;
- the overall highly competitive nature of the automotive and commercial vehicle parts industries, and any resultant inability to realize the sales represented by our awarded book of business (which is based on anticipated pricing and volumes over the life of the applicable program);
- changes in capital availability or costs, including increases in our cost of borrowing (i.e., interest rate increases), the amount of our debt, our ability to access capital markets at favorable rates, and the credit ratings of our debt;
- our ability to comply with the covenants contained in our debt instruments;
- our working capital requirements;
- our ability to successfully execute cash management and other cost reduction plans, and to realize the anticipated benefits from these plans;
- risks inherent in operating a multi-national company, including economic conditions, such as currency exchange and inflation rates, and political conditions in the countries where we operate or sell our products, adverse changes in trade agreements, tariffs, immigration policies, political stability, and tax and other laws, and potential disruptions of production and supply;
- increasing competition from lower cost, private-label products;
- damage to the reputation of one or more of our leading brands;
- the impact of improvements in automotive parts on aftermarket demand for some of our products;
- industrywide strikes, labor disruptions at our facilities or any labor or other economic disruptions at any of our significant customers or suppliers or any of our customers' other suppliers;
- developments relating to our intellectual property, including our ability to changes in technology;
- costs related to product warranties and other customer satisfaction actions;
- the failure or breach of our information technology systems, including the consequences of any misappropriation, exposure or corruption of sensitive information stored on such systems and the interruption to our business that such failure or breach may cause;

- the impact of consolidation among vehicle parts suppliers and customers on our ability to compete in the highly competitive automotive and commercial vehicle supplier industry;
- changes in distribution channels or competitive conditions in the markets and countries where we operate;
- the evolution towards autonomous vehicles and car and ride sharing;
- customer acceptance of new products;
- our ability to successfully integrate, and benefit from, any acquisitions that we complete;
- our ability to effectively manage our joint ventures and other third-party relationships;
- the potential impairment in the carrying value of our long-lived assets, goodwill, other intangible assets or our deferred tax assets;
- the negative impact of fuel price volatility on transportation and logistics costs, raw material costs, discretionary purchases of vehicles or aftermarket products and demand for off-highway equipment;
- increases in the costs of raw materials or components, including our ability to successfully reduce the impact of any such cost increases through materials substitutions, cost reduction initiatives, customer recovery and other methods;
- changes by the Financial Accounting Standards Board or the Securities and Exchange Commission of authoritative generally accepted accounting principles or policies;
- changes in accounting estimates and assumptions, including changes based on additional information;
- any changes by the International Organization for Standardization (ISO) or other such committees in their certification protocols for processes and products, which may have the effect of delaying or hindering our ability to bring new products to market;
- the impact of the extensive, increasing and changing laws and regulations to which we are subject, including environmental laws and regulations, which may result in our incurrence of environmental liabilities in excess of the amount reserved or increased costs or loss of revenues relating to products subject to changing regulation;
- potential volatility in our effective tax rate;
- disasters, such as fires, earthquakes and flooding, and any resultant disruptions in the supply or production of goods or services to us or by us, in demand by our customers or in the operation of our system, disaster recovery capabilities or business continuity capabilities;
- acts of war and/or terrorism, as well as actions taken or to be taken by the United States and other governments as a result of further acts or threats of terrorism, and the impact of these acts on economic, financial and social conditions in the countries where we operate;
- pension obligations and other postretirement benefits;
- our hedging activities to address commodity price fluctuations; and
- the timing and occurrence (or non-occurrence) of other transactions, events and circumstances which may be beyond our control.

In addition, important factors related to the acquisition of Federal-Mogul LLC ("Federal-Mogul") and the planned separation of our company into a powertrain technology company and an aftermarket and ride performance company that could cause actual results to differ materially from the expectations reflected in the forward-looking statements, including:

- the risk that the benefits of the acquisition of Federal-Mogul, including synergies, may not be fully realized or may take longer to realize than expected;
- the risk that the acquisition of Federal-Mogul may not advance our business strategy;
- the risk that we may experience difficulty integrating or separating employees or operations;
- the risk that the transaction may have an adverse impact on existing arrangements with us, including those related to transition, manufacturing and supply services and tax matters, our ability to retain and hire key personnel or our ability to maintain relationships with customers, suppliers or other business partners;
- the risk that the company may not complete a separation of its powertrain technology business and its aftermarket and ride performance business (or achieve some or all of the anticipated benefits of such a separation);
- the risk that the combined company and each separate company following the spin-off will underperform relative to our expectations;
- the ongoing transaction costs and risk that we may incur greater costs following the spin-off; and
- the risk that the spin-off is determined to be a taxable transaction.

The risks included here are not exhaustive. Refer to "Part I, Item 1A — Risk Factors" of this report for further discussion regarding our exposure to risks. Additionally, new risk factors emerge from time to time and it is not possible for us to predict all such risk

factors, nor to assess the impact such risk factors might have on our business or the extent to which any factor or combination of factors may cause actual results to differ materially from those contained in any forward-looking statements. Given these risks and uncertainties, investors should not place undue reliance on forward-looking statements as a prediction of actual results. Unless otherwise indicated in this report, the forward-looking statements in this report are made as of the date of this report, and, except as required by law, the Company does not undertake any obligation, and disclaims any obligation, to publicly disclose revisions or updates to any forward-looking statements.

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PART I

ITEM 1. BUSINESS.

TENNECO INC.

General

Our company, Tenneco Inc., designs, manufactures and sells innovative products and services for light vehicle, commercial truck, off-highway, industrial and aftermarket customers. We serve both original equipment manufacturers ("OEM") and replacement markets worldwide. We are one of the world's leading manufacturers of clean air, powertrain and ride performance products and systems for light vehicle, commercial truck, off-highway, industrial and aftermarket customers. As used herein, the term "Tenneco," "we," "us," "our," or the "Company" refers to Tenneco Inc. and its consolidated subsidiaries.

We were incorporated in Delaware in 1996. In 2005, we changed our name from Tenneco Automotive Inc. to Tenneco Inc. The name Tenneco better represents the expanding number of markets we serve through our commercial truck and off-highway businesses. Our Class A Voting Common Stock is traded on the New York Stock Exchange ("NYSE") under the symbol "TEN."

On October 1, 2018, we completed the acquisition of Federal-Mogul LLC ("Federal-Mogul"), a global supplier of technology and innovation in vehicle and industrial products for fuel economy, emissions reductions, and safety systems. Federal-Mogul serves the world's foremost OEM and servicers ("OES", and together with OEM, "OE") of automotive, light, medium and heavy-duty commercial vehicles, off road, agricultural, marine, rail, aerospace, power generation and industrial equipment, as well as the worldwide aftermarket. We expect to separate our businesses to form two new independent, publicly traded companies, an Aftermarket and Ride Performance company and a new Powertrain Technology company, in the second half of 2019. See Note 3 — Acquisitions and Divestitures to our consolidated financial statements in Item 8 — "Financial Statements and Supplementary Data" for additional information.

As a result of the Acquisition, the number of our reportable segments increased from three to five segments, consisting of the following: our historical Clean Air, Ride Performance and Aftermarket segments and the newly acquired Powertrain and Motorparts segments.

On January 10, 2019 , we closed on our acquisition of Öhlins Racing A.B. ("Öhlins"), a Sweden-based company. Öhlins offers suspension systems and components to automotive, and motorsport industries.

Our Internet address is *http://www.tenneco.com* . We make our proxy statements, annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports, as filed with or furnished to the Securities and Exchange Commission (SEC), available free of charge on our Internet website as soon as reasonably practicable after submission to the SEC. Securities ownership reports on Forms 3, 4 and 5 are also available free of charge on our website as soon as reasonably practicable after submission to the SEC. The contents of our website are not, however, a part of this report.

Available Information

Our Audit Committee, Compensation Committee and Nominating and Governance Committee Charters, Corporate Governance Principles, Stock Ownership Guidelines, Audit Committee policy regarding accounting complaints, Code of Ethical Conduct for Financial Managers, Code of Conduct, Policy and Procedures for Transactions with Related Persons, Equity Award Policy, Clawback Policy, Insider Trading Policy, policy for communicating with the Board of Directors, and Audit Committee policy regarding the pre-approval of audit, non-audit, tax and other services are available free of charge on our website at *www.tenneco.com*. In addition, we will make a copy of any of these documents available to any person, without charge, upon written request to Tenneco Inc., 500 North Field Drive, Lake Forest, Illinois 60045, Attn: General Counsel. We intend to satisfy the disclosure requirements under Item 5.05 of Form 8-K and applicable NYSE rules regarding amendments to, or waivers of, our Code of Ethical Conduct for Financial Managers and Code of Conduct by posting this information on our website at *www.tenneco.com*.

DESCRIPTION OF OUR BUSINESS

We design, manufacture and sell innovative products and services for light vehicle, commercial truck, off-highway, industrial and aftermarket customers, and generated revenues of $11.8 billion in 2018. We serve both original equipment (OE) manufacturers and replacement markets worldwide. Our portfolio of the industry's most well-respected enduring brands include Monroe®, Champion®, Öhlins®, MOOG®, Walker®, Fel-Pro®, Wagner®, Ferodo®, Rancho®, Thrush®, National®, and Sealed Power®, among others. We seek to leverage our OE product engineering and development capability, manufacturing know-how, and expertise in managing a broad and deep range of replacement parts to service the aftermarket. We effectively manage the life cycle of a broad range of products to a diverse customer base.

As a parts supplier, we produce individual component parts for vehicles as well as groups of components that are combined as modules or systems within vehicles. These parts, modules, and systems are sold globally to the world's leading light vehicle and commercial truck manufacturers as well as aftermarket customers, including independent warehouse distributors, distributors, engine rebuilders, retail parts stores, mass merchants, and service chains.

On October 1, 2018, we closed the acquisition of Federal-Mogul, (the "Acquisition") pursuant to the Membership Interest Purchase Agreement, dated as of April 10, 2018, by and among us, Federal-Mogul, American Entertainment Properties Corp. ("AEP") and Icahn Enterprises L.P. ("IEP"). We agreed to use our reasonable best efforts to pursue the separation of the combined company's aftermarket and ride performance business and its powertrain technology business into two new independent, publicly traded companies in a spin-off transaction that is expected to be treated as a tax-free reorganization for U.S. federal income tax purposes. We expect the spin-off to be completed in the second half of 2019.

As a result of the Acquisition, the number of our reportable segments increased from three to five segments, consisting of the following: our historical Clean Air, Ride Performance and Aftermarket segments and the newly acquired Powertrain and Motorparts segments.

Our Industry

The parts industry for vehicles and engines is generally separated into two categories, both of which we operate within:(1) "original equipment" or "OE" parts that are sold in large quantities directly for use by manufacturers of light vehicles and commercial vehicles and (2) "aftermarket" or replacement parts that are sold in varying quantities to wholesalers, retailers and installers. Light vehicles are comprised of passenger cars and light trucks, which include sport-utility vehicles (SUVs), crossover vehicles (CUVs), pick-up trucks, vans and multi-purpose passenger vehicles. Commercial vehicles include commercial trucks and off-highway equipment.

Global OE Industry

Products for the global OE industry are sold directly to OE manufacturers that use these parts, which include components, systems, subsystems, and modules, in the manufacture of new light and commercial vehicles. Demand for component parts in the OE market is generally a function of the number of new vehicles/engines produced, which is driven by macroeconomic conditions and other factors such as fuel prices, consumer confidence, employment trends, regulatory requirements, and trade agreements. Although OE demand is tied to planned vehicle production, parts suppliers also have the opportunity to grow revenues by increasing their product content per vehicle. Companies, like us, with a global presence, leading technology and innovation, and advanced product, engineering, manufacturing, and customer support capabilities are best positioned to take advantage of these opportunities.

Key Industry Trends Affecting the Global OE Industry

Global Light Vehicle Production

Global light vehicle production is expected to grow by approximately 2% annually from 2018 to 2025, reaching nearly 109 million units by 2025, according to leading forecasting company IHS Markit. In 2018, global light vehicle production declined 1% versus the previous year, including a 1% decline in North America, 1% decline in Europe and 4% decline in China, with increases of 3% in South America and 6% in India. Global light vehicle production increased 2% in 2017 and 5% in 2016.

Intelligent Suspension, Autonomous Driving and Mobility

There are a number of trends that are driving "Auto 2.0," defined as the transformation of cars into hybrid systems, electric and fully autonomous vehicles, the business model shift from individual car ownership to ride-sharing, and multi-model forms of mobility. For instance, higher levels of autonomy will drive increased passenger expectations for a comfortable ride, which, in turn, will create additional content opportunities per vehicle and heighten demand for advanced suspension products, including full-corner/around-the-wheel intelligent suspension systems.

Advanced suspension technology is expected to grow with adoption led by global OE manufacturers. Increased connectivity also presents additional prospects for active suspension systems, predictive vehicle diagnostics, and system-based integration within the vehicle as well as broader vehicle to everything ("V2X") communications. The addition of Öhlins to the portfolio is expected to accelerate the development of advanced OE intelligent suspension solutions, while also fast-tracking time to market. This acquisition is yet another example of our strategy to leverage key technologies that will better position us to take advantage of secular trends. It will also enhance our portfolio in broader mobility markets through the addition of Öhlins' range of premium OE and aftermarket automotive and motorsports performance products.

Maturing powertrain technology, including the increased adoption of hybrid and fully electric powertrains, will create further opportunities for increased ride performance and noise, vibration and harshness ("NVH") capabilities, as consumers look for smoother, quieter and more efficient rides. Our capability in both the suspension and NVH performance materials categories provide the opportunity to maximize driving comfort and ride performance for motorists worldwide.

Shared mobility describes a range of transportation options that involve the shared use of a vehicle, motorcycle, scooter, bicycle or other travel mode; it provides users with short-term access to a transportation mode on an as-needed basis. Shared mobility may reduce vehicle volumes in established markets, but it also provides an opportunity for us to develop higher-mileage, durable solutions to meet the needs of new mobility fleets. Additionally, ride comfort and durability will become increasingly important differentiators as consumers increasingly take advantage of the sharing economy.

Focus on Fuel Economy, Reduced Emissions and Alternative Energy Sources

Increased fuel economy and decreased vehicle emissions are of great importance to OE suppliers, as customers, consumers and legislators continue to demand more efficient and cleaner operating vehicles. Increasingly stringent fuel economy standards and environmental regulations are driving OE customers to focus on new technologies including downsized, higher-output and turbocharged gasoline and diesel engines, and hybrid electric and pure electric powertrains, such as fuel cell and battery powered cars. We continue to expand our investment around the world, in regions such as North America, Europe, China, India, and Japan to capitalize on the growing demand for environmentally friendly solutions for light vehicle, commercial truck and off-highway applications driven by environmental regulations in these regions.

The products that our clean air segment provides reduce the tailpipe emissions of criteria pollutants. In addition, regulations have been adopted to regulate greenhouse gas emissions of carbon dioxide. Reducing CO2 emissions requires improving fuel economy; as a result improved combustion efficiency and reduction of vehicle mass have become priorities. As a leading supplier of clean air systems with strong technical capabilities, we believe we are well positioned to benefit from the more rigorous environmental standards being adopted around the world.

The demand for smaller but more powerful engines requires more technology per engine to withstand the higher output requirements, which we estimate will result in an increase in content per engine for our powertrain business. With a global manufacturing presence, we believe we are well-positioned to meet expectations of our global customers. For the foreseeable future, it is expected that gasoline and diesel engines will remain the dominant powertrain for cars (including hybrids), heavy-duty, and industrial applications. We are equally capable of providing components for both gasoline and diesel engines.

Increasing Technologically Sophisticated Content

As end users and consumers continue to demand vehicles with improved performance, safety and functionality at competitive prices, the components and systems in these vehicles are becoming technologically more advanced and sophisticated. Mechanical functions are being replaced with electronics; and mechanical and electronic devices are being integrated into single systems. More stringent emission and other regulatory standards are increasing the complexity of the systems as well.

To remain competitive as a parts and systems supplier, we invest in engineering, research and development. We also fund and sponsor university and other independent research to advance development efforts. By investing in technology, we have been able to expand our product offerings and penetrate new markets.

Enhanced Vehicle Safety and Handling

To serve the needs of their customers and meet government mandates, OE manufacturers are seeking parts suppliers that invest in new technologies, capabilities and products that advance vehicle safety and handling, such as roll-over protection systems, intelligent suspension, and safer, more durable materials. Those suppliers, such as us, that are able to offer such innovative products and technologies have a distinct competitive advantage. We offer adjustable and adaptive damping as well as semi-active suspension systems designed to improve vehicle stability, handling and control.

We also are a global leader in the development of leading friction formulas that improve vehicle stopping distances and performance. As the commercial truck customers migrate to air disc brake systems, we remain at the forefront of providing the brake friction necessary for these new systems.

Many of our aftermarket products directly affect vehicle performance. Product quality, reliability, and consistency are paramount to our end-customers, the majority of whom are professional service technicians. Our engineering prowess and product capabilities from chassis to braking allow us to provide a complete around-the-wheel offering. Additionally, we have a number of braking products including disc pads for passenger cars, motorcycles and commercial vehicles; drum brake shoes and CV drum brake lining; and brake accessories including rotors, drums, hydraulics, hardware and brake fluid.

Sourcing by OE Manufacturers

As OE manufacturers expand their reach, many are looking for suppliers with a global footprint and the capability to supply them with full system integration and solutions, rather than individual standalone products.

Because of these trends, OE manufacturers are increasingly seeking suppliers capable of supporting vehicle platforms on a global basis. They want suppliers like us with design, production, engineering and logistics capabilities that can be accessed not just in North America and Europe but also in emerging markets such as India and China. OE manufacturers have standardized on global platforms, designing basic mechanical structures suitable for a number of similar vehicle models and are able to accommodate different features across regions. This standardization will drive growth in production of light vehicles designed on global platforms. Accordingly, global platforms, identified as platforms produced in more than one region, are expected to grow.

As OE manufacturers look to simplify and streamline design, they are also increasingly selecting suppliers like us that provide fully-engineered, integrated systems and solutions. OE manufacturers have steadily outsourced more of the design and manufacturing of vehicle parts and systems to simplify the assembly process, lower costs and reduce development times. Furthermore, they have demanded from their parts suppliers fully integrated, functional modules and systems made possible with the development of advanced electronics in addition to innovative, individual vehicle components and parts that may not readily interface together.

Global Aftermarket Industry

Products for the global aftermarket are sold directly to a wide range of distributors, retail parts stores, and mass merchants that distribute these products to professional service providers, "do-it-yourself" consumers, and in some cases, directly to service chains. Demand for aftermarket products historically has been driven by four primary factors: (i) the number of vehicles in operation ("VIO"); (ii) the average age of VIO; (iii) vehicle usage trends; and (iv) component failure and wear rates. These factors, while applicable in all regions, vary depending on the composition of VIO and other factors.

Key trends affecting the Global Aftermarket Industry

Growth in the Number of VIO in both Mature and Emerging Markets

The global number of VIO is expected to grow, with the number of VIO in emerging markets such as China expected to increase substantially. The number of VIO in mature markets, such as North America and Europe, is also expected to grow, though at a lesser pace than the emerging markets. We have strong aftermarket positions in North America, Europe and South America and a growing aftermarket position in Asia. We expect there to be aftermarket growth opportunities in emerging markets such as China and India where the VIO are expected to increase and are investing to position ourselves as a leading aftermarket supplier in these regions. We are leveraging our market-leading capabilities from mature markets and investing to develop the right distributor base, drive brand recognition, increase product coverage, build the supply chain and promote our experience as an OE-quality supplier.

Increase in the Average Age of Vehicles in Operation

The average age of VIO in North America and Europe has increased significantly this century, and is expected to increase further. Increases in the average age of VIO will drive the need for maintenance and repair work, thereby increasing the overall demand for aftermarket replacement parts in North America and Europe. The average age of VIO in China is expected to increase, which we believe will lead to continuing significant growth in the China aftermarket.

Extended Product Life of Automotive Parts

The average useful life of automotive parts, both OE and replacement, has steadily increased in recent years due to technological innovations including longer-lasting materials. As a result, there are more vehicles on the road than ever before. Aftermarket suppliers are focused on reducing costs and providing product differentiation through advanced technology and recognized brand names. With our long history of technological innovation, iconic brands and operational efficiency, we believe we are well-positioned to leverage our products and technology.

Managing Complexity

We operate in a highly fragmented and dynamic industry and are among the few large aftermarket-focused suppliers globally. The increasing global vehicle population, brand and vehicle complexity, and need for rapid new part introduction, as well as new distribution channels (including online) continue to drive significant SKU proliferation and business complexity. Our recent investments in our supply chain and information technology capabilities are designed to manage this complexity, which we believe will be an important competitive differentiator.

Channel Consolidation

In the more mature markets of North America and Europe, there has been increasing consolidation in the aftermarket distribution channel with larger aftermarket distributors and retailers gaining market share. These distributors generally require larger, more capable suppliers that have the ability to provide world-class product expertise, category management capabilities, brand management and supply chain support, as well as a competitive manufacturing and sourcing network. We have undertaken many initiatives to support the value of our branded products to end-market consumers and diversify our revenue base.

Growth of Online Capabilities

Reaching consumers directly through online capabilities, including e-commerce, is expected to have an increasing effect on the global aftermarket industry and how aftermarket products are marketed and sold. The establishment of a robust online presence will be critical for suppliers regardless of whether they intend to participate directly in e-commerce. We invested heavily in online initiatives to improve our capabilities and connectivity to our end-customers, including a new online order management system, customer relationship management tools, global brand websites, and data analytics capabilities. We will continue to invest in these competencies. Additionally, consumers increasingly are utilizing online research prior to making buying or repair decisions. We will continue to expand our online presence in order to connect with our customers and more effectively communicate the value of our premium aftermarket brands.

Increase in Lower Cost, Private Label Brands

In many of our markets, there has been an increase in private label or store brands sold by retailers and distributors at a lower price point than premium brands of the same products. However, in many cases, retailers or wholesale distributors creating private label brands still rely on established suppliers, like us, to design and manufacture their private label products and, in some cases, utilize co-branding to support their private label offerings.

We have some of the strongest and most recognized brands in the automotive aftermarket. In addition, we expect to continue to invest in product innovation, marketing and brand support that differentiate our premium branded products for their quality while also supporting lower priced, mid- grade offerings. Additionally, we expect to continue to drive productivity and cost reduction efforts and enhance our already strong global sourcing capabilities to remain competitive in each product tier.

Resilience during Economic Downturn

Aftermarket products are largely stable, non-discretionary and less susceptible to cyclicality as customers often have no choice but to replace automotive parts that are worn. During the 2008 economic downturn, the number of consumers with the ability to purchase new vehicles declined and led to increased demand for aftermarket parts in order to keep older vehicles road-worthy. The resilience of the automotive aftermarket industry is exhibited by the fact that the U.S. light vehicle aftermarket has grown every year for the last 20 years, except for 2009 when industry sales declined by approximately 1.4% according to Automotive Aftermarket Suppliers Association (AASA).

Customers

We strive to develop long-standing business relationships with our customers around the world. We work collaboratively with our OE customers in all stages of production, including design, development, component sourcing, quality assurance, manufacturing and delivery. For both OE and aftermarket customers, we provide timely delivery of quality products at competitive prices and deliver customer service. With our diverse product mix and numerous facilities in major markets worldwide, we believe we are well positioned to meet customer needs.

Our OE customers consist of automotive and commercial manufacturers as well as agricultural, off-highway, marine, railroad, aerospace, high performance, and power generation and industrial application manufacturers. We have well-established relationships with substantially all major American, European, and Asian automotive OE manufacturers.

The following customers accounted for 10% or more of our net sales in any of the last three years.

Customer	2018	2017	2016
General Motors Company	12%	14%	17%
Ford Motor Company	12%	13%	13%

Our aftermarket customers include independent warehouse distributors that redistribute products to local parts suppliers, distributors, engine rebuilders, retail parts stores, mass merchants and service chains. The breadth of our product lines, the strength of our leading marketing expertise, a sizable sales force, and supply chain and logistics capabilities are central to our success in the aftermarket. We have a large and diverse aftermarket customer base.

Competition

We operate in highly competitive markets. Customer loyalty is a key element of competition in these markets and is developed through long-standing relationships, customer service, high quality value-added products and timely delivery. Product pricing and services provided are other important competitive factors.

As a supplier of OE and aftermarket parts, we compete with the vehicle manufacturers, some of which are also customers of ours, and numerous independent suppliers. We believe we are meeting these competitive challenges by developing leading technologies, efficiently integrating and expanding our manufacturing and distribution operations, widening our product coverage within our core businesses, restructuring our operations and transferring production to best cost countries, and utilizing our worldwide technical centers to develop and provide value-added solutions to our customers.

Seasonality

Our businesses are somewhat seasonal. OE production is historically higher in the first half of the year compared to the second half. It typically decreases in the third quarter due to OE plant shutdowns for model changeovers and European holidays, and softens further in the fourth quarter due to reduced production during the end-of-year holiday season in North America and Europe. Shut-down periods in the rest of the world generally vary by country. Our aftermarket operations experience relatively higher demand during the spring as vehicle owners prepare for the summer driving season. While seasonality does impact our business, actual results may vary from the above trends due to global and local economic dynamics as well as industry-specific platform launches and other production-related events. Aftermarket sales tend not to be as adversely affected during periods of economic downturn, as consumers forgo new vehicle purchases and keep their vehicles longer, thereby increasing demand for repair and maintenance services.

The aftermarket is affected by changes in economic conditions, volatility in fuel prices, and expanding focus on environmental and energy conservation.

Order Fulfillment

For OE customers, we generally receive long-term production contracts for specific products supplied for particular vehicles. These supply relationships typically extend over the life of the related vehicle, subject to interim design and technical specification revisions, and do not require the customer to purchase a minimum quantity. In addition to customary commercial terms and conditions, long-term production contracts generally provide for annual price reductions based upon expected productivity improvements and other factors. Customers typically retain the right to terminate long-term production contracts, but we generally cannot terminate long-term production contracts. OE order fulfillment is typically manufactured in response to customer purchase order releases, and we ship directly from a manufacturing location to the customer for use in vehicle production and assembly. Accordingly, our manufacturing locations turn finished goods inventory relatively quickly, producing from on-hand raw materials and work-in-process inventory within relatively short manufacturing cycles. Significant risks to us include a change in vehicle or engine production, lower than expected vehicle or engine production by one or more of our OE customers, or termination of the business based upon perceived or actual shortfalls in delivery, quality or value.

For our global aftermarket customers, we generally establish product line arrangements that encompass substantially all parts offered within a particular product line. In some cases, we will enter into agreements with terms ranging from one to three years that cover one or more product lines with fixed prices. Pricing is market responsive and subject to adjustment based upon competitive pressures, material costs, and other commercial factors. Global aftermarket order fulfillment is largely performed from finished goods inventory stocked in our worldwide distribution network. Inventory stocking levels in our distribution centers are established based upon historical and anticipated future customer demand.

Although customer programs typically extend to future periods, and although there is an expectation we will supply certain levels of OE production over such periods, we believe outstanding purchase orders and product line arrangements do not constitute firm

orders. Firm orders are limited to specific and authorized customer purchase order releases placed with our manufacturing and distribution centers for actual production and order fulfillment. Firm orders are typically fulfilled as promptly as possible from the conversion of available raw materials and work-in-process inventory for OE orders, and from current on-hand finished goods inventory for aftermarket orders.

Clean Air Segment

We operate 64 clean air manufacturing facilities worldwide, of which 17 facilities are located in North and South America, 20 in Europe and 27 in Asia Pacific. We operate 16 of the manufacturing facilities in Asia Pacific through joint ventures in which we hold a controlling interest. We operate five clean air engineering and technical facilities worldwide and share three other such facilities with our ride performance operations. Of the five clean air engineering and technical facilities, one is located in North America, two in Europe, and two in Asia Pacific. In addition, one joint venture in which we hold a noncontrolling interest operates one manufacturing facility in Europe.

Through the recent acquisition of Federal-Mogul Powertrain, combined with our Clean Air emissions expertise, we are focused on delivering an optimized trade-off between fuel economy and emission control from the cylinder to the tailpipe. Specifically, Clean Air products and systems are designed to help global OE manufacturers in light vehicle, commercial truck and off-highway markets to meet global emissions regulations anywhere in the world. With significant investment in core sciences and technical capabilities, including combustion and thermal management, materials science and thermoelectrical energy, we are able to provide advance emissions solutions that solve unique technical challenges.

Our technologies are broken into four key product areas:

- Emissions Control Products — includes Dosing Systems, Advanced Mixers, Selective Catalytic Reduction, Gasoline and Diesel Particulate Filters and Catalytic Converters;
- Lightweighting and Thermal Management — includes Rankine Cycle Power Pack, Thermo-electric Generators, Thermoacoustic Converters, Heat Exchangers, Lightweight Aftertreatment Systems and Fabricated Manifolds;
- Acoustic Products — includes Muffler and Resonator Tuning Devices. Active Noise Cancellation, Signature Sound, Smart Sound a Electronic and Passive Valves; and
- Noise, Vibration and Harshness — includes Exhaust System Isolators, Lightweight Hanger Solutions and Modular Exhaust Dampers.

Our engineering capabilities include advanced predictive design tools, advanced prototyping processes and state-of-the-art testing equipment. These technological capabilities make us a "full system" integrator and supplier to the OE manufacturers, supplying optimized emission control systems from the manifold to the tailpipe, while delivering emission regulatory compliance and acoustic noise control. Our technology includes the use of urea injectors, electronic controls and software for use in selective catalytic reduction (SCR) and other exhaust after-treatment systems. We also offer a complete suite of alternative full system NOx aftertreatment technologies, including the Hydrocarbon Lean NOx Catalyst (HC-LNC) technology.

Vehicle emission control products and systems play a critical role in safely conveying noxious exhaust gases away from the passenger compartment and reducing the level of pollutants and engine exhaust noise emitted to acceptable levels. Precise engineering of the exhaust system - which extends from the manifold that connects an engine's exhaust ports to an exhaust pipe, to the catalytic converter that eliminates pollutants from the exhaust, and to the muffler that modulates noise emissions - leads to a pleasantly tuned engine sound, reduced pollutants and optimized engine performance.

We design, manufacture and distribute a variety of clean air products and systems. The following table sets forth a description of the largest product lines sold by our Clean Air segment:

Product	Description
Catalytic converters and diesel oxidation catalysts	Devices consisting of a substrate coated with precious metals enclosed in a steel casing used to reduce harmful gaseous emissions such as carbon monoxide.
Diesel particulate filters (DPFs)	Devices to capture and regenerate particulate matter emitted from diesel engines.
Burner systems	Devices which actively combust fuel and air inside the exhaust system to create extra heat for DPF regeneration, or to improve the efficiency of SCR systems.
Lean NOx traps	Devices which reduce nitrogen oxide (NOx) emissions from diesel powertrains using capture and store technology.
Hydrocarbon vaporizers and injectors	Devices to add fuel to a diesel exhaust system in order to regenerate particulate filters or Lean NOx traps.
SCR systems	Devices which reduce NOx emissions from diesel powertrains using urea mixers and injected reductants such as Verband der Automobil industrie e.V.'s AdBlue® or Diesel Exhaust Fluid (DEF).
SCR-coated diesel particulate filters (SDPF) systems	Lightweight and compact devices combining the SCR catalyst and the particulate filter onto the same substrate for reducing NOx and particulate matter emissions.
Urea dosing systems	Systems comprised of a urea injector, pump, and control unit, among other parts, that dose liquid urea onto SCR catalysts.
Four-way catalysts	Devices that combine a three-way catalyst and a particulate filter onto a single device by having the catalyst coating of a converter directly applied onto a particulate filter.
Alternative NOx reduction technologies	Devices which reduce NOx emissions from diesel powertrains, by using, for example, alternative reductants such as diesel fuel, E85 (85% ethanol, 15% gasoline), or solid forms of ammonia.
Mufflers and resonators	Devices to provide noise elimination and acoustic tuning.
Fabricated exhaust manifolds	Components that collect gases from individual cylinders of a vehicle's engine and direct them into a single exhaust pipe. Fabricated manifolds can form the core of an emissions module that includes an integrated catalytic converter (maniverter) and/or turbocharger.
Pipes	Utilized to connect various parts of both the hot and cold ends of an exhaust system.
Hydroformed assemblies	Forms in various geometric shapes, such as Y-pipes or T-pipes, which provide optimization in both design and installation as compared to conventional pipes.
Elastomeric hangers and isolators	Used for system installation and elimination of noise and vibration, and for the improvement of useful life.
Aftertreatment control units	Computerized electronic devices that utilize embedded software to regulate the performance of active aftertreatment systems, including the control of sensors, injectors, vaporizers, pumps, heaters, valves, actuators, wiring harnesses, relays and other mechatronic components.

For the catalytic converters, SCR systems and other substrate-based devices we sell, we need to procure substrates coated with precious metals or in the case of catalytic converter systems only, purchase the complete systems. We obtain these components and systems from third parties, often at the OE manufacturer's direction, or directly from OE vehicle and engine manufacturers. See Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" for more information on our sales of these products.

Powertrain Segment

We operate 85 manufacturing sites in 19 countries, serving a large number of major automotive, heavy-duty, marine and industrial customer worldwide. Powertrain has also invested globally in nonconsolidated affiliates that have multiple manufacturing sites, mainly in Turkey and China.

Powertrain offers its customers a diverse array of market-leading products for OE applications, including pistons, piston rings, piston pins, cylinder liners, valvetrain products, valve seats and guides, ignition products, dynamic seals, bonded piston seals, combustion and exhaust gaskets, static gaskets and seals, rigid heat shields, engine bearings, industrial bearings, bushings and washers, systems protection sleeves, acoustic shielding and flexible heat shields.

We design, manufacture and distribute a variety of powertrain products and systems. The following table sets forth a description of the largest product lines sold by our Powertrain segment:

Product	Description
Pistons	Pistons convert the energy created by the combustion event into mechanical energy to drive a car; Pistons can be made from aluminum or steel, both casted and forged; Highly efficient engines impose high demands on pistons in terms of rigidity and temperature resistance.
Piston rings	Piston rings are mounted on the piston to seal the combustion chamber while the piston is moving up and down; Modern rings need to resist high temperature and very abrasive environments without significant wear; Rings are critical for low oil consumptions.
Cylinder liners	Cylinder liners, or sleeves, are specially engineered where surfaces formed within the engine block, working in tandem with the piston and ring, as the chamber in which the thermal energy of the combustion process is converted into mechanical energy.
Valve seats and guides	Valve seats and guides are produced from powdered metal based on sophisticated metal-ceramic structures to meet extreme requirements for hardness.
Bearings	Bearings provide the low-friction environment for rotating components like crankshafts and camshafts; Modern bearings are able to deal with very low viscosity oil even in highly repetitive motions like in stop/start-conditions.
Spark plugs	Modern spark plugs for engines fueled by gasoline or natural gas have to ignite fuel even at very high combustion pressure and with very clean fuel-air mixture - combined with extended life expectation well over 100,000 miles for turbo-charged engines.
Valvetrain products	Valvetrain products include mainly engine valves but also retainers, rotators, cotters, and tappets for use in both diesel and gas engines; the most demanding applications require sodium-filled hollow valves for fast heat dissipation.
System protection	System protection products include protection sleeves for wire harness and for oil and water tubes as well as acoustic and EMI/RFI shielding, heat and abrasion protection, and safety/ crash protection for cables and tubes for engines and cars.
Seals and gaskets	Cylinder-head gaskets and other hot and cold gaskets are sealing engines and engine components; dynamic and static seals protecting rotating engine and transmission components against oil and gas leakages. Such seals and gaskets are made from high-alloyed steel as well as from sophisticated rubber and polymers.

Ride Performance Segment

We operate 25 ride performance manufacturing facilities worldwide, of which 10 facilities are located in North and South America, seven in Europe and South Africa, and eight in Asia Pacific. We operate two of the facilities through joint ventures in which we hold a controlling interest, one in Europe and another one in Asia. We operate seven engineering and technical facilities worldwide and share three other such facilities with our clean air operations. Of the seven ride performance engineering and technical facilities, two are located in North America, three in Europe and South America, and two in Asia Pacific.

Within each of our ride performance manufacturing facilities, operations are organized by product (e.g., shocks, struts and vibration control products) and include computer numerically controlled and conventional machine centers; tube milling and drawn-over-mandrel manufacturing equipment; metal inert gas and resistance welding; powdered metal pressing and sintering; chrome plating; stamping; and assembly/test capabilities. Our manufacturing systems incorporate cell-based designs, allowing work-in-process to move through the operation with greater speed and flexibility.

In designing our shock absorbers and struts, we use advanced engineering and test capabilities to provide product reliability, endurance and performance. Our engineering capabilities feature advanced computer-aided design equipment and testing facilities. Our dedication to innovative solutions has led to such technological advances as:

- Adaptive damping systems — adapt to the vehicle's motion to better control undesirable vehicle motions;
- Electronically adjustable suspensions — change suspension performance based on a variety of inputs such as steering, braking, vehicle height, and velocity; and
- Air leveling systems — manually or automatically adjust the height of the vehicle.

Superior ride control is governed by a vehicle's suspension system, including shock absorbers and struts. Shock absorbers and struts maintain the vertical loads placed on vehicle tires, helping keep the tires in contact with the road. Vehicle steering, braking, acceleration and safety depend on maintaining contact between the tires and the road. Worn shocks and struts can allow excessive transfer of the vehicle's weight - from side to side, known as "roll;" from front to rear, called "pitch;" or up and down, "bounce." Because shock absorbers and struts are designed to control the vertical loads placed on tires, they provide resistance to excessive roll, pitch and bounce.

We design, manufacture and distribute a variety of ride performance products and systems. The following table sets forth a description of the largest product lines sold by our Ride Performance segment:

Product	Description
Shock absorbers and struts	A broad range of mechanical shock absorbers and related components for light- and heavy-duty vehicles, including twin-tube and monotube shock absorbers and a complete line of struts and strut assemblies for light vehicles. Shock absorbers and struts maintain the vertical loads placed on vehicle tires, helping keep tires in contact with the road.
Monroe® intelligent suspension portfolio	An extensive product portfolio of advanced electronically controlled ride performance technology, which improve ride quality and vehicle handling: Kinetic ® suspension technology - A suite of roll-control and nearly equal wheel-loading systems ranging from simple mechanical systems to complex hydraulic systems featuring proprietary and patented technology. We have won the PACE Award for our Kinetic ® suspension technology; Dual-mode suspension - An adaptive suspension solution used for small- and medium-sized vehicles that provides drivers a choice of two suspension modes such as comfort and sport; DRiV— A digital electronic adaptive suspension system that adapts to road surfaces and vehicle control data through sensors, valves and intelligence located within the damper. CVSAe Continuously Variable 1 valve semi active suspension systems — Shock absorbers and suspension systems that electronically adjust a vehicle's performance based on certain inputs such as steering, braking and other chassis control data CVSA2/Kinetic — Continuously Variable 2 valve semi active damping systems with hydraulic roll control (Kinetic H2) or hydraulic roll and pitch control (Kinetic X2).
NVH performance materials	Highly-engineered elastomer performance materials designed to reduce noise, vibration and harshness. Generally, rubber-to-metal bushings and mountings to reduce vibration between metal parts of a vehicle. Offerings include a broad range of suspension arms, rods and links for light- and heavy-duty vehicles.

On January 10, 2019 , we closed on our acquisition of Öhlins Racing A.B. ("Öhlins"), a Sweden-based company. Öhlins offers suspension systems and components to automotive and motorsport industries.

Aftermarket Segment

We operate five Aftermarket production facilities worldwide, two in North America, one in Europe, and two in Asia Pacific. We share engineering testing facilities with our clean air and ride performance operations. In addition, we operate 22 distribution centers worldwide, four in North America, one in South America, 14 in Europe, and three in Asia Pacific. Eight of these are third party logistics providers.

The following table sets forth a description of the largest product categories sold by our Aftermarket segment:

Product	Description	Select Brands
Ride control	Ride Control parts include a broad range of mechanical shock absorbers and related components as well as struts and strut assemblies. Shock absorbers and struts maintain the vertical loads placed on vehicle tires, helping keep the tires in contact with the road.	Monroe®, Monroe® Reflex® Monroe® Adventure ™ , Rancho®, Quick-Strut®, Gas-Matic®, Sensa-Trac®, Quick-Strut® and Gas-Magnum®
NVH performance materials	Highly-engineered elastomer performance materials designed to reduce noise, vibration and harshness. Generally, rubber-to-metal bushings and mountings to reduce vibration between metal parts of a vehicle. Offerings include a broad range of suspension arms, rods and links for light- and heavy-duty vehicles.	Clevite® Elastomers and Axios ™
Emission control	Mufflers provide noise elimination and acoustic tuning. Pipes that connect various parts of the hot and cold exhaust system and catalytic converters. In addition, specialty exhaust products for heavy-duty and high performance vehicle applications.	Walker® , Walker® Perfection, Quiet-Flow®, Tru-Fit®, Thush®, Fonos ™ Mega-Flow® and DynoMax®

Motorparts Segment

We operate 31 manufacturing sites in 14 countries, 36 distribution centers and warehouses in 10 countries, 11 engineering and technical centers in 6 countries, and 11 technical service centers in two countries.

We engineer, manufacture, source, and distribute a broad portfolio of products in the global vehicle aftermarket while also servicing the OE/OES markets with products including braking, wipers, and a limited range of chassis components. Motorparts' products are designed to enhance safety, durability, and vehicle performance, while providing ease of installation. Motorparts' products are utilized in vehicle braking systems and also include a wide variety of chassis, engine, sealing, wiper, filter, lighting, and other general maintenance applications. Motorparts uses market analytics, supply chain expertise, brand and product line management, innovative technology, manufacturing, sourcing, and distribution capabilities to satisfy its customers' requirements. On March 1, 2019, we completed the sale of substantially all of the global OE and aftermarket wipers business.

The following table sets forth a description of the largest product categories sold by our Motorparts segment:

Product	Description	Select Brands
Chassis	Chassis parts include ball joints, tie rod ends, sway bar links, hub assemblies, anti-friction bearings and universal joints, strut assemblies, idler arms, pitman arms, and control arms. These components affect vehicle steering and vehicle ride quality.	MOOG®, QuickSteer® and National®
Braking	Braking products include disc pads for passenger cars, motorcycles and commercial vehicles; drum brake shoes and CV drum brake lining; and brake accessories including rotors, drums, hydraulics, hardware and brake fluid. These products provide stopping ability, a safety feature on all vehicles.	Wagner®, Ferodo®, Jurid®, Beck Arnley® and Abex®
Sealing and Engine	Gaskets and seals create a barrier between two surfaces to contain fluids, pressure, and gases while keeping out dust and other contaminants. There are numerous areas of application including engine covers, oil pans, intake manifolds, shaft seals, transmission covers, and differential covers.	Fel-Pro®, Payen®, Goetze® and National®
Maintenance and Other	*Filtration* - Filtration parts include oil, air, cabin, fuel, and other filters for both light and commercial vehicles. These components prevent harmful contaminants contained in liquids and gases from passing through vehicle components and potentially leading to premature wear or failure. *Lighting* - Lighting products include forward lighting capsules, miniature light bulbs, LED lighting and sealed beams for virtually every application on cars, trucks, commercial vehicles and other off-road vehicles. Lighting improves driver visibility and safety. *Ignition* - Ignition products include spark plugs, glow plugs, ignition coils, wires, harnesses, and accessories for automotive, commercial, lawn and garden, marine, and industrial applications.	Interfil®, Champion® and Beru®

Sales, Marketing and Distribution

We have separate and distinct sales and marketing efforts for our OE and aftermarket customers.

For OE sales, our sales and marketing team is an integrated group of sales professionals, including skilled engineers and program managers, who are organized globally by customer business unit and product type (e.g., Ride Performance, Clean Air, and Powertrain). Our sales and marketing teams are focused on meeting and exceeding our customer's needs by delivering engineered products and services on time; maximizing profit for our investors while financing continued growth and product development; and developing a common system approach to create a superior customer experience. Our teams provide the appropriate mix of operational and technical expertise needed to interface successfully with the OE manufacturers. Our business capture process involves targeting select programs and working closely with the OE manufacturer platform engineering and purchasing teams. Bidding on OE automotive platforms typically encompasses many months of engineering and business development activity. Throughout the process, our sales team, program managers and product engineers assist the OE customer in defining the project's technical and business requirements. A normal part of the process includes our engineering and sales personnel working on customers' integrated product teams, creating a statement of requirements, and assisting our customers with full system or component design and development concepts that deliver expectations and create value for OE manufacturer customers. Given that the Clean Air, Ride Performance and Powertrain operations typically involve long-term production contracts awarded on a platform-by-platform basis, our strategy is to leverage our engineering expertise and strong customer relationships to target and win new business and increase operating margins.

For aftermarket sales and marketing, our sales force is generally organized by region and customer and covers multiple product lines. We sell aftermarket products through five primary channels of distribution: (1) traditional three-step distribution system of full-line warehouse distributors, jobbers and service providers; (2) two-step distribution system of warehouse distributors that distribute directly to the service providers; (3) direct sales to retailers; (4) direct sales to service provider chains and (5) direct sales through online channels. Our aftermarket sales and marketing representatives cover all levels of the distribution channel, stimulating interest in our products and helping our products move through the distribution system. Also, to generate demand for our products, we run print, online and outdoor advertisements and training conducted by our field sales force along with E-training courses. In addition, we maintain detailed web sites for certain of our brands.

Business Strategy

We are a leading diversified, global supplier of innovative products and services to light vehicle, commercial truck, off-highway, industrial and aftermarket customers. Our strategy focuses on addressing the evolving needs of our OE and aftermarket customers around the world to drive growth.

The key components of our business strategy are described below:

Continue to optimize our operations by aggressively pursuing cost competitiveness in all business segments and continuing to drive productivity in existing operations

As we continue to expand our distribution and service capabilities globally, we seek to continue optimizing our performance through enhanced efficiencies in order to meet the world-class delivery performance our customers increasingly require. We have made investments in our global distribution network, through our new multi-product distribution centers, and through the implementation of automated picking technology and a more efficient replenishment system with the objective of improving inventory visibility and availability and lowering costs.

We will continue to focus on operational excellence by optimizing our manufacturing footprint, further developing our engineering capabilities, managing the complexities of our global supply chain to realize purchasing economies of scale while satisfying diverse and global requirements, and supporting our businesses with robust information technology systems. We will make investments in our operations and infrastructure as required to achieve our strategic goals.

From a design perspective, we will bring a lean mindset to our portfolio to ensure standardization, remove redundancies, reduce transit costs, leverage economies of scale, and optimize manufacturing productivity. We will also continually look for ways to innovate and leverage cross- and up-sell opportunities to the market through a customer-centric product development process. From a manufacturing perspective, we will maintain a continuous improvement philosophy by streamlining plant operations and our network, and executing projects to improve efficiency.

Serving our customers also requires that we compete effectively at the unit cost level, in particular with OE customers. We are making concerted and systematic efforts to continuously improve our position on the cost curve for each of our component part categories. In doing so, we will continue to be a preferred supplier to our customers.

We will be mindful of the changing market conditions that might necessitate adjustments to our resources and manufacturing capacity around the world. We will also remain committed to protecting the environment as well as the health and safety of our employees.

Further execute on attaining synergies from the acquisition of Federal-Mogul

We completed the acquisition of Federal-Mogul on October 1, 2018. While we have undertaken significant integration subsequent to closing the Federal-Mogul acquisition, we continue to seek to optimize the combined operations. This optimization should present additional opportunities for cost reduction, increased profitability and cash flow.

Assess focused acquisition and investment opportunities that provide product line expansion, technological advancements, geographic positioning, penetration of emerging markets and market share growth

Throughout our history, we have successfully identified and capitalized on acquisitions, alliances and divestitures to achieve strategic growth and alignment. Through these transactions, we have (1) expanded our product portfolio with complementary technologies; (2) realized incremental business from existing customers; (3) gained access to new customers; (4) achieved leadership positions in geographic regions outside North America; and (5) re-focused on areas that will contribute to our profitable growth.

We intend to continue to explore strategic alliances, joint ventures, acquisitions and other transactions that complement, expand or enhance our existing products, technology, systems development efforts, customer base and/or global presence. We will align with companies that have proven products, proprietary technology, advanced research capabilities, broad geographic reach, and/or strong market positions to further strengthen our product leadership, technology position, global reach and customer relationships.

Adapt cost structure to economic realities

We aggressively respond to difficult economic environments, aligning our operations to any resulting reductions in production levels and replacement demand and executing comprehensive restructuring and cost-reduction initiatives. Suppliers must continually identify and implement product innovation and cost reduction activities to fund customer annual price concession expectations in order to retain current business as well as to be competitively positioned for future new business opportunities.

Original Equipment Specific Strategies

The converging forces of connectivity, autonomy, electrification and shared mobility are spawning a new age of automotive autonomy and a unique opportunity to position our business for significant growth and profitability. We strive to strengthen our global position by designing, manufacturing, delivering and marketing technologically innovative products and systems for OE manufacturers.

The key components of our OE strategy are described below:

Maintain technological leadership to drive further growth from secular market trends

In order to maintain our strong market positions, we are focused on meeting changing performance requirements and keeping up with new OE trends such as mobility, electrification and autonomous driving. Aligning product lines and technical capabilities creates an ideal foundation to meet changing performance requirements for comfort and safety and again ultimately reinventing the ride of the future. In addition, our suite of solutions represents an opportunity to drive greater partnership with OE manufacturers, capturing growth with higher value content per vehicle.

OE manufacturers are responding to changing end customer trends and preferences alongside their own challenging cost structures by reducing design and production complexities and investing in advanced technologies that enable vehicle electrification and autonomy. We anticipate that OE suppliers with high technology capabilities in vehicle system integration will be able to enable a more seamless transition to next-generation electric vehicles and become preferred suppliers to OE manufacturers.

Penetrate adjacent market segments

We seek to penetrate a variety of adjacent sales opportunities and achieve growth in higher-margin businesses by applying our design, engineering and manufacturing capabilities. For example, we aggressively leverage our technology and engineering leadership in powertrain, clean air, ride performance and aftermarket into adjacent sales opportunities for heavy-duty trucks, buses, agricultural equipment, construction machinery and other vehicles in other regions around the world.

We design and launch clean air products for commercial vehicle customers such as Caterpillar, for whom we are their global diesel clean air system integrator, John Deere, Navistar, Deutz, Daimler Trucks, Scania, Weichai Power, FAW Group and Kubota. We also engineer and build modular NOx-reduction systems for large engines that meet standards of the International Maritime Organization, among others.

Our revenues generated by commercial truck, off-highway and industrial customers were 16% of our total revenues in 2018 and 12% in 2017.

Aftermarket Specific Strategies

We expect the demand for replacement parts to increase steadily as a result of the anticipated significant increase in VIO through 2040, the increase in the average age of VIO and the increase in the average miles driven per year. The characteristics of aftermarket sales and distribution are defined regionally, which require regionally focused strategies to address the key success factors of our customers.

The key components of our aftermarket strategy are described below:

Leverage the strength of our global aftermarket leading brands positions, product portfolio and range, marketing and selling expertise, and distribution and logistics capabilities

Our aftermarket business houses multiple leading brands with strong product offerings. We will build upon our brand strengths and grow our global aftermarket business by leveraging our broad product coverage and extensive distribution network. We intend to capitalize on aftermarket trends and expand in established markets (North America, Europe, Australia) as well as high-growth regions (China, South America, India, Southeast and Northeast Asia). Important focus areas are enhancing our presence in high-growth markets; leveraging our portfolio and strong presence in suspension to expand our business globally; and diversifying outside of chassis with our sealing, electronic and underhood products, as well as other components.

Continue to strengthen our aftermarket capabilities and product offerings in mature markets, including North America and Europe

The scale of our aftermarket business allows for strong distribution channels that significantly enhance our go-to-market capabilities across mature markets in North America and Europe. We continually rationalize our already strong distribution networks with the goal of improved customer service at a lower cost. This is achieved by constantly sharing information across channels on best practices in go-to-market, manufacturing and distribution capabilities.

The North America and Europe go-to-market capabilities will be defined by positioning our distribution and installer partners for success. We believe this will require maintaining a vast catalog of products to provide the ability to address customer requirements quickly and easily. Managing vast and complex catalog of products requires an understanding of the composition of the car parc within the regions including wear patterns, typical replacement rates based on weather, road quality, and average miles driven annually. These compositions differ significantly by region, which will impact the range and frequency of replacement part requirements. The understanding of these regional dynamics will help us provide the right parts when they are needed and achieve the industry's best "Order to Delivery" times. We will continue to innovate product solutions that will be cost competitive, reliable, reduce install time, reduce the number of unique parts that installers need to inventory on-site, reduce the number of unique installer tools and equipment required, and improve installer safety.

In addition to having a comprehensive product catalog, we also strive to maintain very close relationships with our customers and help position them for success. We have launched a series of 'Tech First' initiatives to provide online, on demand, and onsite technical training and support to vehicle repair technicians who use and install our products in North America, Europe and China and plan to expand into South America. This initiative included Garage Gurus™, a network of technical support centers that provide some of the most comprehensive training programs in the industry that educate our partners and customers with emerging vehicle technologies and vehicle repair operational skills. We believe it is key to our strategy to provide aftermarket parts that are simple to install and to make sure our customers have the resources to know how to install these parts properly. In having the right products and resources for our customers, we believe we will continue to be a preferred aftermarket supplier and continue to drive growth in the Americas and emerging economic areas.

Increase aftermarket position in high-growth regions, notably in Asia Pacific

The Asia Pacific region, particularly the high-growth markets of China and India, presents a significant opportunity for us to expand our business. We have made investments in distribution and in our sales force in both China and the rest of Asia to help drive growth in this increasingly important region. We must take into account the different operational requirements in Asia Pacific in order to drive aftermarket growth in this region.

The Asia Pacific light vehicle and commercial vehicle aftermarket industry is fragmented with a large number of small distributors and installers that require different strategies and solutions than more mature consolidated markets. Distribution in smaller volumes will require us to have a hub and spoke warehousing approach to compete on the basis of optimal "Order to Delivery" timeliness while maintaining a broad range of products.

Additionally, buying online is the preferred purchase method for many smaller distribution and installer partners. The sophistication of the existing online marketplaces in Asia Pacific will require us to develop adaptive and flexible omnichannel tools in order to compete effectively. We believe that developing a competitive online platform for our Asia Pacific customers will be the foundation for us to build a digital platform that will improve our competitiveness globally.

Environmental Matters

For additional information regarding environmental matters, see Item 3, "Legal Proceedings," Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations — Environmental Matters" and Note 15 — Commitments and Contingencies of the consolidated financial statements included in Item 8, "Financial Statements and Supplementary Data."

Employees

As of December 31, 2018 , we had approximately 81,000 employees of whom approximately 48% were covered by collective bargaining agreements. With the exception of two facilities in the U.S., most of our unionized manufacturing facilities have their own contracts with their own expiration dates and, as a result, no contract expiration date affects more than one facility.

Other

We purchase various raw materials and component parts for use in our manufacturing processes, including ferrous and non-ferrous metals, non-metallic raw materials, stampings, castings and forgings. We also purchase parts manufactured by other manufacturers for sale in the aftermarket. The principal raw material that we use is steel. We obtain steel from a number of sources pursuant to various contractual and other arrangements. We believe that an adequate supply of steel can presently be obtained from a number of different domestic and foreign suppliers. We address price increases by evaluating alternative materials and processes, reviewing material substitution opportunities, increasing component sourcing and parts assembly in best

cost countries, strategically pursuing regional and global purchasing strategies for specific commodities, and aggressively negotiating with our customers to allow us to recover these higher costs from them.

We hold a number of domestic and foreign patents and trademarks relating to our products and businesses. Through our acquisition of Federal-Mogul, we acquired in excess of 6,900 patents and more than 6,700 active trademark registrations and applications worldwide. We manufacture and distribute our aftermarket products under a number of brand names that are well-recognized in the marketplace and some of are registered trademarks. We also market certain of our clean air products to OE manufacturers under the names Solid SCR ™ and XNOx ® . The patents, trademarks and other intellectual property owned by or licensed to us are important in the manufacturing, marketing and distribution of our products. However, we do not materially rely on any single patent, nor will the expiration of any single patent materially affect our business. Our current patents expire over various periods into the year 2040. We are actively introducing and patenting new technology to replace formerly patented technology before the expiration of the existing patents. In the aggregate, our worldwide patent portfolio is materially important to our business because it enables us to achieve technological differentiation from our competitors.

ITEM 1A. RISK FACTORS.

Future deterioration or prolonged difficulty in economic conditions could have a material adverse impact on our business, financial position and liquidity.

We are a global company and, as such, our businesses are affected by economic conditions in the various geographic regions in which we do business. Economic difficulties generally lead to tightening of credit and liquidity. These conditions often lead to low consumer confidence, which in turn results in delayed and reduced purchases of durable goods such as automobiles and other vehicles. As a result, during difficult economic times our OE customers can significantly reduce their production schedules. For example, light vehicle production declined significantly during the economic crisis in 2008 and 2009 in North America and Europe. More recently, light vehicle and commercial vehicle production has declined significantly in South America in 2015 and 2016 and persistent challenges in the Chinese economy in 2018 and continuing into 2019 may result in lower-than-anticipated growth in both light and commercial vehicles in the region. Additionally, production of off-highway equipment with our content on them have been weak in certain product applications, such as agricultural and construction equipment in North America and Europe. Any deterioration or prolonged difficulty in economic conditions in any region in which we do business could have a material adverse effect on our business, financial position and liquidity.

In addition, economic difficulties often lead to disruptions in the financial markets, which may adversely impact the availability and cost of credit which could materially and negatively affect our company. Future disruptions in the capital and credit markets could adversely affect our customers' and our ability to access the liquidity that is necessary to fund operations on terms that are acceptable to us or at all.

In addition, financial or other difficulties at any of our major customers could have a material adverse impact on us, including as a result of lost revenues, significant write downs of accounts receivable, significant impairment charges or additional restructuring beyond our current global plans. Severe financial or other difficulties at any of our major suppliers could have a material adverse effect on us if we are unable to obtain on a timely basis on similar economic terms the quantity and quality of components we require to produce our products.

Moreover, severe financial or operating difficulties at any light vehicle or commercial vehicle manufacturer or other supplier could have a significant disruptive effect on the entire industry, leading to supply chain disruptions and labor unrest, among other things. These disruptions could force original equipment manufacturers and, in turn, other suppliers, including us, to shut down production at plants. While the issues that our customers and suppliers face during economic difficulties may be primarily financial in nature, other difficulties, such as an inability to meet increased demand as conditions recover, could also result in supply chain and other disruptions.

Factors that reduce demand for our products or reduce prices could materially and adversely impact our financial condition and results of operations.

Demand for and pricing of our products are subject to economic conditions and other factors present in the various domestic and international markets where our products are sold. Demand for our OE products is subject to the level of consumer demand for new vehicles that are equipped with our parts. The level of new light vehicle, commercial truck and off-highway vehicle purchases is cyclical, affected by such factors as general economic conditions, interest rates and availability of credit, consumer confidence, patterns of consumer spending, industrial construction levels, fuel costs, government incentives and vehicle replacement cycles. Consumer preferences and government regulations also impact the demand for new light vehicle purchases equipped with our products. For example, if consumers increasingly prefer electric vehicles, demand for the vehicles equipped with our clean air products would decrease.

Demand for our aftermarket, or replacement, products varies based upon such factors as general economic conditions; the level of new vehicle purchases, which initially displaces demand for aftermarket products; the severity of winter weather, which increases the demand for certain aftermarket products; the number of vehicles in operation; and other factors, including the average useful life of parts and number of miles driven.

The highly cyclical nature of the automotive and commercial vehicle industry presents a risk that is outside our control and that cannot be accurately predicted. Decreases in demand for automobiles and commercial vehicles and vehicle parts generally, or in the demand for our products in particular, could materially and adversely impact our financial condition and results of operations.

In addition, we believe that increasingly stringent environmental standards for emissions have presented and will continue to present an important opportunity for us to grow our clean air product line. We cannot assure you, however, that environmental standards for emissions will continue to become more stringent or that the adoption of any new standards will not be delayed beyond our expectations.

We are dependent on certain large customers for future revenue. The loss of all or a substantial portion of our revenues from any of these customers or the loss of market share by these customers could have a material adverse impact on us.

We depend on major vehicle manufacturers for a substantial portion of our revenues. For example, during the fiscal year ended December 31, 2018 , General Motors and Ford accounted for 12% and 12% of our net sales, respectively. Following the Federal-Mogul acquisition, we are increasingly dependent on certain major aftermarket customers for our revenues. The loss of all or a substantial portion of our revenues from any of our large-volume customers could have a material adverse effect on our financial condition and results of operations by reducing cash flows and our ability to spread costs over a larger revenue base. We may experience decreased revenues from these customers for a variety of reasons, including but not limited to: (i) in the case of our OE customers, loss of awarded platforms, reduced demand for our customers' products, and work stoppages or other disruptions impacting OE production, and (ii) in the case of our aftermarket customers, reduced or delayed consumer requirements and competition from other brands or lower-cost alternatives. Further, our aftermarket customers are generally able to change suppliers more quickly than OE customers, which exacerbates these risks with respect to our aftermarket business. For all of our customers, we face the risk of their failure to pay us for a variety of reasons, including their respective financial conditions.

In addition, our customers compete intensively against each other. The loss of market share by any of our major customers could have a material adverse effect on our business unless we are able to achieve increased sales to other major customers.

We are subject to, and could be further subject to, government investigations or actions by other third parties.

We are subject to a variety of laws and regulations that govern our business both in the United States and internationally, including antitrust laws, violations of which can involve civil or criminal sanctions. Responding to governmental investigations or other actions may be both time-consuming and disruptive to our operations and could divert the attention of our management and key personnel from our business operations.

For example, antitrust authorities in various jurisdictions are investigating possible violations of antitrust laws by multiple automotive parts suppliers, including Tenneco. In addition, Tenneco and certain of its competitors are currently subject to civil putative class action lawsuits in the United States, which allege anti-competitive conduct related to the activities subject to these investigations. More related lawsuits may be filed, including in other jurisdictions.

While we have established a reserve that we believe is adequate to resolve Tenneco's antitrust matters globally, we cannot, however, assure you that the reserve will not change materially from time to time or that the costs, charges and liabilities associated with these matters will not exceed any amounts reserved for them in our consolidated financial statements.

We may be unable to realize sales represented by our awarded business, which could materially and adversely impact our financial condition and results of operations.

The realization of future sales from awarded business is inherently subject to a number of important risks and uncertainties, including the number of vehicles that our OE customers will actually produce, the timing of that production and the mix of options that our OE customers and consumers may choose. For example, light vehicle production declined significantly during the economic crisis in 2008 and 2009 in North America and Europe. More recently, light vehicle and commercial truck production has declined significantly in South America in 2015 and 2016 and persistent challenges in the Chinese economy in 2018 and going into 2019 may result in lower-than-anticipated growth in both light and commercial vehicles in the region. In addition to the risks inherent in the cyclicality of vehicle production, our customers generally have the right to replace us with another supplier at any time for a variety of reasons and have demanded price decreases over the life of awarded business. Accordingly, we cannot assure you that we will in fact realize any or all of the future sales represented by our awarded business. Any failure to realize these sales could have a material adverse effect on our financial condition, results of operations, and liquidity.

In many cases, we must commit substantial resources in preparation for production under awarded OE business well in advance of the customer's production start date. In certain instances, the terms of our OE customer arrangements permit us to recover these pre-production costs if the customer cancels the business through no fault of our company. Although we have been successful in recovering these costs under appropriate circumstances in the past, we can give no assurance that our results of operations will not be materially impacted in the future if we are unable to recover these types of pre-production costs in the event of an OE customer's cancellation of awarded business.

Our level of debt, which increased in amount and percentage of floating rate debt as a result of the Acquisition, makes us more sensitive to the effects of economic downturns; and provisions in our debt agreements could constrain our ability to react to changes in the economy or our industry.

Our leverage increased as a result of the Acquisition. As of December 31, 2018, we had approximately $3.3 billion of indebtedness outstanding under our new senior credit facility, $2.0 billion of outstanding notes and approximately $100 million of other debt. In addition, as a result of the Acquisition we have increased exposure to interest rate fluctuations because our percentage of floating rate debt increased.

Our level of debt makes us more vulnerable to changes in our results of operations because a significant portion of our cash flow from operations is dedicated to servicing our debt and is not available for other purposes and our level of debt could impair our ability to raise additional capital if necessary. Further increases in interest rates will increase the amount of cash required for debt service. Under the terms of our existing senior secured credit facility, the indentures governing our notes and the agreements governing our other indebtedness, we are able to incur significant additional indebtedness in the future. The more we become leveraged, the more we, and in turn our security holders, become exposed to many of the risks described herein.

Our ability to make payments on our indebtedness depends on our ability to generate cash in the future. If we do not generate sufficient cash flow to meet our debt service, capital investment and working capital requirements, we may need to reduce or cease our repurchase of shares or payments of dividends, seek additional financing or sell assets. If we require such financing and are unable to obtain it, we could be forced to sell assets under unfavorable circumstances and we may not be able to sell assets quickly enough or for sufficient amounts to enable us to meet our obligations.

In addition, our senior credit facility and our other debt agreements contain covenants that limit our flexibility in planning for or reacting to changes in our business and our industry, including limitations on our ability to:

- declare dividends or redeem or repurchase capital stock;
- prepay, redeem or purchase other debt;
- incur liens;
- make loans, guarantees, acquisitions and investments;
- incur additional indebtedness;
- amend or otherwise alter debt and other material agreements;
- engage in mergers, acquisitions or asset sales; and
- engage in transactions with affiliates.

Our failure to comply with the covenants contained in our debt instruments, including as a result of events beyond our control, could result in an event of default, which could materially and adversely affect our operating results and our financial condition.

Our senior credit facility and other agreements governing financings we enter into from time to time require us to maintain certain financial ratios. Our senior credit facility and our other financing instruments require us to comply with various operational and other covenants. If there were an event of default under any of our financing instruments that was not cured or waived, the holders of the defaulted financing could cause all amounts outstanding with respect to that financing to be due and payable immediately (which, in turn, could also result in an event of default under one or more of our other financing arrangements). If such event occurs, the lenders under our senior credit facility could elect to terminate their commitments, cease making further loans and institute foreclosure proceedings against our assets and we could lose access to our factoring and supply chain financing programs. We cannot assure you that our assets or cash flow would be sufficient to fully repay borrowings under our outstanding financing instruments, either upon maturity or if accelerated, upon an event of default, or that we would be able to refinance or restructure the payments on those financing instruments. This would have a material adverse impact on our liquidity, financial position and results of operations, and on our ability to effect our share repurchase and dividend programs. For example, as a result of the economic downturn in 2008 and 2009, we needed to amend our senior credit agreement to revise the financial ratios we were required to maintain. Even though we were able to obtain that amendment, we cannot assure you that we would be able to obtain an amendment on commercially reasonable terms, or at all, if required in the future.

Our working capital requirements may negatively affect our liquidity and capital resources.

Our working capital requirements can vary significantly, depending in part on the level, variability and timing of our customers' worldwide vehicle production and the payment terms with our customers and suppliers. If our working capital needs exceed our cash flows from operations, we would look to our cash balances and availability for borrowings under our borrowing

arrangements to satisfy those needs, as well as potential sources of additional capital, which may not be available on satisfactory terms and in adequate amounts, if at all.

We may be unable to realize the expected benefits of our initiatives to improve operating performance and generate cost savings and improvements.

We regularly implement strategic and other initiatives designed to improve our operating performance. Our inability to implement these initiatives in accordance with our plans or our failure to achieve the goals of these initiatives could have a material adverse effect on our business. We rely on these initiatives to offset pricing pressures from our suppliers and our customers, as described above, as well as to manage the impacts of production cuts. Our implementation of announced initiatives is from time to time subject to legal challenge in certain non-U.S. jurisdictions (where applicable employment laws differ from those in the United States). Furthermore, the terms of our senior credit facility and the indentures governing our notes may restrict the types of initiatives we undertake. In the past we have been successful in obtaining the consent of our senior lenders where appropriate in connection with our initiatives. We cannot assure you, however, that we will be able to pursue, successfully implement or realize the expected benefits of any initiative or that we will be able to sustain improvements made to date.

Exchange rate fluctuations could cause a decline in our financial condition and results of operations.

As a result of our international operations, we are subject to increased risk because we generate a significant portion of our net sales and incur a significant portion of our expenses in currencies other than the U.S. dollar. For example, where we have a greater portion of costs than revenues generated in a foreign currency, we are subject to risk if the foreign currency in which our costs are paid appreciates against the currency in which we generate revenue because the appreciation effectively increases our cost in that country.

The financial condition and results of operations of some of our operating entities are reported in foreign currencies and then translated into U.S. dollars at the applicable exchange rate for inclusion in our consolidated financial statements. As a result, appreciation of the U.S. dollar against these foreign currencies generally will have a negative impact on our reported revenues and operating profit while depreciation of the U.S. dollar against these foreign currencies will generally have a positive effect on reported revenues and operating profit.

We do not generally seek to mitigate the impact of currency through the use of derivative financial instruments. To the extent we are unable to match revenues received in foreign currencies with costs paid in the same currency, exchange rate fluctuations in that currency could have a material adverse effect on our business.

The hourly workforce in the industry in which we participate is highly unionized and our business could be adversely affected by labor disruptions.

A portion of our hourly workforce in North America and the majority of our hourly workforce in other regions are unionized. Although we consider our current relations with our employees to be satisfactory, if major work disruptions were to occur, our business could be adversely affected by, for instance, a loss of revenues, increased costs or reduced profitability. We have not experienced a material labor disruption in our recent history, but there can be no assurance that we will not experience a material labor disruption at one of our facilities in the future in the course of renegotiation of our labor arrangements or otherwise.

In addition, substantially all of the hourly employees of General Motors, Ford and Fiat Chrysler Automobiles in North America and many of their other suppliers are represented by the United Automobile, Aerospace and Agricultural Implement Workers of America under collective bargaining agreements. Vehicle manufacturers, their suppliers and their respective employees in other countries are also subject to labor agreements. A work stoppage or strike at one of our production facilities, at those of a customer, or impacting a supplier of ours or any of our customers, could have an adverse impact on us by disrupting demand for our products and/or our ability to manufacture our products.

From time to time we experience significant increases and fluctuations in raw materials pricing and increases in certain lead times; and future changes in the prices of raw materials or utility services, or future increases in lead times, could have a material adverse impact on us.

Significant increases in the cost of certain raw materials used in our products, mainly steel, oil and rubber, or the cost of utility services required to produce our products, to the extent they are not timely reflected in the price we charge our customers or are otherwise mitigated, could materially and adversely impact our results. For example, in March 2018, the current U.S. administration imposed a 25% tariff on steel imports and a 10% tariff on aluminum imports and throughout 2018, and announced additional tariffs on goods imported from China specifically, as well as certain other countries. In addition, during 2017, carbon steel prices as well as raw material prices (such as ferrochrome, iron ore, scrap and coking coal) to produce carbon steel remained at high levels after the sharp increases in 2016. In addition, both the European Union as well as the

United States continue to impose a variety of anti-dumping duties on carbon steel as well as stainless steel. This not only results in higher domestic pricing but limits opportunities in terms of off shore buying. Carbon steel prices in North America increased further in the fourth quarter of 2017 in the run-up to the mandated "232 Section Investigations" against the import deadline of mid January 2018.

We attempt to mitigate price increases by evaluating alternative materials and processes, reviewing material substitution opportunities, increasing component sourcing and parts assembly in best cost countries, and strategically pursuing regional and global purchasing strategies for specific commodities. We also aggressively negotiate to recover these higher costs from our customers, and in some cases, such as with respect to steel surcharges, we have the contractual right to recover some or all of these higher costs from certain of our customers. However, if we are successful in recovering these higher costs, we may not receive that recovery in the same period that the costs were incurred and the benefit of the recovery may not be evenly distributed throughout the year.

We also continue to pursue productivity initiatives and other opportunities to reduce costs through restructuring activities. During periods of economic recovery, the cost of raw materials and utility services generally rise. Accordingly, we cannot ensure that we will not face further increased prices in the future or, if we do, whether our actions will be effective in containing them.

By entering into new product lines and employing new technologies, our ability to produce certain of these products may be constrained due to longer lead times for our facilities, as well as those of our suppliers. We attempt to mitigate the negative effects of these longer lead times by improving the accuracy of our long term planning; however, we cannot provide any certainty that we will always be successful in avoiding disruptions to our delivery schedules.

We may incur costs related to product warranties, environmental and regulatory matters, legal proceedings and other claims, which could have a material adverse impact on our financial condition and results of operations.

From time to time, we receive product warranty claims from our customers, pursuant to which we may be required to bear costs of repair or replacement of certain of our products. Vehicle manufacturers require their outside suppliers to guarantee or warrant their products and to be responsible for the operation of these component products in new vehicles sold to consumers. Warranty claims may range from individual customer claims to full recalls of all products in the field. We cannot assure you that costs associated with providing product warranties will not be material, or that those costs will not exceed any amounts reserved in our consolidated financial statements. For a description of our accounting policies regarding warranty reserves, see "Management's Discussion and Analysis of Financial Condition and Results of Operations — Critical Accounting Policies" included in Item 7.

Our global operations subject us to extensive governmental regulations worldwide. Foreign, federal, state and local laws and regulations may change from time to time and our compliance with new or amended laws and regulations in the future may materially increase our costs and could adversely affect our results of operations and competitive position. For example, we are subject to a variety of environmental and pollution control laws and regulations in all jurisdictions in which we operate. Soil and groundwater remediation activities are being conducted at certain of our current and former real properties. We record liabilities for these activities when environmental assessments indicate that the remedial efforts are probable and the costs can be reasonably estimated. On this basis, we have established reserves that we believe are adequate for the remediation activities at our current and former real properties for which we could be held responsible. Although we believe our estimates of remediation costs are reasonable and are based on the latest available information, the cleanup costs are estimates and are subject to revision as more information becomes available about the extent of remediation required. In future periods, we could incur cash costs or charges to earnings if we are required to undertake remediation efforts as the result of ongoing analysis of the environmental status of our properties. In addition, violations of the laws and regulations we are subject to could result in civil and criminal fines, penalties and sanctions against us, our officers or our employees, as well as prohibitions on the conduct of our business, and could also materially affect our reputation, business and results of operations.

We also from time to time are involved in a variety of legal proceedings, claims or investigations. These matters typically are incidental to the conduct of our business. Some of these matters involve allegations of damages against us relating to environmental liabilities, intellectual property matters, personal injury claims, taxes, employment matters or commercial or contractual disputes or allegations relating to legal compliance by us or our employees. For example, we are subject to a number of lawsuits initiated by a significant number of claimants alleging health problems as a result of exposure to asbestos. Many of these cases involve significant numbers of individual claimants. Many of these cases also involve numerous defendants, with the number of defendants in some cases exceeding 100 defendants from a variety of industries. As major asbestos manufacturers or other companies that used asbestos in their manufacturing processes continue to go out of business, we may experience an increased number of these claims.

We vigorously defend ourselves in connection with all of the matters described above. We cannot, however, assure you that the costs, charges and liabilities associated with these matters will not be material, or that those costs, charges and liabilities will not exceed any amounts reserved for them in our consolidated financial statements. In future periods, we could be subject to cash costs or charges to earnings if any of these matters are resolved unfavorably to us. See "Management's Discussion and Analysis of Financial Condition and Results of Operations — Environmental and Legal Contingencies" included in Item 7.

Developments relating to our intellectual property could materially impact our business.

We and others in our industry hold a number of patents and other intellectual property rights, including licenses, which are critical to our respective businesses and competitive positions. Notwithstanding our intellectual property portfolio, our competitors may develop similar or superior proprietary technologies. Further, as we expand into regions where the protection of intellectual property rights is less robust, the risk of others replicating our proprietary technologies increases, which could result in a deterioration of our competitive position. On occasion, we may assert claims against third parties who are taking actions that we believe are infringing on our intellectual property rights. Similarly, third parties may assert claims against us and our customers and distributors alleging our products infringe upon third party intellectual property rights. These claims, regardless of their merit or resolution, are frequently costly to prosecute, defend or settle and divert the efforts and attention of our management and employees. Claims of this sort also could harm our relationships with our customers and might deter future customers from doing business with us. If any such claim were to result in an adverse outcome, we could be required to take actions which may include: expending significant resources to develop or license non-infringing products; paying substantial damages to third parties, including to customers to compensate them for their discontinued use or replacing infringing technology with non-infringing technology; or cessation of the manufacture, use or sale of the infringing products. Any of the foregoing results could have a material adverse effect on our business, financial condition, results of operations or our competitive position.

We are increasingly dependent on information technology, and if we are unable to protect against service interruptions or security breaches, our business could be adversely affected.

Our operations rely on a number of information technologies to manage, store, and support business activities. Some of these technologies are managed by third-party service providers and are not under our direct control. We have put in place a number of systems, processes, and practices designed to protect against the failure of our systems, as well as the misappropriation, exposure or corruption of the information stored thereon. Unintentional service disruptions or intentional actions such as intellectual property theft, cyber-attacks, unauthorized access or malicious software, may lead to such misappropriation, exposure or corruption if our, or our service providers', protective measures prove to be inadequate. Further, these events may cause operational impediments or otherwise adversely affect our product sales, financial condition and/or results of operations. We could also encounter violations of applicable law or reputational damage from the disclosure of confidential information belonging to us or our employees, customers or suppliers. In addition, the disclosure of non-public information could lead to the loss of our intellectual property and/or diminished competitive advantages. Should any of the foregoing events occur, we may be required to incur significant costs to protect against damage caused by these disruptions or security breaches in the future. In addition, evolving and expanding compliance and operational requirements under the privacy laws of the jurisdictions in which we operate, such as the EU General Data Protection Regulation, or GDPR, which took effect in May 2018, impose significant costs that are likely to increase over time.

We may have difficulty competing favorably in the highly competitive light vehicle and commercial vehicle supplier industry.

The light vehicle and commercial vehicle supplier automotive parts industry is highly competitive. Although the overall number of competitors has decreased due to ongoing industry consolidation, we face significant competition within each of our major product areas, including from new competitors entering the markets which we serve. The principal competitive factors include price, quality, service, product performance, design and engineering capabilities, new product innovation, global presence and timely delivery. As a result, many suppliers have established or are establishing themselves in emerging, low-cost markets to reduce their costs of production and be more conveniently located for customers. Although we are also pursuing a best-cost country production strategy and otherwise continue to seek process improvements to reduce costs, we cannot assure you that we will be able to continue to compete favorably in this competitive market or that increased competition will not have a material adverse effect on our business by reducing our ability to increase or maintain sales or profit margins.

In addition, our competitors may foresee the course of market development more accurately than we do, develop products that are superior to ours, adapt more quickly than we do to new technologies or evolving customer requirements or develop or introduce new products or solutions before we do, particularly in respect of potential transformative technologies such as autonomous driving solutions. As a result, our products may not be able to compete successfully with their products. These trends may adversely affect our sales as well as the profit margins on our products. Failure to innovate and to develop or acquire new and compelling products that capitalize on new technologies could have a material adverse impact on our results of operations.

Furthermore, due to the cost focus of our major OE customers, we have been, and expect to continue to be, requested to reduce prices as part of our initial business quotations and over the life of OE vehicle platforms we have been awarded. We cannot be certain that we will be able to generate cost savings and operational improvements in the future that are sufficient to offset price reductions requested by existing OE customers and necessary to win additional business. OE customers also direct us into suppliers for component purchases not allowing us to leverage our own supply base and realize cost reductions on this directed spend.

The decreasing number of customers and suppliers in our industry could make it more difficult for us to compete favorably.

Our financial condition and results of operations could be adversely affected because the customer base for our parts and services is decreasing in both the OE market and aftermarket. As a result, we are competing for business from fewer customers. Furthermore, consolidation among suppliers have resulted in fewer, larger suppliers who benefit from purchasing and distribution economies of scale. If we cannot achieve cost savings and operational improvements sufficient to allow us to compete favorably in the future with these larger companies, our financial condition and results of operations could be adversely affected due to a reduction of, or inability to increase, sales.

Our aftermarket sales may be negatively impacted by increasing competition from lower cost, private-label products.

Distribution channels in the aftermarket have continued to consolidate and, as a result, our sales to large retail customers represent a significant portion of our aftermarket business. Private-label aftermarket products, which are typically manufactured at a lower cost, often containing little or no premium technology, and are branded with a store or other private-label brand, are increasingly available to these large retail customers. Our aftermarket business is facing increasing competition from these lower cost, private-label products and there is growing pressure to expand our entry-level product lines so that retailers may offer a greater range of price points to their consumer customers. We cannot assure you that we will be able to maintain or increase our aftermarket sales to these large retail customers or that increased competition from these lower cost, private-label aftermarket products will not have an adverse impact on our aftermarket business.

If the reputation of one or more of our leading brands is harmed, aftermarket sales may be negatively impacted.

Our aftermarket sales are dependent on the reputation and success of our brands, including Monroe®, Champion®, Öhlins®, MOOG®, Walker®, Fel-Pro®, Wagner®, Ferodo®, Rancho®, Thrush®, National®, Sealed Power® and others. Product liability claims or recalls could result in negative publicity that could harm the reputation of our brands. If one or more of our leading brands suffers damage to its reputation due to real or perceived quality or safety issues, our financial results could be adversely affected.

Improvements in automotive parts are adversely affecting aftermarket demand for some of our products.

The average useful life of automotive parts has steadily increased in recent years due to innovations in products and technologies. The longer product lives allow vehicle owners to replace parts of their vehicles less often. As a result, a portion of sales in the aftermarket has been displaced. In addition, advancements in technology may lead to enhancements in aftermarket product performance that render our product obsolete. This has adversely impacted, and could continue to adversely impact, our aftermarket sales. Also, any additional increases in the average useful lives of automotive parts or other enhancements in aftermarket performance would further adversely affect the demand for our aftermarket products.

If we do not respond appropriately, the evolution towards autonomous vehicles and car and ride sharing could adversely affect our business.

The light vehicle industry is increasingly focused on the development of advanced driver assistance technologies, with the goal of developing and introducing a commercially viable, fully automated driving experience. There has also been an increase in consumer preferences for car and ride sharing, as opposed to automobile ownership, which may result in a long-term reduction in the number of vehicles per capita. These evolving areas have also attracted increased competition from entrants outside the traditional light vehicle industry. Failure to innovate and to develop or acquire new and compelling products that capitalize upon new technologies in response to OE and consumer preferences could have a material adverse impact on our results of operations.

We may not be able to respond quickly enough to changes in technology and to develop our intellectual property into commercially viable products.

Changes in competitive technologies may render certain of our products obsolete or less attractive. Our ability to anticipate changes in technology and to successfully develop and introduce new and enhanced products on a timely basis are significant factors in our ability to remain competitive and to maintain or increase our revenues.

We cannot provide assurance that certain of our products will not become obsolete or that we will be able to achieve the technological advances that may be necessary for us to remain competitive and maintain or increase our revenues in the future. We are also subject to the risks generally associated with new product introductions and applications, including lack of market acceptance, delays in product development or production, and failure of products to operate properly. If we are unable to react to changes in the marketplace, including the potential introduction of technologies such as autonomous driving solutions, our financial performance could be adversely affected.

Any acquisitions we make could disrupt our business and seriously harm our financial condition.

We may, from time to time, consider acquisitions of complementary companies, products or technologies. Acquisitions involve numerous risks, including difficulties in the assimilation of the acquired businesses, the diversion of our management's attention from other business concerns and potential adverse effects on existing business relationships with customers and suppliers. In addition, any acquisitions could involve the incurrence of substantial additional indebtedness. We cannot assure you that we will be able to successfully integrate any acquisitions that we pursue or that such acquisitions, and the potential related synergies, will perform as planned or prove to be beneficial to our operations and cash flow, or deliver any anticipated strategic benefits. Any such failure could seriously harm our business, financial condition and results of operations.

Certain of our operations are conducted through joint ventures, which have unique risks.

Certain of our operations are conducted through joint ventures. Our joint ventures are governed by mutually established agreements that we entered into with our partners, and, as such, we do not unilaterally control the joint ventures. There is a risk that our partners' objectives for the joint ventures may not be aligned with ours, leading to potential disagreements over management of the joint ventures. At some of our joint ventures, our joint venture partner is also affiliated with the largest customer of the joint venture, which may create a conflict between the interests of our partner and the joint venture. Also, our ability to sell our interest in a joint venture may be subject to contractual and other limitations.

Additional risks associated with joint ventures include our partners failing to satisfy contractual obligations, conflicts arising between us and any of our partners, a change in the ownership of any of our partners and our limited ability to control compliance with applicable rules and regulations. Accordingly, any such occurrences could adversely affect our financial condition, operating results and cash flows.

We are subject to risks related to operating a multi-national company.

We have manufacturing and distribution facilities in many regions across six continents. For the fiscal year ended December 31, 2018 , a significant portion of our net sales were derived from operations outside North America. Current events including tax reform proposals and the possibility of renegotiated trade deals and international tax law treaties, create a level of uncertainty, and potentially increased complexity, for multi-national companies. These uncertainties could have a material adverse effect on our business and our results of operations and financial condition. In addition, international operations are subject to various risks which could have a material adverse effect on those operations or our business as a whole, including:

- currency exchange rate fluctuations;
- exposure to local economic conditions and labor issues;
- exposure to local political conditions, including the risk of seizure of assets by a foreign government;
- exposure to local social conditions, including corruption and any acts of war, terrorism or similar events;
- exposure to local public health issues and the resultant impact on economic and political conditions;
- inflation in certain countries;
- limitations on the repatriation of cash, including imposition or increase of withholding and other taxes on remittances and other payments by foreign subsidiaries;
- retaliatory tariffs and restrictions limiting free movement of goods and an unfavorable trade environment, including as a result of political conditions and changes in the laws in the United States and elsewhere and as described in more details below;
- the impact of uncertainties surrounding the implementation of Brexit; and
- requirements for manufacturers to use locally produced goods.

Entering new markets poses new competitive threats and commercial risks.

As we have expanded into markets beyond light vehicles, we expect to diversify our product sales by leveraging technologies being developed for the light vehicle segment. Such diversification requires investments and resources which may not be available as needed. We cannot guarantee that we will be successful in leveraging our capabilities into new markets and thus, in meeting the needs of these new customers and competing favorably in these new markets. Further, a significant portion of our growth potential is dependent on our ability to increase sales to commercial truck and off-highway vehicle customers. While we believe that we can achieve our growth targets with the production contracts that have been or will be awarded to us, our future prospects will be negatively affected if those customers underlying these contracts experience reduced demand for their products, or financial difficulties.

We have recorded a significant amount of long lived assets, goodwill, and other intangible assets, which may become impaired in the future and negatively affect our operating results.

We have recorded a significant amount of long lived assets, goodwill, and other identifiable intangibles assets, including customer relationships, trademarks and brand names, and developed technologies due to the acquisition of Federal-Mogul. Long lived assets, goodwill, and other identifiable intangible assets were approximately $4,078 million as of December 31, 2018, or 30% of our total assets. Under generally accepted accounting principles in the United States, long-lived assets, excluding goodwill and indefinite lived intangible assets, are required to be evaluated for impairment whenever adverse events or changes in circumstances indicate a possible impairment. If business conditions or other factors cause profitability and cash flows to decline, we may be required to record non-cash impairment charges. Goodwill and indefinite lived intangible assets must be evaluated for impairment annually or more frequently if events indicate it is warranted. Impairment of goodwill and other identifiable intangible assets may result from, among other things, deterioration in our performance, adverse market conditions, adverse changes in applicable laws or regulations, including changes that restrict the activities of or affect the products sold by our business, and a variety of other factors. The amount of any quantified impairment must be expensed immediately and subjects us to financial statement risk in the event that long lived assets, goodwill or other identifiable intangible assets become impaired.

The value of our deferred tax assets may not be realized, which could materially and adversely affect our operating results.

As of December 31, 2018 , we had approximately $379 million in net deferred tax assets. These deferred tax assets include net operating loss carryovers and tax credits that can be used to offset taxable income in future periods and reduce income taxes payable in those future periods. Each quarter, we determine the probability of the realization of deferred tax assets, using significant judgments and estimates with respect to, among other things, historical operating results and expectations of future earnings and tax planning strategies. If we determine in the future that there is not sufficient positive evidence to support the valuation of these assets, due to the risk factors described herein or other factors, we may be required to further adjust the valuation allowance to reduce our deferred tax assets. Such a reduction could result in material non-cash expenses in the period in which the valuation allowance is adjusted and could have a material adverse effect on our results of operations.

Our expected annual effective tax rate could be volatile and materially change as a result of changes in mix of earnings and other factors.

Our overall effective tax rate is equal to our total tax expense as a percentage of our total profit or loss before tax. However, tax expenses and benefits are determined separately for each tax paying entity or group of entities that is consolidated for tax purposes in each jurisdiction. Losses in certain jurisdictions may provide no current financial statement tax benefit. As a result, changes in the mix of profits and losses between jurisdictions, among other factors, could have a significant impact on our overall effective tax rate.

Changes in tax law or trade agreements and new or changed tariffs could have a material adverse effect on us.

Changes in U.S. political, regulatory and economic conditions and/or changes in laws and policies governing U.S. tax laws, foreign trade (including trade agreements and tariffs), manufacturing, and development and investment in the territories and countries where we and/or our customers operate could adversely affect our operating results and business.

For example, on December 22, 2017, the U.S. President signed into law new legislation that significantly revises the U.S. Internal Revenue Code. The newly enacted federal income tax law, among other things, contains significant changes to corporate taxation, including the reduction of the corporate income tax rate from a top marginal rate of 35% to a flat rate of 21%, a one-time transition tax on offshore earnings at reduced tax rates regardless of whether the earnings are repatriated, elimination of U.S. tax on foreign dividends (subject to certain important exceptions), new taxes on certain foreign earnings, a new minimum tax related to payments to foreign subsidiaries and affiliates, immediate deductions for certain new investments as opposed to deductions for depreciation expense over time, and the modification or repeal of many business deductions and credits.

In addition, the United States, Mexico and Canada have renegotiated the North American Free Trade Agreement ("NAFTA"). The revised agreement, the US-Mexico-Canada Agreement ("USMCA"), contains new and revised provisions that alter the prior rules governing when imports and exports of autos and auto parts are eligible for duty-free treatment. Generally these new rules require a higher percentage of the overall content of the auto or autopart to originate in one of the USMCA's countries (the U.S., Mexico or Canada). The U.S. Congress must approve the USMCA provisions before they can become effective. Our manufacturing facilities in the U.S., Mexico and Canada are dependent on duty-free trade within the USMCA region. We have significant movement of goods within NAFTA region, and the imposition of customs duties on imports could negatively impact our financial performance.

Moreover, in March 2018, the U.S. government imposed a 25% *ad valorem* tariff on certain steel imports and a 10% *ad valorem* tariff on certain aluminum imports. There was a short exemption period from the steel and aluminum tariffs for Canada, Mexico and the European Union, which ended on June 1, 2018. As a result of the tariffs, countries such as, Canada, China and Mexico have implemented retaliatory actions with respect to U.S. imports into their countries, which could adversely affect our business, financial condition or results of operations.

In addition, on three separate occasions in 2018, the U.S. government imposed additional tariffs on products from China. Specifically, on July 6, 2018, an additional 25% *ad valorem* tariff was imposed on certain imports from China. On August 23, 2018, an additional group of Chinese imports were assessed an additional 25% *ad valorem* tariff, and finally on September 24, 2018, a third group of Chinese imports were assessed an additional 10% *ad valorem* tariff (set to increase to 25% on March 2, 2019, if no resolution is reached with China by that date). The Administration has signaled that additional Chinese products may be targeted with additional tariffs. China has retaliated with tariffs on certain U.S. imports.

The imposition of the steel and aluminum tariffs, or any future imposition of tariffs or duties, is expected to have a pervasive impact on the metals market in which we operate and could result in a decrease in imports and higher prices for those imports which are sold into the U.S. When we buy metals internationally, we may be unable to pass through the higher costs to our customers, which could adversely impact our financial condition and operating results. In addition, a decrease in imports could cause a disruption or shortage in the availability of the raw materials that we buy, which could limit our ability to meet customer demand or purchase material at competitive prices. This could cause the Company to lose sales, incur additional costs, or suffer harm to our reputation, all of which may adversely affect operating results.

Further, in May 2018, the U.S. government announced that it is considering potential additional tariffs to be imposed on imported automobiles and automotive parts. Certain aspects of our business depend on the importation of automotive parts from outside of the U.S. If these or other similar tariffs are imposed, our business and results of operations could be materially adversely affected.

The Company's pension obligations and other postretirement benefits assumed as a result of the Acquisition could adversely affect the Company's operating margins and cash flows.

Following completion of the Acquisition, pension and other postretirement benefit obligations have increased. The automotive industry, like other industries, continues to be affected by the rising cost of providing pension and other postretirement benefits. In addition, the Company sponsors certain defined benefit plans worldwide that are underfunded and will require cash payments. If the performance of the assets in the pension plans does not meet the Company's expectations, or other actuarial assumptions are modified, the Company's required contributions may be higher than it expects.

The Company's hedging activities to address commodity price fluctuations may not be successful in offsetting future increases in those costs or may reduce or eliminate the benefits of any decreases in those costs.

In order to mitigate short-term variation in operating results due to the aforementioned commodity price fluctuations, the Company hedged a portion of near-term exposure to certain raw materials used in production processes, primarily copper, nickel, tin, zinc, high-grade aluminum and aluminum alloy. The results of this hedging practice could be positive, neutral or negative in any period depending on price changes in the hedged exposures.

Our hedging activities are not designed to mitigate long-term commodity price fluctuations and, therefore, will not protect from long-term commodity price increases. Our future hedging positions may not correlate to actual raw materials costs, which would accelerate the recognition in our operating results of unrealized gains and losses on hedging positions.

If we cannot attract, retain, and motivate employees, we may be unable to compete effectively, and lose the ability to improve and expand our businesses.

Our success and ability to grow depend, in part, on our ability to hire, retain, and motivate sufficient numbers of talented people with the increasingly diverse skills needed to serve clients and expand our business in many locations around the world. We face intense competition for highly qualified, specialized technical, managerial and other personnel. Recruiting, training, retention, and benefit costs place significant demands on our resources. The inability to attract qualified employees in sufficient numbers to meet particular demands or the loss of key management employees or a significant number of our employees could have an adverse effect on us.

Risks Relating to the Acquisition and Planned Spin-off

We may fail to realize all of the anticipated benefits of the Acquisition or those benefits may take longer to realize than expected. We and, following the planned Spin-off, each separate company may also encounter significant difficulties in integrating the business of Federal-Mogul.

The success of the transaction will depend, in part, on our ability (and the ability of each separate company following the planned Spin-off) (defined below) to realize the anticipated benefits of the Acquisition and planned Spin-off (the "Transaction") and on our (and each separate company's) ability to integrate Federal-Mogul's business in an effective and efficient manner, which is a complex, costly and time-consuming process. The integration process may disrupt business and, if we are unable to successfully integrate Federal-Mogul's business, we (and each separate company) could fail to realize the anticipated benefits of the Transaction. The failure to meet the challenges involved in the integration process and realize the anticipated benefits of the Transaction could cause an interruption of, or a loss of momentum in, our operations and could have a material adverse effect on our (and each separate company's) business, financial condition and results of operations.

In addition, the integration of Federal-Mogul may result in material unanticipated challenges, expenses, liabilities, competitive responses and loss of customers and other business relationships. Additional integration challenges include:

- diversion of management's attention to integration matters;
- difficulties in achieving anticipated cost savings, synergies, business opportunities and growth prospects from the Transaction;
- difficulties in the integration of operations and systems;
- difficulties in conforming standards, controls, procedures and accounting and other policies, business cultures and compensation structures;
- difficulties in the assimilation of employees;
- difficulties in managing the expanded operations of a significantly larger and more complex company;
- challenges in attracting and retaining key personnel;
- the impact of potential liabilities the Company may be inheriting from Federal-Mogul; and
- coordinating a geographically dispersed organization.

Many of these factors are outside of our control and could result in increased costs, decreases in the amount of anticipated revenues and diversion of management's time and energy, each of which could adversely affect our (and each separate company's) business, financial condition and results of operations.

In addition, even if the integration of Federal-Mogul's business is successful, we (and each separate company) may not realize all of the anticipated benefits of the Transaction, including the synergies, cost savings, or sales or growth opportunities. These benefits may not be achieved within the anticipated time frame, or at all. Further, additional unanticipated costs may be incurred in the integration process. All of these factors could cause reductions in earnings per share, decrease or delay the expected accretive effect of the transaction and negatively impact the price of shares of our Common Stock (or each separate company's stock). As a result, it cannot be assured that the Transaction will result in the realization of the anticipated benefits and potential synergies.

Our current stockholders may have reduced ownership and voting interests following the exercise of certain rights under the Purchase Agreement and exercise less influence over management.

We have granted certain registration rights to AEP for the resale of the shares issued in connection with the Acquisition. These registration rights would facilitate the resale of such shares into the public market, and any such resale would increase the number of shares of our Class A Common Stock available for public trading. Sales of a substantial number of shares of our Class A Common Stock in the public market, or the perception that such sales might occur, could have a material adverse effect on the price of our Class A Common Stock.

If AEP transfers any shares of its Class B Common Stock to a third-party, the shares of Class B Common Stock so transferred will automatically convert in shares of Class A Common Stock and as a result, our current stockholders will experience a proportionate reduction in voting power.

The market price of our Class A Common Stock may be affected by factors different from those affecting the shares of our Common Stock prior to the completion of the Acquisition.

Our historical business differs from that of Federal-Mogul. Accordingly, our results of operations and the market price of our Common Stock following the completion of the Acquisition may be affected by factors that differ from those that previously affected the independent results of operations of each of Tenneco and Federal-Mogul and the market price of our existing common stock prior to the completion of the Acquisition.

The planned Spin-Off following the transaction is subject to various risks and uncertainties and may not be completed in accordance with the expected plans or anticipated timeline, or at all, and will involve significant time and expense, which could disrupt or adversely affect our business.

We intend to separate the combined company's businesses to create two new independent, publicly traded companies in a planned Spin-Off transaction. The planned Spin-Off is intended to be treated as a tax-free reorganization for U.S. federal income tax purposes. There can be no assurance that the planned Spin-Off will be completed at all or that the planned Spin-Off will be tax-free for U.S. federal income purposes. We expect that the process of completing the planned Spin-Off will be time consuming and involve significant costs and expenses, which may be significantly higher than what we currently anticipate and may not yield a benefit if the planned Spin-Off is not completed. We may encounter unforeseen impediments to the completion of the planned Spin-Off that render it impossible or impracticable.

If the planned Spin-Off is not completed, our business, financial condition and results of operations may be materially adversely affected and the market price of our Common Stock may decline significantly, particularly to the extent that the current market price reflects a market assumption that the planned Spin-Off will be completed. If the completion of the planned Spin-Off is delayed, including by the receipt of an acquisition proposal, our business, financial condition and results of operations may be materially adversely affected.

The tendency of the planned Spin-Off and impact of the Transaction could adversely affect our business, financial results and operations.

The announcement and tendency of the planned Spin-Off could cause disruptions and create uncertainty surrounding our business and affect our relationships with our customers, suppliers and employees.

As a result of the Transaction, some customers, suppliers or strategic partners may terminate their business relationship with us. Potential customers, suppliers or strategic partners may delay entering into, or decide not to enter into, a business relationship with us because of the Transaction. If customer or supplier relationships or strategic alliances are adversely affected by the Transaction, our (and each separate company's after the planned Spin-Off) business, financial condition and results of operations following the Acquisition or planned Spin-Off could be adversely affected.

We are dependent on the experience and industry knowledge of our officers and other key employees to execute our business plans. Our success after and in implementing the Transaction depends in part upon the ability to retain key management personnel and other key employees. Current and prospective employees of the Company may experience uncertainty about their roles with the combined company following the Acquisition or either separate company following the planned Spin-Off, or concerns regarding operations following the Transaction, any of which may have an adverse effect on the ability to attract or retain key management and other key personnel. Accordingly, no assurance can be given that we (or each separate company after the planned Spin-Off) will be able to attract or retain key management personnel and other key employees following the Transaction to the extent that we have previously been able to attract or retain such employees.

In addition, we have diverted, and will continue to divert, significant management resources to complete the Transaction, which could adversely impact our ability to manage existing operations or pursue alternative strategic transactions, which could adversely affect our business, financial condition and results of operations.

The planned Spin-Off may not achieve some or all of the anticipated benefits.

We may not realize some or all of the anticipated strategic, financial, operational or other benefits from the planned Spin-Off. As new independent, publicly traded companies, the two companies will be smaller, less diversified companies with a narrower business focus. As a result, the two companies may be more vulnerable to changing market conditions, which could result in increased volatility in their cash flows, working capital and financing requirements and could have a material adverse effect on the respective business, financial condition and results of operations of each company. Further, there can be no assurance that the combined value of the common stock of the two companies will be equal to or greater than what the value of our common stock would have been had the planned Spin-Off not occurred.

The combined company prior to the planned Spin-Off and, if the planned Spin-Off is completed, each separate company following the Spin-Off may underperform relative to our expectations.

Following completion of the Transaction, the combined company or each separate company may not be able to maintain the growth rate, levels of revenue, earnings or operating efficiency that we and Federal-Mogul have achieved or might achieve separately. The failure to do so could have a material adverse effect on our business, financial condition and results of operations or, following the planned Spin-Off, the business, financial condition and results of operations of each separate company.

We have incurred, and will continue to incur, significant transaction costs in connection with the Transaction that could adversely affect our results of operations.

We have incurred, and will continue to incur, significant costs in connection with integrating the business and operations of Federal-Mogul with our business and operations and effectuating the planned Spin-Off. We may also incur additional unanticipated costs in the separation processes. These could adversely affect our business, financial condition and results of operations, or the business, financial condition and results of operations of each company following the planned Spin-Off, in the period in which such expenses are recorded, or the cash flows, in the period in which any related costs are actually paid.

Furthermore, we and each company following the planned Spin-Off may incur material restructuring charges in connection with integration activities or the planned Spin-Off, which may adversely affect operating results for the period in which such expenses are recorded, or cash flows in the period in which any related costs are actually paid.

We may incur greater costs following the planned Spin-Off, which could decrease our profitability.

Our businesses are operating in conjunction with one another, allowing us in certain circumstances to take advantage of the combined businesses' size and purchasing power in procuring certain goods and services. After the planned Spin-Off, we may be unable to obtain goods and services at prices or on terms as favorable to us as those we obtained prior to the planned Spin-Off. Our businesses also benefit from certain shared functions and services. Following the planned spin-off, we will retain some of these functions and services, and the entity to be spun off ("DRiV Incorporated" or "DRiV TM ") will retain some of these functions and services. As to those functions and services DRiV retains, DRiV will provide certain of them to us on a short-term transitional basis after the planned Spin-Off, and we will be required to establish the necessary infrastructure and systems to provide these functions and services on an ongoing basis. As to those functions and services we retain, we will provide DRiV certain transition services on a short-term transitional basis after the planned Spin-Off. We may not be able to replace the services provided by DRiV in a timely manner or on terms and conditions as favorable as those we receive from DRiV, and it may cost us more to provide services to DRiV than DRiV pays us for those services. If functions previously performed by DRiV, or services provided by us to DRiV, cost us more than the amounts reflected in our historical financial statements, our profitability could decrease.

We could incur substantial additional costs and experience temporary business interruptions to transition information technology infrastructure in connection with the planned Spin-Off.

We may incur temporary interruptions in business operations if we and DRiV cannot transition effectively from the existing transactional and operational systems and data centers retained by the other, or from the transition services that support these functions. We may not be successful in implementing new systems and transitioning data, and we may incur substantially higher costs for implementation than currently anticipated. Our failure to avoid operational interruptions as we implement any necessary new systems, our failure to implement any new systems and replace services successfully, or the insufficiency of our business continuity and disaster recovery capabilities in the event of a disruption of our information technology services, could disrupt our business and have a material adverse effect on our profitability. In addition, if we are unable to replicate or transition certain systems, our ability to comply with regulatory requirements could be impaired.

DRiV may not satisfy its obligations under various agreements that have been or will be executed as part of the planned Spin-Off.

In connection with the planned spin-off, we and DRiV will enter various agreements that govern the allocation of assets and liabilities between the two company and other matters. Included among these agreements will be a Separation and Distribution Agreement, Employee Matters Agreement, Transition Services Agreement, Tax Matters Agreement, Intellectual Property Matters Agreement and certain other agreements. Certain of these agreements will provide for the performance of services by each company for the benefit of the other for a period of time after the planned Spin-Off. We will rely on DRiV to satisfy its performance and payment obligations under these agreements. If DRiV is unable to satisfy its obligations under these agreements, including its indemnification obligations, we could incur operational difficulties or losses.

There could be significant liability if the planned Spin-Off is determined to be a taxable transaction.

A condition to the planned spin-off is our receipt of an opinion from certain tax advisors with respect to certain U.S. federal income tax consequences of the DRiV spin-off, each of which is in substance and form satisfactory to us. The opinion is expected to conclude that the planned spin-off of 100% of the outstanding DRiV shares to our stockholders and certain related transactions will qualify as tax-free to us and our stockholders under Sections 355 and 368 of the Internal Revenue Code, except to the extent of any cash received in lieu of fractional shares of DRiV's common stock. Any such opinion is not binding on the U.S. Internal Revenue Service ("IRS"). Accordingly, the IRS may reach conclusions with respect to the DRiV that are different from the conclusions reached in the opinion. The opinion will rely on certain facts, assumptions, representations and undertakings from us and DRiV regarding the past and future conduct of the companies' respective businesses and other matters, which, if incomplete, incorrect or not satisfied, could alter the conclusions of the party giving such opinion or ruling.

If the planned Spin-Off ultimately is determined to be taxable, the Spin-Off could be treated as a taxable dividend to our stockholders for U.S. federal income tax purposes, and our stockholders could incur significant U.S. federal income tax liabilities. In addition, we would recognize a taxable gain to the extent that the fair market value of DRiV common stock

exceeds our tax basis in such stock on the date of the planned Spin-Off. The Tax Matters Agreement we will enter into with DRiV will address which company is responsible for any taxes imposed as a result of the planned Spin-Off.

ITEM 1B. UNRESOLVED STAFF COMMENTS.

None.

ITEM 2. PROPERTIES.

We lease our principal executive offices, which are located at 500 North Field Drive, Lake Forest, Illinois, 60045.

	Reportable Segments					
	Clean Air	Ride Performance	Aftermarket	Powertrain	Motorparts	Total
Manufacturing plants:						
North America	15	7	2	23	10	57
Europe	20	7	1	33	13	74
South America	2	3	—	5	3	13
Asia Pacific	27	8	2	24	5	66
	64	25	5	85	31	210
Engineering and technical facilities	5	7	—	14	11	37
Shared engineering and technical facilities (1)	—	3	—	—	—	3
Distribution centers and warehouses	—	—	22	—	36	58
Total as of December 31, 2018	69	35	27	99	78	308
Lease	38	9	23	25	45	140
Own	31	26	4	74	33	168
Total	69	35	27	99	78	308

(1) Clean Air shares three engineering and technical facilities with Ride Performance.

The above-described manufacturing locations are located in Argentina, Australia, Belgium, Brazil, Canada, China, Czech Republic, Denmark, France, Germany, Hungary, India, Italy, Japan, Mexico, Morocco, Philippines, Poland, Portugal, Russia, Romania, Spain, South Africa, South Korea, Sweden, Thailand, Turkey, the United Kingdom, the United States and Vietnam.

We hold 35 of the above-described international manufacturing facilities through joint ventures in which we own controlling interest. In addition, five joint ventures in which we hold a noncontrolling interest operate eight manufacturing facilities in Europe, Asia and North America, which are not included in the table above.

We also have warehouses and distribution facilities at our manufacturing sites and a few off-site locations, substantially all of which we lease, and a network of 11 technical support centers that provide some of the most comprehensive training programs in the industry that educate our partners and customers with emerging vehicle technologies and vehicle repair operational skills.

We believe that substantially all of our plants and equipment are, in general, well maintained and in good operating condition. They are considered adequate for present needs and, as supplemented by planned construction, are expected to remain adequate for the near future.

We also believe that we generally have satisfactory title to the properties owned and used in our respective businesses. In the United States, substantially all of our owned real property is pledged to secure our obligations under our senior credit facility.

ITEM 3. LEGAL PROCEEDINGS.

We are involved in environmental remediation matters, legal proceedings, claims (including warranty claims) and investigations. These matters are typically incidental to the conduct of our business and create the potential for contingent losses. We accrue for potential contingent losses when our review of available facts indicates that it is probable a loss has been incurred and the amount of the loss is reasonably estimable. Each quarter we assess our loss contingencies based upon currently available facts, existing technology, presently enacted laws and regulations and taking into consideration the likely effects of inflation and other societal and economic factors and record adjustments to these reserves as required. As an example, we consider all available evidence, including prior experience in remediation of contaminated sites, other companies' cleanup experiences and data released by the U.S. Environmental Protection Agency or other organizations when we evaluate our environmental remediation contingencies. All of our loss contingency estimates are subject to revision in future periods based on actual costs or new information. With respect to our environmental liabilities, where future cash flows are fixed or reliably determinable, we have discounted those liabilities. We evaluate recoveries separately from the liability and, when they are assured, recoveries are recorded and reported separately from the associated liability in our consolidated financial statements.

Environmental Matters

We are subject to a variety of environmental and pollution control laws and regulations in all jurisdictions in which we operate. We have been notified by the U.S. Environmental Protection Agency, other national environmental agencies, and various provincial and state agencies that we may be a potentially responsible party ("PRP") under such laws for the cost of remediating hazardous substances pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") and other national and state or provincial environmental laws. PRP designation typically requires the funding of site investigations and subsequent remedial activities. Many of the sites that are likely to be the costliest to remediate are often current or former commercial waste disposal facilities to which numerous companies sent wastes. Despite the potential joint and several liability which might be imposed on us under CERCLA and some of the other laws pertaining to these sites, our share of the total waste sent to these sites generally has been small. We believe our exposure for liability at these sites is limited.

On a global basis, we have also identified certain other present and former properties at which we may be responsible for cleaning up or addressing environmental contamination, in some cases as a result of contractual commitments and/or federal or state environmental laws. We are actively seeking to resolve these actual and potential statutory, regulatory, and contractual obligations.

We expense or capitalize, as appropriate, expenditures for ongoing compliance with environmental regulations. As of December 31, 2018 , we have the obligation to remediate or contribute towards the remediation of certain sites, including the sites discussed above at which we may be a PRP. Our aggregated estimated share of environmental remediation costs for all these sites on a discounted basis was approximately $40 million as of December 31, 2018 , of which $12 million is recorded in accrued expenses and other current liabilities and $28 million is recorded in deferred credits and other liabilities in our consolidated balance sheets. For those locations where the liability was discounted, the weighted average discount rate used was 2.9%. The undiscounted value of the estimated remediation costs was $46 million as of December 31, 2018. Our expected payments of environmental remediation costs for non-indemnified locations are estimated to be approximately $10 million in 2019, $6 million in 2020, $3 million in both 2021 and 2022, $2 million in 2023 and $16 million in aggregate thereafter.

In addition to amounts described above, we estimate that we will make expenditures for property, plant and equipment for environmental matters of approximately $14 million in 2019 and $7 million in 2020.

Based on information known to us from site investigations and the professional judgment of consultants, we have established reserves that we believe are adequate for these costs. Although we believe these estimates of remediation costs are reasonable and are based on the latest available information, the costs are estimates, difficult to quantify based on the complexity of the issues, and are subject to revision as more information becomes available about the extent of remediation required. At some sites, we expect that other parties will contribute to the remediation costs. In addition, certain environmental statutes provide that our liability could be joint and several, meaning that we could be required to pay amounts in excess of our share of remediation costs. The financial strength of other PRPs at these sites has been considered, where appropriate, in our determination of our estimated liability. We do not believe that any potential costs associated with our current status as a PRP, or as a liable party at the other locations referenced herein, will be material to our annual consolidated financial position, results of operations, or liquidity.

Antitrust Investigations and Litigation

On March 25, 2014, representatives of the European Commission (EC) were at Tenneco GmbH's Edenkoben, Germany administrative facility to gather information in connection with an ongoing global antitrust investigation concerning multiple automotive suppliers. On the same date, we also received a related subpoena from the U.S. Department of Justice ("DOJ").

On November 5, 2014, the DOJ granted conditional leniency to Tenneco, its subsidiaries and its 50% affiliates as of such date ("2014 Tenneco Entities") pursuant to an agreement we entered into under the Antitrust Division's Corporate Leniency Policy. This agreement provides important benefits to the 2014 Tenneco Entities in exchange for our self-reporting of matters to the DOJ and our continuing full cooperation with the DOJ's resulting investigation. For example, the DOJ will not bring any criminal antitrust prosecution against the 2014 Tenneco Entities, nor seek any criminal fines or penalties, in connection with the matters we reported to the DOJ. Additionally, there are limits on the liability of the 2014 Tenneco Entities related to any follow-on civil antitrust litigation in the United States. The limits include single rather than treble damages, as well as relief from joint and several antitrust liability with other relevant civil antitrust action defendants. These limits are subject to us satisfying the DOJ and any court presiding over such follow-on civil litigation.

On April 27, 2017, we received notification from the EC that it has administratively closed its global antitrust inquiry regarding the production, assembly, and supply of complete exhaust systems. No charges against us or any other competitor were initiated at any time and the EC inquiry is now closed.

Certain other competition agencies are also investigating possible violations of antitrust laws relating to products supplied by us and our subsidiaries, including Federal-Mogul. We have cooperated and continue to cooperate fully with all of these antitrust investigations, and have taken other actions to minimize our potential exposure.

The Company and certain of its competitors are also currently defendants in civil putative class action litigation, and are subject to similar claims filed by other plaintiffs, in the United States and Canada. More related lawsuits may be filed, including in other jurisdictions. Plaintiffs in these cases generally allege that defendants have engaged in anticompetitive conduct, in violation of federal and state laws, relating to the sale of automotive exhaust systems or components thereof. Plaintiffs seek to recover, on behalf of themselves and various purported classes of purchasers, injunctive relief, damages and attorneys' fees. However, as explained above, because the DOJ granted conditional leniency to the 2014 Tenneco Entities, our civil liability in United States follow-on actions with respect to these entities is limited to single damages and we will not be jointly and severally liable with the other defendants, provided that we have satisfied our obligations under the DOJ leniency agreement and approval is granted by the presiding court. Typically, exposure for follow-on actions in Canada is less than the exposure for U.S. follow-on actions.

Following the EC's decision to administratively close its antitrust inquiry into exhaust systems in 2017, receipt by the 2014 Tenneco Entities of conditional leniency from the DOJ and discussions during the third quarter of 2017 following the appointment of a special settlement master in the civil putative class action cases pending against the Company and/or certain of its competitors in the United States, the Company continues to vigorously defend itself and/or take actions to minimize its potential exposure to matters pertaining to the global antitrust investigation, including engaging in settlement discussions when it is in the best interests of the Company and its stockholders. For example, in October 2017, we settled an administrative action brought by Brazil's competition authority for an amount that was not material. In December 2018, we settled a separate administrative action brought by Brazil's competition authority against a Federal-Mogul subsidiary, also for an amount that was not material.

Additionally, in February 2018, we settled civil putative class action litigation in the United States brought by classes of direct purchasers, end-payors and auto dealers. No other classes of plaintiffs have brought claims against us in the United States. Based upon earlier developments, including settlement discussions, we established a reserve of $132 million in our second quarter 2017 financial results for settlement costs that were probable, reasonably estimable, and expected to be necessary to resolve our antitrust matters globally, which primarily involves the resolution of civil suits and related claims. Of the $132 million reserve that was established, $79 million was paid through December 31, 2018 resulting in a remaining reserve of $53 million as of December 31, 2018, which is recorded in accrued expenses and other current liabilities in our consolidated balance sheets. While the Company, including its Federal-Mogul subsidiaries, continues to cooperate with certain competition agencies investigating possible violations of antitrust laws relating to products supplied by the Company, and the Company may be subject to other civil lawsuits and/or related claims, no amount of this reserve is attributable to matters with the DOJ or the EC, and no such amount is expected based on current information.

Our reserve for antitrust matters is based upon all currently available information and an assessment of the probability of events for those matters where we can make a reasonable estimate of the costs to resolve such outstanding matters. Our estimate involves significant judgment, given the number, variety and potential outcomes of actual and potential claims, the uncertainty of future rulings and approvals by a court or other authority, the behavior or incentives of adverse parties or regulatory authorities, and other factors outside of our control. As a result, our reserve may change from time to time, and actual costs may vary. Although the ultimate outcome of any legal matter cannot be predicted with certainty, based on current information, we do not expect that any such change in the reserve will have a material adverse impact on our annual consolidated financial position, results of operations or liquidity.

Other Legal Proceedings, Claims and Investigations

For many years we have been and continue to be subject to lawsuits initiated by claimants alleging health problems as a result of exposure to asbestos. Our current docket of active and inactive cases is less than 500 cases in the United States and less than 50 in Europe.

With respect to the claims filed in the United States, the substantial majority of the claims are related to alleged exposure to asbestos in our line of Walker® exhaust automotive products although a significant number of those claims appear also to involve occupational exposures sustained in industries other than automotive. A small number of claims have been asserted against one of our subsidiaries by railroad workers alleging exposure to asbestos products in railroad cars. We believe, based on scientific and other evidence, it is unlikely that U.S. claimants were exposed to asbestos by our former products and that, in any event, they would not be at increased risk of asbestos-related disease based on their work with these products. Further, many of these cases involve numerous defendants, with the number in some cases exceeding 100 defendants from a variety of industries. Additionally, in many cases the plaintiffs either do not specify any, or specify the jurisdictional minimum, dollar amount for damages.

With respect to the claims filed in Europe, the substantial majority relate to occupational exposure claims brought by current and former employees of Federal-Mogul facilities in France and amounts paid out were not material. A small number of occupational exposure claims have also been asserted against Federal-Mogul entities in Italy and Spain.

As major asbestos manufacturers and/or users continue to go out of business or file for bankruptcy, we may experience an increased number of these claims. We vigorously defend ourselves against these claims as part of our ordinary course of business. In future periods, we could be subject to cash costs or charges to earnings if any of these matters are resolved unfavorably to us. To date, with respect to claims that have proceeded sufficiently through the judicial process, we have regularly achieved favorable resolutions. Accordingly, we presently believe that these asbestos-related claims will not have a material adverse impact on our annual consolidated financial position, results of operations or liquidity.

In connection with Federal-Mogul's emergence from bankruptcy in 2008, trusts were funded and established to assume liability for and resolve Federal-Mogul's legacy asbestos liabilities in the United States and United Kingdom. Accordingly, those legacy liabilities in the United States and United Kingdom have had no ongoing impact on Federal-Mogul, Tenneco or their operations.

We are also from time to time involved in other legal proceedings, claims or investigations. Some of these matters involve allegations of damages against us relating to environmental liabilities (including toxic tort, property damage and remediation), intellectual property matters (including patent, trademark and copyright infringement, and licensing disputes), personal injury claims (including injuries due to product failure, design or warning issues, and other product liability related matters), taxes, unclaimed property, employment matters, and commercial or contractual disputes, sometimes related to acquisitions or divestitures. Additionally, some of these matters involve allegations relating to legal compliance.

While we vigorously defend ourselves against all of these legal proceedings, claims and investigations and take other actions to minimize our potential exposure, in future periods, we could be subject to cash costs or charges to earnings if any of these matters are resolved on unfavorable terms. Although the ultimate outcome of any legal matter cannot be predicted with certainty, based on current information, including our assessment of the merits of the particular claim, except as described above under "Antitrust Investigations", we do not expect the legal proceedings, claims or investigations currently pending against us will have any material adverse impact on our annual consolidated financial position, results of operations or liquidity.

Warranty Matters

We provide warranties on some of our products. The warranty terms vary but range from one year up to limited lifetime warranties on some of our premium aftermarket products. Provisions for estimated expenses related to product warranty are made at the time products are sold or when specific warranty issues are identified with our products. These estimates are established using historical information about the nature, frequency, and average cost of warranty claims. We actively study trends of our warranty claims and take action to improve product quality and minimize warranty claims. We believe that the warranty reserve is appropriate; however, actual claims incurred could differ from the original estimates, requiring adjustments to the reserve. The reserve is included in both "accrued expenses and other current liabilities" and "deferred credits and other liabilities" in the consolidated balance sheets.

ITEM 4. MINE SAFETY DISCLOSURES.

Not applicable.

ITEM 4.1. EXECUTIVE OFFICERS OF THE REGISTRANT.

The following provides information concerning the persons who serve as our executive officers as of March 15, 2019 .

Name and Age	Offices Held
Brian J. Kesseler (52)	Co-Chief Executive Officer
Roger J. Wood (56)	Co-Chief Executive Officer
Bradley S. Norton (55)	Executive Vice President and President Original Equipment
Peng (Patrick) Guo (53)	Executive Vice President and President Clean Air
Rainer Jueckstock (59)	Executive Vice President and President Powertrain
Jason M. Hollar (45)	Executive Vice President Finance and Chief Financial Officer
Kaled Awada (44)	Senior Vice President and Chief Human Resources Officer
Gregg A. Bolt (59)	Senior Vice President Integration Office
Ben P. Patel (51)	Senior Vice President and Chief Technology Officer
Brandon B. Smith (38)	Senior Vice President, General Counsel and Corporate Secretary
John S. Patouhas (52)	Vice President and Chief Accounting Officer

Brian J. Kesseler — Mr. Kesseler became Co-Chief Executive Officer in October 2018. He was previously Chief Executive Officer from May 2017 to September 2018. He served as Chief Operating Officer from January 2015 to May 2017. Prior to joining Tenneco, he spent more than 20 years working for Johnson Controls Inc., most recently serving as President of the Johnson Controls Power Solutions business. In 2013, he was elected a corporate officer, and was a member of the Johnson Controls executive operating team. Mr. Kesseler also served as the sponsor of Johnson Controls' Manufacturing Operations Council. Mr. Kesseler joined JCI in 1994 and during his tenure held leadership positions in all of the company's business units, including serving as Vice President and General Manager, Service-North America, Systems and Services Europe, and Unitary Products Group, for the Building Efficiency business. He began his career with the Ford Motor Company in 1989 and worked in North America Assembly Operations for five years, specializing in manufacturing management. Mr. Kesseler became a director of our company in October 2016.

Roger J. Wood — Mr. Wood became Co-Chief Executive Officer in October 2018. Mr. Wood retired in 2015 as Dana Holding Corporation's (now known as Dana Incorporated) President and Chief Executive Officer, a position he held since 2011, when he joined Dana. Prior to joining Dana Holding Corporation, Mr. Wood served as Executive Vice President and Group President for the Engine Group at BorgWarner. In his 26-year career at BorgWarner, Mr. Wood served in various leadership roles with global operation responsibilities. He is a member of the board of directors of Brunswick Corporation and Executive Director of Fallbrook Technologies. Mr. Wood has been a director of our company since 2016.

Bradley S. Norton — Mr. Norton joined Tenneco as Executive Vice President in October 2018. Prior to joining Tenneco, Mr. Norton was Co-Chairman of the Board and Co-Chief Executive Officer of Federal-Mogul Holdings LLC from March 2017 to September 2018, and Chief Executive Officer, Federal-Mogul Motorparts from July 2014 to March 2017. He was also elected to the Board of Managers of Federal-Mogul LLC in March 2017. Prior to that appointment, Mr. Norton was Senior Vice President, Chassis & Service, Federal-Mogul Motorparts beginning in July 2014.

Peng (Patrick) Guo — Mr. Guo was named Executive Vice President and President Clean Air in March 2017. Previously, Mr. Guo was Executive Vice President, Asia Pacific since December 2016, and was Senior Vice President and General Manager, Asia Pacific from October 2014 until December 2016. Mr. Guo served as Vice President and Managing Director, China from 2007 until October 2014. From 1996 to 2003, Mr. Guo served as General Manager, Asia Aftermarket Operations while based in Beijing, China. He left Tenneco in October 2003 to become president of the AGC Automotive China Operations for the Asahi Glass Company. He returned to Tenneco in July 2007. Before joining Tenneco, Mr. Guo was an engineer at the Ford Motor Company, which included assignments in manufacturing, quality and product design.

Rainer Jueckstock — Mr. Jueckstock joined Tenneco as Executive Vice President and President Powertrain in October 2018. Prior to joining Tenneco, Mr. Jueckstock was Co-Chairman of the Board and Co-Chief Executive Officer of Federal-Mogul LLC from 2014 to 2018, and Chief Executive Officer, Federal-Mogul Powertrain from 2012 to 2018. Prior to his Co-Chairman and Co-Chief Executive Officer positions, Mr. Jueckstock was Senior Vice President, Powertrain Energy from 2005 to 2012, a member of the Strategy Board from 2005 to 2012 and an officer of Federal-Mogul Corporation from 2005 to 2012. He is a director of Plexus Corp.

Jason M. Hollar — Mr. Hollar became Executive Vice President and Chief Financial Officer in July 2018. He joined Tenneco as Senior Vice President Finance and served from June 2017 to June 2018. Prior to joining Tenneco, Mr. Hollar was Chief Financial Officer of Sears Holdings Corporation beginning in October 2016 and has served as Senior Vice President, Finance of Sears since October 2014. Previously, he was with Delphi Automotive PLC, serving from December 2013 to September 2014 as Vice President and Corporate Controller and from April 2011 to November 2013 as CFO, Powertrain Systems and Delphi Europe, Middle East and Africa.

Kaled Awada — Mr. Awada joined Tenneco as Senior Vice President and Chief Human Resources Officer in September 2018. Prior to joining Tenneco, Mr. Awada held Human Resources leadership positions of increasing responsibility at Aptiv PLC for three years, most recently Global Vice President, Human Resources, for the company's electrical distribution systems business. He previously held global Human Resources roles with Eaton Corporation, Textron Fastening Systems, and Faurecia Exhaust Systems.

Gregg A. Bolt — Mr. Bolt has been the Senior Vice President Integration Office since September 2018. He served as Senior Vice President Global Human Resources and Administration from February 2013 to August 2018. Prior to joining Tenneco, Mr. Bolt worked for Quad/Graphics, Inc. as Executive Vice President, Human Resources and Administration from March 2009 to January 2013. Previously, he was with Johnson Controls Inc. for more than 10 years, serving most recently as Vice President, Human Resources for JCI's Building Efficiency division.

Ben P. Patel — Dr. Patel has been the Senior Vice President and Chief Technology officer since October 2018; he served as the Vice President and Chief Technology Officer since March 2017. He served as Vice President, Global Research and Development, Clean Air from March 2012 to March 2017 and Vice President, Technology Development, Emission Control from January 2011 to February 2012. Prior to joining Tenneco in 2011, Dr. Patel worked at GE Global Research Center from July 1998 to December 2007, where he held the position of senior scientist. From January 2008 to December 2010 he served as technology portfolio manager for GE Technology Ventures, a division of General Electric's corporate trading and licensing group. He is a director of Lincoln Electric Holdings, Inc.

Brandon B. Smith — Mr. Smith has served as our Senior Vice President, General Counsel and Corporate Secretary since February 2018 and is responsible for managing our worldwide legal affairs including corporate governance and compliance. Previously, he served as our Vice President, Deputy General Counsel and Assistant Secretary since November 2014 and Interim General Counsel since October 2017. Mr. Smith also served as our Assistant General Counsel from April 2011 to November 2014 and as our Senior Corporate Counsel from November 2010 until April 2011. Mr. Smith joined Tenneco in July 2008 as Corporate Counsel. Prior to joining Tenneco, Mr. Smith was a corporate attorney with Kirkland & Ellis LLP, representing both public and private enterprises on a wide variety of corporate engagements.

John S. Patouhas — Mr. Patouhas has served as our Vice President and Chief Accounting Officer since February 2019. Mr. Patouhas served since 2015 as Vice President and Chief Accounting Officer of Federal-Mogul (a subsidiary of Tenneco since October 2018). From 2011 to 2015, Mr. Patouhas was Vice President and Corporate Controller at Altair Engineering, a product design and development, engineering software and cloud computing software provider. He has over 20 years' experience in financial reporting and corporate accounting at a variety of companies, and began his career as an auditor with Deloitte. Mr. Patouhas is a CPA and CGMA, and has an MBA from Wayne State University.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES.

Our outstanding shares of Class A Common Stock, par value $0.01 per share, are listed on the New York Stock Exchange under the symbol "TEN". On February 1, 2017, we announced the reinstatement of a quarterly dividend program under which we expect to pay a quarterly dividend of $0.25 per share on our common stock, representing a planned annual dividend of $1.00 per share. The Company did not pay any dividends in fiscal year 2016. While we currently expect to pay comparable quarterly cash dividends in the near future, our dividend program and the payment of future cash dividends are subject to continued capital availability, the judgment of our Board of Directors and our continued compliance with the provisions pertaining to the payment of dividends under our debt agreements. Once the contemplated separation of our businesses through a spin-off occurs, each independent company will determine its own dividend policy.

For additional information concerning our payment of dividends, see "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in Item 7.

As of March 11, 2019 , there were approximately 10,100 holders of record of our class A common stock, including brokers and other nominees and two holders of record of our class B common stock.

Purchase of equity securities by the issuer and affiliated purchasers

The following table provides information relating to our purchase of shares of our class A common stock in the fourth quarter of 2018 . These purchases include shares withheld upon vesting of restricted stock for minimum tax withholding obligations. We generally intend to continue to satisfy statutory minimum tax withholding obligations in connection with the vesting of outstanding restricted stock through the withholding of shares.

Period	Total Number of Shares Purchased (1)	Average Price Paid	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Value of Shares That May Yet be Purchased Under These Plans or Programs (Millions)
October 2018	328	$ 35.37	—	$ 231
November 2018	—	$ —	—	$ 231
December 2018	—	$ —	—	$ 231
Total	328	$ 35.37	—	$ 231

(1) Shares withheld upon vesting of restricted stock in the fourth quarter of 2018.

During 2015, our Board of Directors approved a share repurchase program, authorizing us to repurchase up to $550 million of our then outstanding common stock over a three-year period ("2015 Program"). We purchased 4,182,613 shares in 2016 through open market purchases, which were funded through cash from operations, at a total cost of $225 million , at an average price of $53.89 per share. These repurchased shares are held as part of our treasury stock.

In February 2017, our Board of Directors authorized the repurchase of up to $400 million of our then outstanding common stock over the next three years ("2017 Program"), this included $112 million that remained authorized under the 2015 Program. We generally acquire the shares through open market or privately negotiated transactions, and have historically utilized cash from operations. The repurchase program does not obligate us to repurchase shares within any specific time or situations.

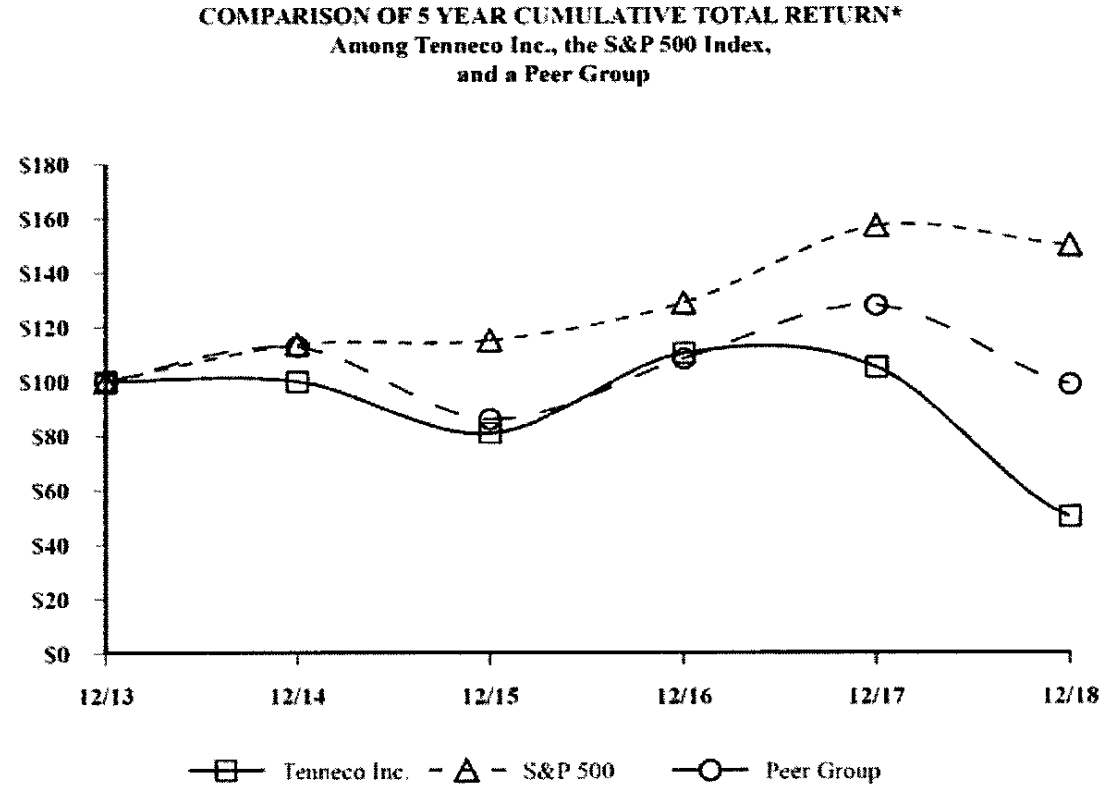
No new share repurchase programs were authorized by our Board of Directors in 2018 and we did not repurchase any shares under the 2017 Program in 2018. Since we announced the repurchase program in January 2015, we have repurchased 11.3 million shares for $607 million through December 31, 2018.

Recent Sales of Unregistered Securities

None.

Share Performance

The following graph shows a five year comparison of the cumulative total stockholder return on Tenneco's common stock as compared to the cumulative total return of two other indexes: a custom composite index ("Peer Group") and the Standard & Poor's 500 Composite Stock Price Index. The companies included in the Peer Group are: American Axle & Manufacturing Co., BorgWarner Inc., Cummins Inc., Johnson Controls International Plc, Lear Corp., Magna International Inc., and Meritor, Inc. These comparisons assume an initial investment of $100 and the reinvestment of dividends.



*$100 invested on 12/31/13 in stock or index, including reinvestment of dividends.
Fiscal year ending December 31

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	As of December 31,					
	2013	2014	2015	2016	2017	2018
Tenneco Inc.	$ 100.00	$ 100.07	$ 81.16	$ 110.43	$ 105.25	$ 50.40
S&P 500	100.00	113.69	115.26	129.05	157.22	150.33
Peer Group	100.00	112.87	86.23	108.46	128.12	99.21

The graph and other information furnished in the section titled "Share Performance" under this Part II, Item 5 of this Form 10-K shall not be deemed to be "soliciting" material or to be "filed" with the Securities and Exchange Commission or subject to Regulation 14A or 14C, or to the liabilities of Section 18 of the Securities Exchange Act of 1934, as amended.

ITEM 6. SELECTED FINANCIAL DATA.

The following data should be read in conjunction with Item 7 — "Management's Discussion and Analysis of Financial Condition and Operations" and our consolidated financial statements in Item 8 — "Financial Statements and Supplementary Data." These items include discussions of factors affecting comparability of the information shown below, including the completion of the Acquisition of Federal-Mogul on October 1, 2018 as discussed in Item 8 — Note 3, Acquisitions and Divestitures .

The amounts below reflect the revisions as discussed in Item 8 — Note 2, Summary of Significant Accounting Policies .

	Year Ended December 31				
	2018	2017	2016	2015	2014
	(Millions Except Share and Per Share Amounts)				
Statements of Income Data:					
Net sales and operating revenues	$ 11,763	$ 9,274	$ 8,597	$ 8,180	$ 8,382
Earnings (loss) before interest expense, income taxes, and noncontrolling interests (a)	$ 306	$ 408	$ 479	$ 503	$ 469
Net income	$ 111	$ 265	$ 415	$ 291	$ 261
Net income attributable to Tenneco Inc.	$ 55	$ 198	$ 347	$ 237	$ 219
Basic earnings per share of common stock	$ 0.93	$ 3.75	$ 6.20	$ 3.98	$ 3.61
Diluted earnings per share of common stock	$ 0.93	$ 3.73	$ 6.15	$ 3.94	$ 3.55
Cash dividends declared	$ 1.00	$ 1.00	$ —	$ —	$ —
Balance Sheet Data (at year end):					
Total assets	$ 13,232	$ 4,796	$ 4,312	$ 3,937	$ 3,964
Short-term debt	$ 153	$ 103	$ 117	$ 103	$ 99
Long-term debt	$ 5,340	$ 1,358	$ 1,294	$ 1,124	$ 1,055
Redeemable noncontrolling interests	$ 138	$ 42	$ 40	$ 41	$ 34
Total equity	$ 1,916	$ 682	$ 573	$ 425	$ 497

(a) Includes restructuring and asset impairments for each year as follows:

	Year Ended December 31				
	2018	2017	2016	2015	2014
			(Millions)		
Restructuring and asset impairments, net	$ 112	$ 47	$ 30	$ 63	$ 49

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS.

You should read the following discussion and analysis in conjunction with the consolidated financial statements and related notes included in Item 8. — "Financial Statements and Supplementary Data." All references to "Tenneco," "we," "us," "our" and "the Company" refer to Tenneco Inc. and its consolidated subsidiaries. Notes referenced in this discussion and analysis refer to the notes to consolidated financial statements that are found in Item 8.—"Financial Statements and Supplementary Data—Notes to Consolidated Financial Statements."

The consolidated financial statements for the years ended December 31, 2017 and 2016 have been revised to correct for prior period errors as discussed in Item 8 — Note 2, Summary of Significant Accounting Policies . Accordingly, this Management's Discussion and Analysis of Financial Condition and Results of Operations reflect the effects of the revisions.

OVERVIEW

Our Company

We are one of the world's leading manufacturers of clean air, powertrain and ride performance products and systems for light vehicle, commercial truck, off-highway, industrial and aftermarket customers. Both original equipment (OE) vehicle designers and manufacturers and the repair and replacement markets, or aftermarket, are served globally through leading brands, including Monroe®, Champion®, Öhlins®, MOOG®, Walker®, Fel-Pro®, Wagner®, Ferodo®, Rancho®, Thrush®, National®, and Sealed Power®, among others. As of December 31, 2018 , we operated 210 manufacturing facilities worldwide and employed approximately 81,000 people to service our customers' demands.

Factors that continue to be critical to our success include winning new business awards, managing our overall global manufacturing footprint to ensure proper placement and workforce levels in line with business needs, maintaining competitive wages and benefits, maximizing efficiencies in manufacturing processes and reducing overall costs. In addition, our ability to adapt to key industry trends, (such as a shift in consumer preferences to other vehicles in response to higher fuel costs and other economic and social factors, increasing technologically sophisticated content, changing aftermarket distribution channels, increasing environmental standards and extended product life of automotive parts), also play a critical role in our success. Other factors that are critical to our success include adjusting to economic challenges such as increases in the cost of raw materials and our ability to successfully reduce the impact of any such cost increases through material substitutions, cost reduction initiatives and other methods.

For 2018, light vehicle production was slightly down compared to 2017 in some of the geographic regions in which we operate. Light vehicle production was down 1% in both North America and Europe, and down 4% in China. Light vehicle production was up 6% in India and 3% in South America.

Federal-Mogul Acquisition

On October 1, 2018, we closed the acquisition of Federal-Mogul LLC ("Federal-Mogul"), (the "Acquisition" or the "Federal-Mogul Acquisition") pursuant to the Membership Interest Purchase Agreement, dated as of April 10, 2018 (the "Purchase Agreement"), by and among us, Federal-Mogul, American Entertainment Properties Corp. ("AEP") and Icahn Enterprises L.P. ("IEP"). Total consideration was approximately $3.7 billion . See Note 3, Acquisitions and Divestitures to our consolidated financial statements for additional information.

As a result of the Federal-Mogul Acquisition, the number of our reportable segments increased from three to five segments, consisting of: our historical Clean Air, Ride Performance, and Aftermarket segments and the newly acquired Powertrain and Motorparts segments. Segment information for periods prior to the Federal-Mogul Acquisition do not include amounts for the Federal-Mogul operations.

Our reportable segments, which are also our operating segments, align with how the Chief Operating Decision Maker allocates resources and assesses performance against our key growth strategies. We evaluate segment performance based primarily on earnings before interest expense, income taxes, noncontrolling interests, depreciation and amortization (EBITDA including noncontrolling interests).

Financial Executive Summary

- We reported total revenue for 2018 of $11,763 million , up 27% from $9,274 million in 2017 . The Federal-Mogul acquisition increased revenues by approximately $1,886 million , or 20% , in 2018 . The remaining increase in our revenues of $603 million , or 7% , was driven by the growth in Clean Air and Ride Performance segments. Excluding the impact of currency and substrate sales, organic revenue was up $292 million, or 4%, from $7,087 million to $7,379 million, which was driven primarily by stronger light vehicle volumes, higher commercial truck, off-highway and other vehicle revenues and new platforms.
- Earnings before interest expense, income taxes, and noncontrolling interests (EBIT) was $ 306 million for 2018 , a decrease of $102 million, when compared to $ 408 million in 2017. Excluding the Federal-Mogul acquisition, EBIT decreased compared to 2017, as higher light vehicle volumes, increased commercial truck, off-highway and other vehicle revenues and new platforms were more than offset by unfavorable mix, price reductions, higher depreciation and amortization expenses, higher restructuring and related expenses, costs related to the Acquisition and expected spin, loss on extinguishment of debt, a litigation settlement charge, and continued investments in growth for new programs. EBIT in 2017 also included a $132 million antitrust settlement accrual, a $11 million goodwill impairment charge and $13 million in charges related to pension derisking and the acceleration of restricted stock vesting. See "Segment Results of Operations" for further information on EBIT including noncontrolling interests.

RESULTS OF OPERATIONS

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Consolidated Results of Operations

The following table presents our consolidated results of operations and reflects the revisions as discussed in Item 8 — Note 2, Summary of Significant Accounting Policies :

	Year Ended December 31		Increase / (Decrease)	
	2018	2017	$ Change	% Change (1)
	(Millions Except Percent, Share and Per Share Amounts)			
Revenues				
Net sales and operating revenues	$ 11,763	$ 9,274	$ 2,489	27 %
Costs and expenses				
Cost of sales (exclusive of depreciation and amortization)	10,071	7,812	2,259	29 %
Selling, general, and administrative	794	638	156	24 %
Depreciation and amortization	345	226	119	53 %
Engineering, research, and development	204	158	46	29 %
Goodwill impairment charge	3	11	(8)	(73)%
	11,417	8,845	2,572	29 %
Other expense (income)				
Loss on sale of receivables	16	5	11	220 %
Non-service pension and postretirement benefit costs	20	16	4	25 %
Loss on extinguishment of debt	10	1	9	n/m
Equity in (earnings) losses of nonconsolidated affiliates, net of tax	(18)	1	(19)	n/m
Other expense (income), net	12	(2)	14	n/m
	40	21	19	90 %
Earnings before interest expense, income taxes, and noncontrolling interests	306	408	(102)	(25)%
Interest expense	132	72	60	83 %
Earnings before income taxes and noncontrolling interests	174	336	(162)	(48)%
Income tax expense (benefit)	63	71	(8)	(11)%
Net income	111	265	(154)	(58)%
Less: Net income attributable to noncontrolling interests	56	67	(11)	(16)%
Net income attributable to Tenneco Inc.	$ 55	$ 198	$ (143)	(72)%
Earnings per share				
Weighted average shares of common stock outstanding —				
Basic	58,625,087	52,796,184	5,828,903	11 %
Diluted	58,758,732	53,026,911	5,731,821	11 %
Basic earnings per share of common stock	$ 0.93	$ 3.75	$ (2.82)	(75)%
Diluted earnings per share of common stock	$ 0.93	$ 3.73	$ (2.80)	(75)%
Cash dividends declared per share	$ 1.00	$ 1.00	$ —	— %
Percent of revenues				
Cost of sales	86%	84%	2 %	
Selling, general, and administrative	7%	7%	— %	
EBIT	3%	4%	(1)%	
Net income attributable to Tenneco Inc.	—%	2%	(2)%	

(1) Percentages above denoted as "n/m" are not meaningful to present in the table.

Revenues

Total revenue for 2018 was $11,763 million , up 27% from $9,274 million in 2017 . The Federal-Mogul Acquisition increased revenues by approximately $1,886 million , or 20% , in 2018 . Excluding the Acquisition, organic revenues increased $603 million , or 7% , driven by the growth in Clean Air and Ride Performance segments. Excluding the impact of currency and substrate sales, organic revenue was up $292 million, or 4%, from $7,087 million to $7,379 million, which was driven primarily by stronger light vehicle volumes, higher commercial truck, off-highway and other vehicle revenues and new platforms. The following table lists the primary drivers behind the change in revenues ($ millions).

Year ended December 31, 2017	$ 9,274
Federal-Mogul Acquisition	1,886
Drivers in the change of organic revenues:	
Volume and mix	597
Currency exchange rates	12
Others	(6)
Year ended December 31, 2018	$ 11,763

Cost of sales

Cost of sales for 2018 was $10,071 million , or 86% of sales, compared to $7,812 million , or 84% of sales in 2017 . Excluding the Acquisition, organic cost of sales for 2018 was $8,434 million or 85% of organic sales. The following table lists the primary drivers behind the change in cost of sales ($ millions).

Year ended December 31, 2017	$ 7,812
Federal-Mogul Acquisition	1,637
Drivers in the change of organic cost of sales:	
Volume and mix	556
Material	13
Currency exchange rates	6
Restructuring and cost to achieve synergies	28
Other costs	19
Year ended December 31, 2018	$ 10,071

The impact of the Federal-Mogul Acquisition increased the cost of sales by $1,637 million in 2018 . The remaining increase in our organic cost of sales was mainly due to the year-over-year increase in volume, higher material costs, higher restructuring and costs to achieve synergies, higher manufacturing and impact of currency. Also refer to section below "Restructuring charges."

Selling, general and administrative (SG&A)

SG&A was up $156 million in 2018 , at $794 million , compared to $638 million in 2017 . The increase was due primarily to the impact of the Federal-Mogul Acquisition. Excluding the Acquisition, included in 2018 was $92 million of Acquisition and expected spin costs, $25 million of costs to achieve synergies, $18 million of cost reduction initiatives and $10 million of litigation settlement, while 2017 included a $132 million antitrust settlement accrual and $22 million of cost reduction initiatives. Also refer to section below "Restructuring charges."

Depreciation and amortization

Depreciation and amortization expense was $345 million and $226 million for 2018 and 2017 , respectively. The increase was due primarily to the impact of the Federal-Mogul Acquisition.

Engineering, research, and development

Engineering, research, and development expense was $204 million and $158 million in 2018 and 2017 , respectively. The increase was due primarily to the impact of the Federal-Mogul Acquisition. Also refer to section below "Restructuring charges."

Goodwill impairment charge

As a result of our goodwill impairment assessment in the fourth quarter of 2018, we determined the fair value of the North America Ride Performance reporting unit was lower than its carrying value. Accordingly, we recorded a full goodwill impairment charge of $3 million in the fourth quarter of 2018. This compared to an $11 million goodwill impairment charge in the fourth quarter of 2017, which related to our Europe and South America Aftermarket and Ride Performance reporting units.

Non-service pension and postretirement benefit costs
Non-service pension and postretirement benefit costs was up $4 million in 2018 at $20 million compared to $16 million at 2017.

Loss on extinguishment of debt
Loss on extinguishment of debt was $10 million in 2018 related to the repayment of our revolver and term loan A and the new refinancing in connection with the Federal-Mogul Acquisition. This compared to a $1 million charge recognized in 2017.

Equity in earnings (losses) of nonconsolidated affiliates, net of tax
Equity in earnings (losses) of nonconsolidated affiliates, net of tax was up $19 million in 2018 , at $18 million , compared to a loss of $1 million in 2017 . The increase was due to the impact of Federal-Mogul Acquisition.

Interest expense, net of interest capitalized
Interest expense in 2018 was $132 million (substantially all in our U.S. operations) net of interest capitalized of $5 million, and $72 million (substantially all in our U.S. operations) net of interest capitalized of $8 million in 2017 . The $60 million increase was primarily due to higher interest expense pertaining to the five-year $1,700 million term loan A facility and the seven-year
$1,700 million term loan B facility that were entered into in connection with the Acquisition and the interest expense on Federal-Mogul debt obligations assumed in the Acquisition, partially offset by the lower interest expense as a result of the retirement of the Company's term loan A and revolver borrowings on October 1, 2018 related to the Acquisition.

For more detailed explanations on our debt structure and senior credit facility refer to "Liquidity and Capital Resources -Capitalization" later in this Management's Discussion and Analysis.

Income Taxes
Income tax expense was $63 million on earnings before income taxes and noncontrolling interests of $174 million in 2018 as compared to income tax expense of $71 million on earnings before income taxes and noncontrolling interests of $336 million in 2017 . The tax expense recorded in 2018 included tax benefits of $10 million relating to a valuation allowance release at our Australian entities and $11 million of tax expense for changes in the toll tax as discussed below. The tax expense recorded in 2017 includes a net provisional tax expense of $43 million for one-time transition tax on deemed repatriation of previously deferred foreign earnings under the Tax Cuts and Jobs Act ("TCJA") as discussed below. The Company remeasured U.S. deferred taxes from an applicable federal rate of 35% to the new statutory rate of 21% at which they are expected to be utilized, recording a $51 million provisional expense. The tax expense recorded in 2017 included a net tax benefit of $74 million relating to recognizing a U.S. tax benefit for foreign taxes.

Net Income
Net income was $111 million for 2018, as compared to $265 million for 2017, a decrease of $154 million , as result of the aforementioned items.

Earnings before Interest Expense, Income Taxes, Noncontrolling Interests and Depreciation and Amortization ("EBITDA including noncontrolling interests")
EBITDA including noncontrolling interests was $ 651 million for 2018 , an increase of $17 million, when compared to
$ 634 million in 2017, as a result of the aforementioned items. See "Segment Results of Operations" for further information on EBITDA including noncontrolling interests.

Restructuring Charges
The classification of our restructuring charges, including costs to achieve synergies and other restructuring actions, in the consolidated statements of income is as follows:

	Year Ended December 31	
	2018	2017
	(Millions)	
Cost of sales	$ 66	$ 41
Engineering, research, and development	4	—
Selling, general, and administrative	40	6
Other expense	2	—
	$ 112	$ 47

See to Item 8 — Note 4, Restructuring Charges and Asset Impairments, Net for further information of restructuring initiatives.

Segment Results of Operations

Overview of Net Sales and Operating Revenues
Our Clean Air segment has substrate sales. Substrates are porous ceramic filters coated with a catalyst - typically, precious metals such as platinum, palladium and rhodium. We do not manufacture substrates, they are supplied to us by Tier 2 suppliers generally as directed by our OE customers. We generally earn a small margin on these components of the system. These substrate components have been increasing as a percentage of our revenue as the need for more sophisticated emission control solutions increases to meet more stringent environmental regulations, and as we capture more diesel aftertreatment business. While these substrates dilute our gross margin percentage, they are a necessary component of an emission control system.

Our value-add content in an emission control system includes designing the system to meet environmental regulations through integration of the substrates into the system, maximizing use of thermal energy to heat up the catalyst quickly, efficiently managing airflow to reduce back pressure as the exhaust stream moves past the catalyst, managing the expansion and contraction of the emission control system components due to temperature extremes experienced by an emission control system, using advanced acoustic engineering tools to design the desired exhaust sound, minimizing the opportunity for the fragile components of the substrate to be damaged when we integrate it into the emission control system and reducing unwanted noise, vibration and harshness transmitted through the emission control system.

We present these substrate sales separately in the following table because we believe investors utilize this information to understand the impact of this portion of our revenues on our overall business and because it removes the impact of potentially volatile precious metals pricing from our revenues. While our OE customers generally assume the risk of precious metals pricing volatility, it impacts our reported revenues.

Finally, we present these reconciliations of revenues in order to reflect value-add revenues without the effect of changes in foreign currency rates. We have not reflected any currency impact in the base period of the comparisons for measuring the effects of currency in the subsequent year.

The tables below reflects our segment revenues for 2018 and 2017 :

	Year Ended December 31, 2018					Year Ended December 31, 2017		
	Revenues	Substrate Sales	Value-add Revenues	Currency Impact on Value-add Revenues	Value-add Revenues excluding Currency	Revenues	Substrate Sales	Value-add Revenues
			(Millions)				(Millions)	
Clean Air	$ 6,707	$ 2,500	$ 4,207	$ 31	$ 4,176	$ 6,216	$ 2,187	$ 4,029
Ride Performance	1,949	—	1,949	(4)	1,953	1,807	—	1,807
Aftermarket	1,221	—	1,221	(29)	1,250	1,251	—	1,251
Powertrain	1,112	—	1,112	—	1,112	—	—	—
Motorparts	774	—	774	—	774	—	—	—
Total Tenneco Inc.	$ 11,763	$ 2,500	$ 9,263	$ (2)	$ 9,265	$ 9,274	$ 2,187	$ 7,087

	Year Ended December 31, 2018 Versus Year Ended December 31, 2017 Dollar and Percent Increase (Decrease)			
	Revenues	Percent	Value-add Revenues excluding Currency	Percent
	(Millions Except Percent Amounts)			
Clean Air	$ 491	8 %	$ 147	4 %
Ride Performance	142	8 %	146	8 %
Aftermarket	(30)	(2)%	(1)	— %
Powertrain	1,112	n/m	1,112	n/m
Motorparts	774	n/m	774	n/m
Total Tenneco Inc.	$ 2,489	27 %	$ 2,178	31 %

Light Vehicle Industry Production by Region for Years Ended December 31, 2018 and 2017 (According to IHS Markit, February 2019)

	Year Ended December 31			
	2018	2017	Increase (Decrease)	% Increase (Decrease)
	(Number of Vehicles in Thousands)			
North America	16,952	17,064	(112)	(1)%
Europe	21,971	22,216	(245)	(1)%
South America	3,394	3,291	103	3 %
China	26,608	27,726	(1,118)	(4)%
India	4,720	4,459	261	6 %

Segment Revenue

Clean Air revenue was up $491 million to $6,707 million in 2018 compared to $6,216 million in 2017 . Higher volumes drove a $486 million increase due to higher light vehicle revenues, higher commercial truck, off-highway and other vehicle sales, as well as new platforms, partially offset by price reductions and the negative impact of the end of OE customer production in Australia. Currency had a $45 million favorable impact on Clean Air revenues.

Ride Performance revenue was up $142 million to $1,949 million in 2018 compared to $1,807 million in 2017 . Higher volumes drove a $138 million increase due to increased light vehicle and commercial truck, off-highway and other vehicle sales and new platforms. Currency had a $4 million unfavorable impact on Ride Performance revenues.

Aftermarket revenue was down $30 million to $1,221 million in 2018 compared to $1,251 million in 2017 due to lower volumes and unfavorable mix, partially offset by favorable pricing. Currency had a $29 million unfavorable impact on Aftermarket revenues.

As a result of the Federal-Mogul Acquisition, Powertrain revenue was $1,112 million and Motorparts revenue was $774 million in 2018 .

Earnings before Interest Expense, Income Taxes, Noncontrolling Interests and Depreciation and Amortization ("EBITDA including noncontrolling interests")

The following table presents the reconciliation from net income attributable to Tenneco Inc. to EBITDA including noncontrolling interests by segment:

	Year Ended December 31		2018 vs 2017 Change	2018 EBITDA including noncontrolling interest as a % of Revenues	2017 EBITDA including noncontrolling interest as a % of Revenues
	2018	2017			
		(Millions)			
EBITDA including noncontrolling interests by Segments:					
Clean Air	$ 597	$ 562	$ 35	9 %	9%
Ride Performance	66	124	(58)	3 %	7%
Aftermarket	169	193	(24)	14 %	15%
Powertrain	92	—	92	8 %	
Motorparts	(39)	—	(39)	(5)%	
Other	(234)	(245)	11		
Total EBITDA including noncontrolling interests	651	634	$ 17	6 %	7%
Depreciation and amortization	(345)	(226)			
Earnings before interest expense, income taxes, and noncontrolling interests	306	408			
Less: Interest expense	132	72			
Less: Income tax expense (benefit)	63	71			
Net income	111	265			
Net Income attributable to noncontrolling interests	56	67			
Net income attributable to Tenneco Inc.	$ 55	$ 198			
Revenue by Segments:					
Clean Air	$ 6,707	$ 6,216			
Ride Performance	1,949	1,807			
Aftermarket	1,221	1,251			
Powertrain	1,112	—			
Motorparts	774	—			
Total	$ 11,763	$ 9,274			
Other data					
EBITDA including noncontrolling interests (1)	$ 651	$ 634	17	6 %	7%

(1) As a result of the Federal-Mogul Acquisition, we changed our key performance measure. We now use EBITDA including noncontrolling interests as the key performance measure in our financial and operational decision making processes, for internal reporting, and for planning and forecasting purposes to effectively allocate resources. EBITDA including noncontrolling interests is defined as earnings before interest expense, income taxes, noncontrolling interests, and depreciation and amortization. Prior period results have been retrospectively recast to reflect the change in our key performance measure. This non-GAAP measure is accompanied by a reconciliation to the comparable US GAAP measure, net income, in the table above. EBITDA including noncontrolling interests should not be considered a substitute for results prepared in accordance with US GAAP and should not be considered an alternative to net income. EBITDA including noncontrolling interests, as determined and measured by us, should not be compared to similarly titled measures reported by other companies.

The EBITDA including noncontrolling interests results shown in the preceding table include the following items, certain of which are discussed below under "Adjustments," which may have an effect on the comparability of EBITDA including noncontrolling interests results between periods:

	Reportable Segments							
	Clean Air	Ride Performance	Aftermarket	Powertrain	Motorparts	Total	Other	Total
				(Millions)				
Year Ended December 31, 2018								
Adjustments:								
Costs to achieve synergies (1):								
Restructuring related to synergy initiatives	$ 3	$ 5	$ 9	$ —	$ 31	$ 48	$ 7	$ 55
Other cost to achieve synergies	—	1	1	—	—	2	5	7
Total costs to achieve synergies	3	6	10	—	31	50	12	62
Restructuring and related expenses:								
Other restructuring charges	11	43	7	(2)	—	59	(2)	57
Asset impairments	—	3	—	—	—	3	2	5
Total restructuring and related expenses	11	46	7	(2)	—	62	—	62
Cost reduction initiatives (2)	—	10	—	—	—	10	8	18
Warranty charge (3)	—	5	—	—	—	5	—	5
Litigation settlement accrual	—	9	—	—	—	9	1	10
Acquisition and expected spin costs (4)	—	—	—	—	—	—	96	96
Loss on extinguishment of debt (5)	—	—	—	—	—	—	10	10
Environmental charge (6)	—	—	—	—	—	—	4	4
Anti-dumping duty charge (7)	—	—	—	—	16	16	—	16
Pension charges (8)	—	3	—	—	—	3	—	3
Purchase accounting adjustments (9)	—	—	—	44	62	106	—	106
Goodwill impairment charge (10)	—	3	—	—	—	3	—	3
Total adjustments	$ 14	$ 82	$ 17	$ 42	$ 109	$ 264	$ 131	$ 395
Year Ended December 31, 2017								
Adjustments:								
Restructuring and related expenses	$ 23	$ 16	$ 7	$ —	$ —	$ 46	$ 1	$ 47
Cost reduction initiatives (2)	4	12	3	—	—	19	3	22
Loss on extinguishment of debt (5)	—	—	—	—	—	—	1	1
Warranty settlement (11)	—	7	—	—	—	7	—	7
Goodwill impairment charge (10)	—	7	4	—	—	11	—	11
Pension charges/ stock vesting charges (12)	—	—	—	—	—	—	13	13
Antitrust settlement accrual (13)	—	—	—	—	—	—	132	132
Gain on sale of unconsolidated JV	—	—	—	—	—	—	(5)	(5)
Total adjustments	$ 27	$ 42	$ 14	$ —	$ —	$ 83	$ 145	$ 228

(1) Costs to achieve synergies related to the Acquisition.
(2) Costs related to cost reduction initiatives and related incentive and retention bonus programs.
(3) Charge related to warranty. Although we regularly incur warranty costs, this specific charge was of an unusual nature in the period incurred.
(4) Costs related to the Acquisition and expected spin.
(5) Loss on extinguishment of debt as a result of the refinancing of the revolving credit loan and tranche A term loan as a result of the Federal-Mogul Acquisition. See Note 11, Debt and Other Financing Arrangements for additional information.
(6) Environmental charge related to a site whereby an indemnification reverted back to the Company resulting from a 2009 bankruptcy filing of Mark IV Industries.
(7) Charges due to retroactive application of anti-dumping duty on a supplier's products.
(8) Charges related to curtailments and settlements of our pension and other postretirement benefit plans in connection with our restructuring initiatives.

(9) This primarily relates to a non-cash charge to cost of goods sold for the amortization of the inventory fair value step-up recorded as part of the Federal-Mogul Acquisition.
(10) Non-cash asset impairment charge related to goodwill.
(11) Warranty settlement with customer.
(12) Charges related to pension derisking and the acceleration of restricted stock vesting in accordance with the long-term incentive plan.
(13) Charges related to establishing a reserve for settlement costs necessary to resolve the Company's antitrust matters globally.

Year Ended December 31, 2017 Compared to Year Ended December 31, 2016

Consolidated Results of Operations

The following table presents our consolidated results of operations and reflects the revisions as discussed in Item 8 — Note 2, Summary of Significant Accounting Policies :

	Year Ended December 31		Increase / (Decrease)	
	2017	2016	$ Change	% Change
	(Millions Except Percent, Share and Per Share Amounts)			
Revenues				
Net sales and operating revenues	$ 9,274	$ 8,597	$ 677	8 %
Costs and expenses				
Cost of sales (exclusive of depreciation and amortization)	7,812	7,126	686	10 %
Selling, general, and administrative	638	514	124	24 %
Depreciation and amortization	226	213	13	6 %
Engineering, research, and development	158	153	5	3 %
Goodwill impairment charge	11	—	11	n/m
	8,845	8,006	839	10 %
Other expense (income)				
Loss on sale of receivables	5	5	—	— %
Non-service pension and postretirement benefit costs	16	84	(68)	(81)%
Loss on extinguishment of debt	1	24	(23)	(96)%
Equity in losses of nonconsolidated affiliates	1	—	1	— %
Other expense (income), net	(2)	(1)	(1)	100 %
	21	112	(91)	(81)%
Earnings before interest expense, income taxes, and noncontrolling interests	408	479	(71)	(15)%
Interest expense	72	68	4	6 %
Earnings before income taxes and noncontrolling interests	336	411	(75)	(18)%
Income tax expense (benefit)	71	(4)	75	n/m
Net income	265	415	(150)	(36)%
Less: Net income attributable to noncontrolling interests	67	68	(1)	(1)%
Net income attributable to Tenneco Inc.	$ 198	$ 347	$ (149)	(43)%
Earnings per share				
Weighted average shares of common stock outstanding —				
Basic	52,796,184	55,939,135	(3,142,951)	(6)%
Diluted	53,026,911	56,407,436	(3,380,525)	(6)%
Basic earnings per share of common stock	$ 3.75	$ 6.20	$ (2.45)	(40)%
Diluted earnings per share of common stock	$ 3.73	$ 6.15	$ (2.42)	(39)%
Cash dividends declared per share	$ 1.00	$ —	$ 1.00	— %
Percent of revenues				
Cost of sales	84%	83%	1 %	
Selling, general, and administrative	7%	6%	1 %	
EBIT	4%	6%	(2)%	
Net income attributable to Tenneco Inc.	2%	4%	(2)%	

(1) Percentages above denoted as "n/m" are not meaningful to present in the table.

Revenues
Total revenue for 2017 was $9,274 million , up 8% from $8,597 million in 2016 , on strong global light vehicle and commercial truck, off-highway and other vehicle revenues, driven by the Clean Air and Ride Performance product lines. Excluding the impact of currency and substrate sales, revenue was up $449 million from $6,569 million to $7,018 million . The increase in revenues was driven primarily by stronger OE light vehicle volumes and higher commercial truck, off-highway and other vehicle revenues in all regions as well as new platforms.

The following table lists the primary drivers behind the change in revenues ($ millions).

Year ended December 31, 2016	$	8,597
Volume and mix		611
Currency exchange rates		86
Others		(20)
Year ended December 31, 2017	$	9,274

Cost of sales
Cost of sales for 2017 was $7,812 million , or 84% of sales, compared to $7,126 million , or 83% of sales in 2016 . The following table lists the primary drivers behind the change in cost of sales ($ millions).

Year ended December 31, 2016	$	7,126
Volume and mix		553
Material		29
Currency exchange rates		75
Restructuring		25
Other costs		4
Year ended December 31, 2017	$	7,812

The increase in cost of sales was mainly due to the year-over-year increase in volume, higher net material costs, higher other costs, mainly manufacturing, higher restructuring costs and the impact of currency exchange rates. Also refer to section below "Restructuring charges."

Selling, general and administrative (SG&A)
SG&A was up $124 million in 2017 , at $638 million , compared to $514 million in 2016 . Included in 2017 was $132 million antitrust settlement accrual. Also refer to section below "Restructuring charges."

Depreciation and amortization
Depreciation and amortization expense was $226 million and $213 million for 2017 and 2016 , respectively.

Engineering, research, and development
Engineering, research, and development expense was $158 million and $153 million in 2017 and 2016 , respectively. Also refer to section below "Restructuring charges."

Goodwill impairment charge
As a result of our goodwill impairment assessment in the fourth quarter of 2017, we determined the estimated fair value of the Europe and South America Ride Performance and Aftermarket reporting unit was lower than its carrying value. Accordingly, we recorded a goodwill impairment charge of $11 million in the fourth quarter of 2017.

Non-service pension and postretirement benefit costs
Non-service pension and postretirement benefit costs was down $68 million in 2017 at $16 million compared to $84 million at 2016. Included in 2016 were $72 million in pension buyout charges.

Loss on extinguishment of debt
Loss on extinguishment of debt was $1 million in 2017, as compared to $24 million in 2016.

Interest Expense, Net of Interest Capitalized
We reported interest expense in 2017 of $72 million (substantially all in our U.S. operations) net of interest capitalized of $8 million, and $68 million (substantially all in our U.S. operations) net of interest capitalized of $6 million in 2016 .

Income Taxes
We reported income tax expense of $71 million on earnings before income taxes and noncontrolling interests of $336 million in 2017 , as compared to an income tax benefit of $4 million in earnings before income taxes and noncontrolling interests of $411 million in 2016 . The tax expense recorded in 2017 included a tax benefit of $12 million primarily relating to valuation allowance releases, a provisional amount of $43 million for a one-time transition tax on deemed repatriation of previously deferred foreign earnings under the Tax Cuts and Jobs Act. We remeasured U.S. deferred taxes from an applicable federal rate of 35% to the new statutory rate of 21% at which they are expected to be utilized, recording a $46 million provisional expense. The tax expense recorded in 2017 included a net tax benefit of $74 million relating to recognizing a U.S. tax benefit for foreign taxes. In addition, the 2017 tax expense included a $50 million tax benefit related to an antitrust settlement accrual. We reported an income tax benefit of $4 million in 2016 . The tax benefit recorded in 2016 included a net tax benefit of $110 million primarily relating to recognizing a U.S. tax benefit for foreign taxes.

Net Income
Net income was $265 million for 2017 as compared to $415 million for 2016, a decrease of 150 million , as result of the aforementioned items.

EBITDA including noncontrolling interests
EBITDA including noncontrolling interests was $ 634 million for 2017 , a decrease of $ 58 million , when compared to $ 692 million in 2016 as a result of the aforementioned items. See "Segment Results of Operations" for further information on EBITDA including noncontrolling interests.

Restructuring Charges
The classification of our restructuring charges in the consolidated statements of income is as follows:

	Year Ended December 31	
	2017	2016
	(Millions)	
Cost of sales	$ 41	$ 17
Engineering, research, and development	—	1
Selling, general, and administrative	6	12
	$ 47	$ 30

See to Item 8 — Note 4, Restructuring Charges and Asset Impairments, Net for further information of restructuring initiatives.

Segment Results of Operations

Revenues

The following tables reflect our revenues for the years of 2017 and 2016 . See "Overview of Net Sales and Operating Revenues" for a description of why we present these reconciliations of revenue. We have not reflected any currency impact in the 2016 table since this is the base period for measuring the effects of currency during 2017 on our operations. Revenues in 2017 have been adjusted to reflect a consistent currency exchange rate with 2016.

	Year Ended December 31, 2017					Year Ended December 31, 2016		
	Revenues	Substrate Sales	Value-add Revenues	Currency Impact on Value-add Revenues	Value-add Revenues excluding Currency	Revenues	Substrate Sales	Value-add Revenues
			(Millions)				(Millions)	
Clean Air	$ 6,216	$ 2,187	$ 4,029	$ 32	$ 3,997	$ 5,764	$ 2,028	$ 3,736
Ride Performance	1,807	—	1,807	27	1,780	1,593	—	1,593
Aftermarket	1,251	—	1,251	10	1,241	1,240	—	1,240
Total Tenneco Inc.	$ 9,274	$ 2,187	$ 7,087	$ 69	$ 7,018	$ 8,597	$ 2,028	$ 6,569

	Year Ended December 31, 2017 Versus Year Ended December 31, 2016 Dollar and Percent Increase (Decrease)			
	Revenues	Percent	Value-add Revenues excluding Currency	Percent
	(Millions Except Percent Amounts)			
Clean Air	$ 452	8%	$ 261	7%
Ride Performance	214	13%	187	12%
Aftermarket	11	1%	1	—%
Total Tenneco Inc.	$ 677	8%	$ 449	7%

Light Vehicle Industry Production by Region for Years Ended December 31, 2017 and 2016 (Updated according to IHS Markit, February 2019)

	Year Ended December 31			
	2017	2016	Increase (Decrease)	% Increase (Decrease)
	(Number of Vehicles in Thousands)			
North America	17,064	17,837	(773)	(4)%
Europe	22,216	21,540	676	3 %
South America	3,291	2,737	554	20 %
China	27,726	27,064	662	2 %
India	4,459	4,175	284	7 %

Segment Revenue

Clean Air revenue was up $452 million to $6,216 million in 2017 compared to $5,764 million in 2016 . Higher volumes drove a $432 million increase due to higher light vehicle, commercial truck, off-highway and other vehicle sales as well as new platforms, partially offset by unfavorable pricing and mix. Currency had a $49 million favorable impact on Clean Air revenues.

Ride Performance revenue was up $214 million to $1,807 million in 2017 compared to $1,593 million in 2016 . Higher volumes drove a $192 million increase due to higher light vehicle, commercial truck, off-highway and other vehicle sales as well as new platforms. Currency had a $27 million favorable impact on Ride Performance revenues.

Aftermarket revenue was up $11 million to $1,251 million in 2017 compared to $1,240 million in 2016 . Lower volumes drove a $30 million decrease, which was more than offset by favorable mix and pricing and a $10 million favorable currency impact.

Earnings before Interest Expense, Income Taxes, Noncontrolling Interests and Depreciation and Amortization ("EBITDA including noncontrolling interests")

The following table presents the reconciliation from net income attributable to Tenneco Inc. to EBITDA including noncontrolling interests by segments:

	Year Ended December 31			2017 EBITDA including noncontrolling interest as a % of Revenues	2016 EBITDA including noncontrolling interest as a % of Revenues
	2017	2016	2017 vs 2016 Change		
		(Millions)			
EBITDA including noncontrolling interests by Segments:					
Clean Air	$ 562	$ 561	$ 1	9%	10%
Ride Performance	124	153	(29)	7%	10%
Aftermarket	193	207	(14)	15%	17%
Other	(245)	(229)	(16)		
Total EBITDA including noncontrolling interests	634	692	$ (58)	7%	8%
Depreciation and amortization	(226)	(213)			
Earnings before interest expense, income taxes, and noncontrolling interests	408	479			
Less: Interest expense	72	68			
Less: Income tax expense (benefit)	71	(4)			
Net income	265	415			
Net Income attributable to noncontrolling interests	67	68			
Net income attributable to Tenneco Inc.	$ 198	$ 347			
Revenue by Segments:					
Clean Air	$ 6,216	$ 5,764			
Ride Performance	1,807	1,593			
Aftermarket	1,251	1,240			
Total	$ 9,274	$ 8,597			
Other data					
EBITDA including noncontrolling interests (1)	$ 634	$ 692	$ (58)	7%	8%

(1) As a result of the Federal-Mogul Acquisition, we changed our key performance measure. We now use EBITDA including noncontrolling interests as the key performance measure in our financial and operational decision making processes, for internal reporting, and for planning and forecasting purposes to effectively allocate resources. EBITDA including noncontrolling interests is defined as earnings before interest expense, income taxes, noncontrolling interests, and depreciation and amortization. Prior period results have been retrospectively recast to reflect the change in our key performance measure. This non-GAAP measure is accompanied by a reconciliation to the comparable US GAAP measure, net income, in the table above. EBITDA including noncontrolling interests should not be considered a substitute for results prepared in accordance with US GAAP and should not be considered an alternative to net income. EBITDA including noncontrolling interests, as determined and measured by us, should not be compared to similarly titled measures reported by other companies.

The EBITDA including noncontrolling interests results shown in the preceding table include the following items, certain of which are discussed below under "Adjustments," which may have an effect on the comparability of EBITDA including noncontrolling interests results between periods:

	Reportable Segments					
	Clean Air	Ride Performance	Aftermarket	Total	Other	Total
			(Millions)			
Year Ended December 31, 2017						
Adjustments:						
Restructuring charges	$ 23	$ 16	$ 7	$ 46	$ 1	$ 47
Cost reduction initiatives (1)	4	12	3	19	3	22
Loss on extinguishment of debt (2)	—	—	—	—	1	1
Warranty settlement (3)	—	7	—	7	—	7
Goodwill impairment charge (4)	—	7	4	11	—	11
Pension charges/ stock vesting charges (5)	—	—	—	—	13	13
Antitrust settlement accrual (6)	—	—	—	—	132	132
Gain on sale of unconsolidated JV	—	—	—	—	(5)	(5)
Total adjustments	$ 27	$ 42	$ 14	$ 83	$ 145	$ 228
Year Ended December 31, 2016						
Adjustments:						
Restructuring charges						
Other restructuring charges	$ 6	$ 13	$ 9	$ 28	$ 2	$ 30
Asset impairments	—	2	—	2	—	2
Total restructuring and related expenses	6	15	9	30	2	32
Pension charges/ stock vesting charges (5)	—	—	—	—	72	72
Total adjustments	$ 6	$ 15	$ 9	$ 30	$ 74	$ 104

(1) Costs related to cost reduction initiatives and related incentive and retention bonus programs.
(2) Loss on extinguishment of debt. See Note 11, Debt and Other Financing Arrangements for additional information.
(3) Warranty settlement with a customer.
(4) Non-cash asset impairment charge related to goodwill.
(5) Charges related to pension derisking and the acceleration of restricted stock vesting in accordance with the long-term incentive plan.
(6) Charges related to establishing a reserve for settlement costs necessary to resolve the Company's antitrust matters globally.

LIQUIDITY AND CAPITAL RESOURCES

Capitalization

	Year Ended December 31		% Change
	2018	2017	
		(Millions)	
Short-term debt and maturities classified as current	$ 153	$ 103	49%
Long-term debt	5,340	1,358	293%
Total debt	5,493	1,461	276%
Total redeemable noncontrolling interests	138	42	229%
Total noncontrolling interests	190	46	313%
Tenneco Inc. shareholders' equity	1,726	636	171%
Total equity	1,916	682	181%
Total capitalization	$ 7,547	$ 2,185	245%

Short-term debt, which includes maturities classified as current, borrowings by the parent company and foreign subsidiaries, and borrowings under our accounts receivable securitization programs, were $153 million and $103 million as of December 31, 2018 and December 31, 2017 . We had no borrowings under our revolving credit facilities, which are classified as long-term debt, at December 31, 2018 and were $244 million at December 31, 2017 .

The 2018 year-to-date increase in our shareholders' equity primarily resulted from net income attributable to Tenneco Inc. of $55 million , an increase of $ 143 million in noncontrolling interest equity resulting from the Federal-Mogul Acquisition, and a $1.2 billion increase in premium on common stock and other capital surplus relating to the new common stock issued for the Federal-Mogul Acquisition, partially offset by a $132 million decrease caused by the effect of changes in foreign exchange rates on the translation of financial statements of our foreign subsidiaries into U.S. dollars and cash dividend payments of $ 59 million .

Financing Arrangements

The table below shows our borrowing capacity on committed credit facilities as of December 31, 2018:

	Committed Credit Facilities (a) as of December 31, 2018				
	Term	Commitments	Borrowings	Letters of Credit(b)	Available
			(Millions)		
Tenneco Inc. revolving credit agreement	**2023**	**$ 1,500**	**$ —**	**$ 24**	**$ 1,476**
Tenneco Inc. Term Loan A	2023	1,700	1,700	—	—
Tenneco Inc. Term Loan B	**2025**	**1,700**	**1,700**	**—**	**—**
Subsidiaries' credit agreements	2018-2028	154	51	3	100
		$ 5,054	$ 3,451	$ 27	$ 1,576

(a) We are generally required to pay commitment fees on the unused portion of the total commitment.

(b) Letters of credit reduce the available borrowings under the revolving credit agreement.

New Credit Facility - General

On October 1, 2018, we entered into a new credit agreement with JPMorgan Chase Bank, N.A., as administrative agent and other lenders (the "New Credit Facility") in connection with the acquisition of Federal-Mogul. The New Credit Facility consists of $4.9 billion of total debt financing, consisting of a five -year $1.5 billion revolving credit facility, a five -year $1.7 billion term loan A facility ("Term Loan A") and a seven -year $1.7 billion term loan B facility ("Term Loan B"). Proceeds from the New Credit Facility were used to finance the cash consideration portion of the Acquisition purchase price, to refinance our then existing senior credit facilities, inclusive of the revolver and the tranche term loan A then outstanding (the "Old Credit Facility"), certain senior credit facilities of Federal-Mogul, to pay Acquisition fees and expenses, and the financing thereof. The remainder, including future borrowings under the revolving credit facility, will be used for general corporate purposes.

We and our wholly-owned subsidiary, Tenneco Automotive Operating Company Inc., are borrowers under the New Credit Facility, and we are the sole borrower under the Term Loan A and Term Loan B facilities. The New Credit Facility is guaranteed on a senior basis by certain of our material domestic subsidiaries. Drawings under the revolving credit facility may be in U.S. dollars, British pounds or euros.

The New Credit Facility is secured by substantially all of our domestic assets, our subsidiary guarantors, and by pledges of up to 66% of the stock of certain first-tier foreign subsidiaries. The security for the New Credit Facility will be pari passu with the security for outstanding senior secured notes of Federal-Mogul that we assumed in connection with the Acquisition. If any of our foreign subsidiaries is added to the revolving credit facility as a borrower, the obligations of such foreign borrower will be secured by the assets of such foreign borrower, and also will be secured by the assets of, and guaranteed by, the domestic borrowers and domestic guarantors as well as certain of our foreign subsidiaries in the chain of ownership of such foreign borrower.

As a result of the refinancing of the revolving credit loan and tranche A term loan under the Old Credit Facility, we recorded a loss on extinguishment of debt of $10 million for the year ended December 31, 2018, primarily consisting of debt issuance costs incurred at the transaction date and write-off of deferred debt issuance costs related to the refinanced revolving credit loan and tranche A term loan. We also recorded $1 million of loss on extinguishment of debt for the year ended December 31, 2017 related to amendment and restatement of the Old Credit Facility and the write off of deferred debt issuance costs related to the Old Credit Facility.

New Credit Facility - Interest Rates and Fees

The interest rate on borrowings under the revolving credit facility and the term loan A facility will initially be LIBOR plus 1.75%, which interest rate will be subject to change if our consolidated net leverage ratio changes. Initially, and so long as our corporate family rating is Ba3 (with a stable outlook) or higher from Moody's Investors Service, Inc. ("Moody's") and BB- (with a stable outlook) or higher from Standard & Poor's Financial Services LLC ("S&P"), the interest rate on borrowings under the term loan B facility will be LIBOR plus 2.75%; at any time the foregoing conditions are not satisfied, the interest rate on the term loan B facility will be LIBOR plus 3.00%. When the term loan B facility is no longer outstanding and we and our subsidiaries have no other secured indebtedness (with certain exceptions set forth in the New Credit Facility), and upon our achieving and maintaining two or more corporate credit and/or corporate family ratings higher than or equal to BBB- from S&P, BBB- from Fitch Ratings Inc. ("Fitch") and/or Baa3 from Moody's (in each case, with a stable or positive outlook), the collateral under the New Credit Facility may be released.

New Credit Facility - Other Terms and Conditions

The New Credit Facility contains representations and warranties, and covenants which are customary for debt facilities of this type. The covenants limit our ability and the ability of our restricted subsidiaries to, among other things, to (i) incur additional indebtedness or issue preferred stock, (ii) pay dividends or make distributions to our stockholders, (iii) purchase or redeem our equity interests, (iv) make investments, (v) create liens on their assets, (vi) enter into transactions with our affiliates, (vii) sell assets and (viii) merge or consolidate with, or dispose of substantially all of our assets to, other companies.

The New Credit Facility includes customary events of default and other provisions that could require all amounts due thereunder to become immediately due and payable, either automatically or at the option of the lenders, if we fail to comply with the terms of the New Credit Facility or if other customary events occur.

The New Credit Facility also contains two financial maintenance covenants for the revolving credit facility and the term loan A facility including (x) a requirement to have a consolidated net leverage ratio (as defined in the New Credit Facility) as of the end of each fiscal quarter of not greater than 4.0 to 1 through September 30, 2019, 3.75 to 1 through September 30, 2020 and 3.5 to 1 thereafter; and (y) a requirement to maintain consolidated interest coverage ratio (as defined in the New Credit Facility) for any period of four consecutive fiscal quarters of not less than 2.75 to 1.

The financial ratios required under the New Credit Facility and the actual ratios we calculated as of December 31, 2018 for the fourth quarter of 2018, are as follows: leverage ratio of 2.74 actual versus 4.00 (maximum) required; and interest coverage ratio of 6.50 actual versus 2.75 (minimum) required.

The covenants in our New Credit Facility generally prohibit us from repaying or refinancing our senior unsecured notes. So long as no default exists, we would, however, under our New Credit Facility, be permitted to repay or refinance our senior unsecured notes (i) with the net cash proceeds of permitted refinancing indebtedness (as defined in the New Credit Facility); (ii) in an amount equal to the net cash proceeds of qualified capital stock (as defined in the New Credit Facility) issued after October 1, 2018 and (iii) in exchange for qualified capital stock issued after October 1, 2018; and (iv) with additional payments provided that such additional payments are capped as follows based on a pro forma consolidated leverage ratio after giving effect to such additional payments:

Pro forma Consolidated Leverage Ratio	**Prior to Spin-Off**	**Post Spin-Off**
	(Millions)	
Greater than or equal to 2.25x	**$ 360**	**$360 x Post Spin-Off EBITDA/Pre Spin-Off EBITDA**
Less than 2.25x	unlimited	unlimited

Although the New Credit Facility agreement would permit us to repay or refinance our senior notes under the conditions described above, any repayment or refinancing of our outstanding notes would be subject to market conditions and either the voluntary participation of note holders or our ability to redeem the notes under the terms of the applicable note indenture. For example, while the New Credit Facility agreement would allow us to repay our outstanding notes via a direct exchange of the notes for either permitted refinancing indebtedness or for shares of our common stock, we do not, under the terms of the agreements governing our outstanding notes, have the right to refinance the notes via any type of direct exchange.

The New Credit Facility agreement also contains other restrictions on our operations that are customary for similar facilities, including limitations on: (i) incurring additional liens; (ii) sale and leaseback transactions (except for the permitted transactions as described in the New Credit Facility agreement); (iii) liquidations and dissolutions; (iv) incurring additional indebtedness or guarantees; (v) investments and acquisitions; (vi) dividends and share repurchases; (vii) mergers and consolidations; and

(viii) refinancing of the senior notes. Compliance with these requirements and restrictions is a condition for any incremental borrowings under the New Credit Facility agreement and failure to meet these requirements enables the lenders to require repayment of any outstanding loans.

As of December 31, 2018 , we were in compliance with all the financial covenants and operational restrictions of the New Credit Facility.

Senior Notes

A summary of our senior unsecured and secured notes as of December 31, 2018 are as follows:

	2018		
	Principal	Carrying Amount(1)	Effective Interest Rate
	(Millions)		
Senior Unsecured Notes			
$225 million of 5.375% Senior Notes due 2024	$ 225	$ 222	5.609%
$500 million of 5.000% Senior Notes due 2026	$ 500	$ 493	5.219%
Senior Secured Notes			
€415 million 4.875% Euro Fixed Rate Notes due 2022	$ 476	$ 496	3.599%
€300 million of Euribor plus 4.875% Euro Floating Rate Notes due 2024	$ 344	$ 349	4.620%
€350 million of 5.000% Euro Fixed Rate Notes due 2024	$ 401	$ 427	3.823%

(1) Carrying amount is net of unamortized debt issuance costs and debt discounts or premiums. Total unamortized debt issuance costs were $90 million as of December 31, 2018 Total unamortized debt (premium) discount, net was $(49) million as of December 31, 2018 .

Senior Unsecured Notes

Our outstanding 5.375% senior notes due December 15, 2024 ("2024 Senior Notes") and 5% senior notes due July 15, 2026 ("2026 Senior Notes" and together with the 2024 Senior Notes, the "Senior Unsecured Notes") at December 31, 2018. We are permitted to redeem some or all of the outstanding Senior Unsecured Notes, at specified redemption prices that decline to par over a specified period, at any time (a) on or after December 15, 2019, in the case of the 2024 Senior Notes and (b) on or after July 15, 2021, in the case of the 2026 Senior Notes. In addition, the Senior Unsecured Notes may also be redeemed at a price generally equal to 100% of the principal amount thereof plus a premium based on the present values of the remaining payments due to the note holders. Further, we may redeem up to 35% of each Senior Unsecured Notes with the proceeds of certain equity offerings on or before July 15, 2019 at a redemption price equal to 105% , in the case of the 2026 Senior Notes.

If we experience specified kinds of changes in control, we must offer to repurchase the Senior Unsecured Notes at 101% of the principal amount thereof plus accrued and unpaid interest. In addition, if we sell certain of our assets and do not apply the proceeds from the sale in a certain manner within 365 days of the sale, we must offer to repurchase the 2024 Senior Unsecured Notes at 100% of the principal amount thereof plus accrued and unpaid interest.

Senior Secured Notes

In connection with the Acquisition of Federal-Mogul on October 1, 2018, we assumed an aggregate principal amount of €350 million ($401 million) 5.000% euro denominated fixed rate notes which are due July 15, 2024 ("5.000% Euro Fixed Rate Notes"), an aggregate principle amount of €415 million ($476 million) 4.875% euro denominated fixed rate notes due April 15, 2022 ("4.875% Euro Fixed Rate Notes"), and aggregate principal amount of €300 million ($344 million) floating rate notes due April 15, 2024 ("Euro Floating Rate Notes", and together with the 5.000% Euro Fixed Rate Notes and the 4.875% Euro Fixed Rate Notes, the "Senior Unsecured Notes"). The Senior Secured Notes will rank equally in right of payment to all our indebtedness under our New Credit Facility.

We are permitted to redeem some or all of the outstanding Senior Secured Notes at specified redemption prices that decline to par over a specified period, at any time (a) on or after July 15, 2020, in the case of the 5.000% Euro Fixed Rate Notes, (b) on or after April 15, 2019, in the case of the 4.875% Euro Fixed Rate Notes and (c) on or after April 15, 2018, in the case of the Euro Floating Rate Notes. In addition, the Senior Secured Notes may also be redeemed at a price generally equal to 100% of the principal amount thereof plus a premium based on the present values of the remaining payments due to the note holders. Further, we may also redeem up to 40% of the 5.000% Euro Fixed Rate Notes and the 4.875% Euro Fixed Rate Notes with the proceeds of certain equity offerings at any time prior to (a) July 15, 2020 at a redemption price of 105.0% in the case of the 5.000% Euro Fixed Rate Notes, and (b) April 15, 2019 at a redemption price of 104.875% in the case of the 4.875% Euro Fixed Rate Notes.

If we experience specified kinds of changes in control, we must offer to repurchase the Senior Secured Notes at 101% of the principal amount thereof plus accrued and unpaid interest. In addition, if we sell certain of our assets and do not apply the proceeds from the sale in a certain manner within 365 days of the sale, we must offer to repurchase the Senior Secured Notes at 100% of the principal amount thereof plus accrued and unpaid interest.

We have designated a portion of the Senior Secured Notes as a net investment hedge of our European operations. As such, the fluctuations in foreign currency exchange rates on the value of the notes is recorded to cumulative translation adjustment. See Note 9, Derivatives and Hedging Activities for further details .

Senior Unsecured Notes and Senior Secured Notes - Other Terms and Conditions
Our Senior Notes contain covenants that will, among other things, limit our ability to create liens and enter into sale and leaseback transactions. Our Senior Secured Notes and 2024 Senior Unsecured Notes also require that, as a condition precedent to incurring certain types of indebtedness not otherwise permitted, our consolidated fixed charge coverage ratio, as calculated on a pro forma basis, be greater than 2.00, as well as containing restrictions on its operations, including limitations on: (i) incurring additional indebtedness; (ii) paying dividends; (iii) distributions and stock repurchases; (iv) investments; (v) asset sales and (vi) mergers and consolidations.

Subject to limited exceptions, all of our existing and future material domestic wholly owned subsidiaries fully and unconditionally guarantee our Senior Unsecured Notes and Senior Secured Notes on a joint and several basis. There are no significant restrictions on the ability of the subsidiaries that have guaranteed these notes to make distributions to us.

As of December 31, 2018 , we were in compliance with the covenants and restrictions of these indentures.

Other Debt
We have approximately $106 million of other debt, which consists primarily of foreign debt with maturities of one year or less.

On-Balance Sheet Arrangements
We have securitization programs for some of our accounts receivable, with limited recourse provisions. Borrowings on these securitization programs are recorded in short-term debt.

Borrowings on these securitization programs at December 31, 2018 and 2017 are as follows:

	As of December 31	
	2018	2017
	(Millions)	
Borrowings on securitization programs	$ 6	$ 30

In the U.S., we had an accounts receivable securitization program with three commercial banks, comprised of a first priority facility and a second priority facility, which we terminated in October 2018. We securitized original equipment and aftermarket receivables on a daily basis under this program. Both facilities monetized accounts receivable generated in the U.S. that met certain eligibility requirements and the second priority facility also monetized certain accounts receivable generated in the U.S. that would otherwise have been ineligible under the first priority securitization facility. The amount of outstanding third-party investments in our securitized accounts receivable under this U.S. program was $30 million , recorded in short-term debt, at December 31, 2017.

Off-Balance Sheet Arrangements
On December 14, 2017, we entered into a new accounts receivable factoring program in the U.S. with a commercial bank. Under this program we sell receivables from certain of our U.S. OE customers at a rate that is favorable versus our senior credit facility. This arrangement is uncommitted and provides for cancellation by the commercial bank with no less than 30 days prior written notice. The amount of outstanding third-party investments in our accounts receivable sold under this program was $130 million and $107 million at December 31, 2018 and 2017.

The Company has two other receivable factoring programs in the U.S. with commercial banks under which we sell receivables from certain of our aftermarket customers to whom we have extended payment terms. Both arrangements are uncommitted and may be terminated with 10 days prior notice for one program and 30 days prior notice for the other program. The amount of outstanding third-party investments in our accounts receivable sold under these programs was $387 million at December 31, 2018.

The Company also has subsidiaries in several countries in Europe that are parties to accounts receivable factoring facilities. The commitments for these arrangements are generally for one year, but some may be canceled with notice 90 days prior to renewal. In some instances, the arrangement provides for cancellation by the applicable financial institution at any time upon notification. The amount of outstanding third-party investments in our accounts receivable sold under programs in Europe was $361 million and $218 million at December 31, 2018 and 2017.

These factoring programs provide us with access to cash at costs that are generally favorable to alternative sources of financing, and allow us to reduce borrowings under our revolving credit agreement. If we were not able to factor receivables under either the European or U.S. programs, our borrowings under our revolving credit agreement might increase, although this could be partially mitigated by exercising our right to shorten payment terms with certain of the aftermarket customers whose receivables we sell under the U.S. factoring programs in the event that those factoring programs are terminated.

In the U.S and Canada we participate in supply chain financing programs with certain of our aftermarket customers to whom we have extended payment terms whereby the accounts receivable are satisfied through the early receipt of negotiable financial instruments that are payable at a later date when payments from our customers are due. We sell these financial instruments before their maturity date to various financial institutions at a discount. Such financial instruments sold to financial institutions with outstanding maturity dates totaled $133 million and $81 million at December 31, 2018 and 2017.

If these drafting programs were terminated or the financial institutions that currently participate in these programs were to reduce their purchases of drafts, our borrowings under our revolving credit agreement might increase, although this could be partially mitigated by exercising our right to shorten payment terms with certain of the aftermarket customers whose drafts we sell under the U.S. and Canadian programs in the event that those programs are terminated or otherwise reduced.

The amounts outstanding for these factoring and drafting arrangements as of December 31, 2018 and 2017 are as follows:

	As of December 31	
	2018	2017
	(Millions)	
Accounts receivable outstanding and derecognized	$ 1,011	$ 406
Deferred purchase price receivable	$ 154	$ 114

Proceeds from the factoring of accounts receivable qualifying as sales and drafting programs, and expenses associated with these arrangements for the years ended December 31, 2018, 2017, and 2016 are as follows:

	Year Ended December 31		
	2018	2017	2016
		(Millions)	
Proceeds from factoring qualifying as sales	$ 3,390	$ 1,984	$ 1,770
Loss on sale of receivables	$ 16	$ 5	$ 5

Supply Chain Financing

Certain of our suppliers participate in supply chain financing programs under which they securitize their accounts receivables from us. Financial institutions participate in the supply chain financing program on an uncommitted basis and can cease purchasing receivables or drafts from our suppliers at any time. If the financial institutions did not continue to purchase receivables or drafts from our suppliers under these programs, the participating vendors may have a need to renegotiate their payment terms with us which in turn could cause our borrowings under our revolving credit facility to increase.

Capital Requirements

We believe that cash flows from operations, combined with our cash on hand, subject to any applicable withholding taxes upon repatriation of cash balances from our foreign operations where most of our cash balances are located, and available borrowing capacity described above, assuming that we maintain compliance with the financial covenants and other requirements of our senior credit facility agreement, will be sufficient to meet our future capital requirements, including debt amortization, capital expenditures, pension contributions, and other operational requirements, for the following year. Our ability to meet the financial covenants depends upon a number of operational and economic factors, many of which are beyond our control. In the event that

we are unable to meet these financial covenants, we would consider several options to meet our cash flow needs. Such actions include additional restructuring initiatives and other cost reductions, sales of assets, reductions to working capital and capital spending, reduction or cessation of our share repurchase and dividend programs, issuance of equity and other alternatives to enhance our financial and operating position. Should we be required to implement any of these actions to meet our cash flow needs, we believe we can do so in a reasonable time frame.

Cash Flows

Operating Activities

As summarized in the table below, net cash provided by operating activities for the years ended December 31, 2018 , 2017 , and 2016 were as follows:

	Year Ended December 31		
	2018	2017	2016
		(Millions)	
Operational cash flow before changes in operating assets and liabilities	$ 449	$ 507	$ 596
Changes in operating assets and liabilities:			
Receivables	(190)	(81)	(325)
Inventories	27	(94)	(55)
Payables and accrued expenses	291	136	140
Accrued interest and income taxes	(19)	1	13
Other assets and liabilities	(119)	48	5
Total change in operating assets and liabilities	(10)	10	(222)
Net cash provided by operating activities	$ 439	$ 517	$ 374

Cash provided by operations for the year ended December 31, 2018 decreased by $ 78 million compared to the year ended December 31, 2017 . The net decrease was primarily the result of:

- cash flows provided by the operations of Federal-Mogul, which was acquired in the fourth quarter, of approximately $234 million, this included a cash outflow of $61 million related to the settlement of a litigation matter that was assumed as part of the Federal-Mogul Acquisition (see Note 3, Acquisitions and Divestitures for further information);
- offset by a $88 million outflow in working capital items (excluding changes in working capital of the acquired Federal-Mogul operations);
- an increase in cash payments for interest of $36 million; and
- other one-time charges of approximately $180 million, including, among other items, transactional related costs and advisory fees in connection with the Federal-Mogul Acquisition, and an antitrust settlement payment.

Cash provided by operations for the year ended December 31, 2017 increased by $ 143 million compared to the year ended December 31, 2016 . The net increase was primarily the result of:

- increase in cash provided by working capital of $ 201 million ; and
- decrease in cash taxes paid of $ 18 million .

Investing Activities

	Year Ended December 31		
	2018	2017	2016
	(Millions)		
Federal-Mogul acquisition, net of cash acquired	$ (2,194)	$ —	$ —
Proceeds from sale of assets	9	8	6
Proceeds from sale of equity interest	—	9	—
Cash payments for plant, property, and equipment	(507)	(419)	(345)
Proceeds from deferred purchase price of factored receivables	174	112	110
Other	4	(10)	—
Net cash used by investing activities	$ (2,514)	$ (300)	$ (229)

In 2018 , cash used for the Federal-Mogul Acquisition, net of cash acquired, was $ 2,194 million . See "Note 3, Acquisitions and Divestitures " for additional details.

Capital expenditures were $ 507 million , $ 419 million , and $ 345 million for the years ended December 31, 2018 , 2017 , and 2016 . These capital expenditures were primarily related to investing in new facilities, upgrading existing products, continuing new product launches, and infrastructure and equipment at our facilities (including investments in software-related intangible assets) to support our manufacturing, distribution, and cost reduction efforts. For 2019, we expect our capital expenditures to be between $730 million and $780 million, depending on timing of expenditures, as we continue to invest in our strategic priorities and growth.

Proceeds from deferred purchase price of factored receivables was $ 174 million , $ 112 million , and $ 110 million for the years ended December 31, 2018 , 2017 , and 2016 . This increase in 2018 as compared to 2017 is primarily attributable to the Federal-Mogul Acquisition.

Financing Activities

	Year Ended December 31		
	2018	2017	2016
	(Millions)		
Proceeds from term loans and notes	$ 3,426	$ 160	$ 529
Repayments of term loans and notes	(453)	(36)	(545)
Borrowings on revolving lines of credit	5,149	6,664	5,417
Payments on revolving lines of credit	(5,405)	(6,737)	(5,221)
Issuance (repurchase) of common shares	(1)	(1)	13
Cash dividends	(59)	(53)	—
Debt issuance cost of long-term debt	(95)	(8)	(9)
Purchase of common stock under the share repurchase program	—	(169)	(225)
Net increase (decrease) in bank overdrafts	(5)	(7)	10
Other	(30)	—	—
Distributions to noncontrolling interest partners	(51)	(64)	(55)
Net cash provided (used) by financing activities	$ 2,476	$ (251)	$ (86)

Cash flow from financing activities was $ 2,476 million for the year ended December 31, 2018 . On October 1, 2018, we issued an aggregate principal amount of $3,400 million as a part of our New Credit Facility entered into in conjunction with the Federal-Mogul Acquisition. As a part of this New Credit facility we refinanced the revolving credit agreement and tranche A term loan under the Old Credit facility. In 2018 , we paid a dividend of $0.25 per share in each quarter, or $ 59 million in the aggregate. We also had distributions to noncontrolling interest partners of $ 51 million .

Cash flow used in financing activities was $ 251 million for the year ended December 31, 2017 . This included borrowings under term loans of $ 160 million , repayments of term loans of $ 36 million , and net repayments under revolving lines of credit of $ 73 million . We also had distributions to noncontrolling interest partners of $ 64 million .

Cash flow used in financing activities was $ 86 million for the year ended December 31, 2016 . This included $ 529 million borrowings under term loans and $ 545 million repayment of terms loans. We also had distributions to noncontrolling interest partners of $ 55 million .

We did not repurchase any shares during 2018 . During 2017 , we repurchased 2,936,950 shares of our outstanding common stock for $169 million at an average price of $57.57 per share. During 2016, we repurchased 4,182,613 shares of our outstanding common stock for $ 225 million at an average price of $53.89 per share. Since announcing our share repurchase program in 2015, we have repurchased a total of approximately 11.3 million shares for $607 million, representing 19% of the shares outstanding at that time. In February 2017, the Board authorized the repurchase of up to $400 million of common stock over the next three years. This amount includes the remaining $112 million amount authorized under earlier repurchase programs. As of December 31, 2018 , we had $231 million remaining on the share repurchase authorization. Borrowings under our revolving credit facility were $0 million at December 31, 2018 and $244 million at December 31, 2017 . There was $0 million borrowed under the U.S. accounts receivable securitization programs at both the period ending December 31, 2018 and December 31, 2017 .

Dividends on Common Stock

On February 1, 2017, we announced the reinstatement of a quarterly dividend program. In 2018 , we paid dividends of $0.25 per share in each of the quarters, or $ 59 million in the aggregate. In 2017 , we paid dividends of $0.25 per share in each of the quarters, or $ 53 million in the aggregate. While we currently expect that comparable quarterly cash dividends will continue to be paid in the near future, our dividend program and the payment of future cash dividends under the program are subject to continued capital availability, the judgment of our Board of Directors and our continued compliance with the provisions pertaining to the payment of dividends under its debt agreements. Once the contemplated separation of our businesses through a spin-off occurs, each independent company will determine its own dividend policy.

Contractual Obligations

Our remaining required debt principal amortization and payment obligations under lease and certain other financial commitments as of December 31, 2018 are shown in the following table:

	Payments due by period:				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
			(Millions)		
Senior term loans	$ 3,400	$ 102	$ 247	$ 1,436	$ 1,615
Senior notes	1,946	—	—	476	1,470
Other long term debt (including maturities classified as current)	106	73	21	10	2
Short-term debt (including bank overdrafts)	80	80	—	—	—
Total debt obligations	5,532	255	268	1,922	3,087
Pension obligations	1,075	96	200	201	578
Operating leases	483	120	186	123	54
Purchase obligations (a)	260	260	—	—	—
Interest payments	1,402	276	578	400	148
Capital commitments	181	181	—	—	—
Total payments	$ 8,933	$ 1,188	$ 1,232	$ 2,646	$ 3,867

(a) Short-term, ordinary course payment obligations have been excluded.

If we do not maintain compliance with the terms of our New Credit Facility or senior notes indentures described above, all amounts under those arrangements could, automatically or at the option of the lenders or other debt holders, become due. Additionally, each of those facilities contains provisions that certain events of default under one facility will constitute a default under the other facility, allowing the acceleration of all amounts due. We currently expects to maintain compliance with the terms of all of our various credit agreements for the foreseeable future.

Included in our contractual obligations is the amount of interest to be paid on our long-term debt. As our debt structure contains both fixed and variable rate obligations, we have made assumptions in calculating the amount of future interest payments. Interest on our senior notes is calculated using the fixed rates of 5.375% and 5%, respectively. Interest on our variable rate debt is calculated as LIBOR plus the applicable margin in effect at December 31, 2018 for the Eurodollar and Term Loan A loan and prime plus the applicable margin in effect on December 31, 2018 on the prime-based loans. We have assumed that both LIBOR and the prime rate will remain unchanged for the outlying years. See "— Capitalization."

We have also included an estimate of expenditures required after December 31, 2018 to complete the projects authorized at December 31, 2018 , in which we have made substantial commitments in connection with purchasing property, plant and equipment for our operations. For 2019, we expect our capital expenditures to be between $730 million and $780 million.

We have included an estimate of the expenditures necessary after December 31, 2018 to satisfy purchase requirements pursuant to certain ordinary course supply agreements that we have entered into. With respect to our other supply agreements, they generally do not specify the volumes we are required to purchase. In many cases, if any commitment is provided, the agreements state only the minimum percentage of our purchase requirements we must buy from the supplier. As a result, these purchase obligations fluctuate from year-to-year and we are not able to quantify the amount of our future obligations.

We have not included material cash requirements for unrecognized tax benefits or taxes. It is difficult to estimate taxes to be paid as changes in where we generate income can have a significant impact its future tax payments. We have also not included cash requirements for funding pension and postretirement benefit costs. Based upon current estimates, we believe we will be required to make contributions of approximately $97 million to those plans in 2019 . Pension and postretirement contributions beyond 2019 will be required but those amounts will vary based upon many factors, including the performance of its pension fund investments during 2019 and future discount rate changes. For additional information relating to the funding of our pension and other postretirement plans, refer to Note 13 of the consolidated financial statements. In addition, we have not included cash requirements for environmental remediation. Based upon current estimates, we believe we will be required to spend approximately $46 million over the next 30 years. However, due to possible modifications in remediation processes and other factors, it is difficult to determine the actual timing of the payments. See "— Environmental and Other Matters."

We occasionally provide guarantees that could require it to make future payments in the event that the third party primary obligor does not make its required payments. The Company is not required to record a liability for any of these guarantees.

Additionally, we have from time to time issued guarantees for the performance of obligations by some of our subsidiaries, and some of our subsidiaries have guaranteed our debt. All of our existing and future material domestic subsidiaries fully and unconditionally guarantee its New Credit Facility and its senior notes on a joint and several basis. The New Credit Facility is also secured by first-priority liens on substantially all our domestic assets and pledges of up to 66% of the stock of certain first-tier foreign subsidiaries. As described above, certain of our senior notes are secured by pledges of stock and assets. See Note 23 of the consolidated financial statements of Tenneco Inc., where the Company presents the Supplemental Guarantor Consolidating Financial Statements.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

We prepare our consolidated financial statements in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"), which requires us to make estimates and assumptions that affect the reported amounts and disclosures in our consolidated financial statements. These estimates are subject to an inherent degree of uncertainty and actual results could differ from our estimates. Our significant accounting policies have been disclosed in Note 2, Summary of Significant Accounting Policies . The following paragraphs include a discussion of some critical areas where estimates are required.

Goodwill and Other Indefinite-Lived Intangible Assets

We review goodwill for impairment annually, during the fourth quarter, or more frequently if events or circumstances indicate goodwill might be impaired. We perform assessments at the reporting unit level. We compare the estimated fair value of our reporting units with goodwill to the carrying value of the reporting unit to determine if a goodwill impairment exists. If the carrying value of our reporting units exceeds the fair value, the goodwill is considered impaired. Our assessment of fair value utilizes a combination of the income approach, market approach, and, in instances where a reporting unit's free cash flows do not support the value of the underlying assets, an asset approach. In our assessment, for reporting units where the free cash flows support the value of the underlying assets, we apply a 75% weighting to the income approach and a 25% weighting to the market approach. Assumptions used in the discounted cash flow analysis that have the most significant effect on the estimated fair value of our reporting units are the weighted average cost of capital and revenue growth-rates.

We have nine reporting units that have goodwill as of December 31, 2018 , four of which are as a result of the acquisition of Federal-Mogul. Based on our 2018 annual impairment analysis, each of the five reporting units that have goodwill unrelated to the Federal-Mogul acquisition have at least an excess of 18% between the reporting unit's fair value and carrying value. Additionally, for the reporting units assessed, sensitivity analyses were completed indicating that a one percent increase in the discount rate, a one percent decrease in the long-term operating margin, or a one percent decrease in the long-term revenue growth rate assumptions would not result in the carrying value exceeding the fair value. Goodwill recorded as a result of our acquisition of Federal-Mogul is based on preliminary estimates and assumptions, as well as other information compiled by us. We will continue to evaluate available information prior to finalization of the amounts and these values may be adjusted in the measurement period.

We will review our trade names and trademarks for impairment annually, during the fourth quarter, or more frequently if events or circumstances indicated the assets might be impaired. We will perform a quantitative assessment of estimating fair values based upon the prospective stream of hypothetical after-tax royalty cost savings discounted at rates that reflect the rates of return appropriate for these intangible assets. The primary, and most sensitive, input utilized in determining fair values of trade names and trademarks is branded product sales. These trademarks and brand names were fair valued as part of our acquisition of Federal-Mogul and are based on preliminary estimates and assumptions, as well as other information compiled by us. While we believe these preliminary estimates provide a reasonable basis for estimating the fair value of these assets, we will continue to evaluate available information prior to finalization of the amounts and these values may be adjusted in the measurement period.

Due to the many variables inherent in estimating fair value and the relative size of the goodwill and indefinite-lived intangible assets, differences in assumptions could have a material effect on the results of our analysis.

Refer to Note 7, Goodwill and Other Intangible Assets in Item 8, "Financial Statements and Supplementary Data" for more information regarding our goodwill and indefinite-lived intangible assets.

Impairment of Long-Lived Assets, Definite-Lived Intangible Assets, and Changes to Expected Useful Lives

We monitor our long-lived and definite-lived intangible assets for impairment indicators on an on-going basis. If impairment indicators exist, we perform the required impairment analysis by comparing the undiscounted cash flows expected to be generated from the long-lived assets to the related net book values. If the net book value exceeds the undiscounted cash flows, an impairment loss is recognized. Even if an impairment charge is not recognized, a reassessment of the useful lives over which depreciation or amortization is being recognized may be appropriate based on our assessment of the recoverability of these assets.

We estimate cash flows and fair value using internal budgets based on recent sales data, independent automotive production volume estimates, and customer commitments. The key factors that affect our estimates are (1) future production estimates; (2) customer preferences and decisions; (3) product pricing; (4) manufacturing and material cost estimates; and (5) product life / business retention. Any differences in actual results from the estimates could result in fair values different from the estimated fair values, which could materially affect our future results of operations and financial condition. We believe the projections of

anticipated future cash flows and fair value assumptions are reasonable; however, changes in assumptions underlying these estimates could affect our valuations.

Pension and Other Postretirement Benefits

The Company sponsors defined benefit pension and postretirement benefit plans for certain employees and retirees around the world. Its defined benefit plans are accounted for on an actuarial basis, which requires the selection of various assumptions, including an expected long-term rate of return, discount rate, mortality rates of participants, expected rates of mortality improvement, and health care cost trend rates.

The approach to establishing the discount rate assumption for both our domestic and international plans is based on high-quality corporate bonds. The weighted-average discount rates used to calculate net periodic benefit cost for 2018 and year-end obligations as of December 31, 2018 were as follows:

	Pension Benefits		Other Postretirement
	U.S. Plans	Non-U.S. Plans	Benefits
Used to calculate net periodic benefit cost	4.1%	2.4%	4.2%
Used to calculate benefit obligations	4.2%	2.6%	4.3%

Our approach to determining expected return on plan asset assumptions evaluates both historical returns as well as estimates of future returns, and is adjusted for any expected changes in the long-term outlook for the equity and fixed income markets and for changes in the composition of pension plan assets. As a result, our estimate of the weighted average long-term rate of return on plan assets for all of our pension plans was lowered to 5.2% in 2018 from 5.5% in 2017 .

Our pension plans generally do not require employee contributions. Our policy is to fund these pension plans in accordance with applicable domestic and international government regulations. At December 31, 2018 , all legal funding requirements had been met.

The following table illustrates the sensitivity to a change in certain assumptions for our pension and postretirement benefit plan obligations. The changes in these assumptions have no effect on our funding requirements.

	Pension Benefits				Other Postretirement Benefits	
	U.S. Plans		Non-U.S. Plans			
	Change in 2019 pension expense	Change in PBO	Change in 2019 pension expense	Change in PBO	Change in 2019 pension expense	Change in PBO
	(Millions)					
25 basis point ("bp") decrease in discount rate	$ —	$ 31	$ (1)	$ 35	$ —	$ 8
25 bp increase in discount rate	$ 1	$ (30)	$ 1	$ (33)	$ —	$ (8)
25 bp decrease in return on assets rate	$ 2	n/a	$ 1	n/a	n/a	n/a
25 bp increase in return on assets rate	$ (2)	n/a	$ (1)	n/a	n/a	n/a

The assumed health care trend rate affects the amounts reported for our postretirement benefit plan obligations. The following table illustrates the sensitivity to a change in the assumed health care trend rate:

	Total service and interest cost	APBO
	(Millions)	
100 bp increase in health care cost trend rate	$ 1	$ 23
100 bp decrease in health care cost trend rate	$ (1)	$ (20)

Refer to Note 13, Pension Plans, Postretirement and Other Employee Benefits in Item 8, "Financial Statements and Supplementary Data" for more information regarding our pension and other postretirement employee benefit costs and assumptions.

Warranty Reserves

Where we have offered product warranty and also provide for warranty costs. Provisions for estimated expenses related to product warranty are made at the time products are sold or when specific warranty issues are identified on OE products. These estimates are established using historical information about the nature, frequency, and average cost of warranty claims and upon specific warranty issues as they arise. The warranty terms vary but range from one year up to limited lifetime warranties on some of our premium aftermarket products. While we have not experienced any material differences between these estimates and our actual costs, it is reasonably possible that future warranty issues could arise that could have a significant effect on our consolidated financial statements.

Income Taxes

We recognize deferred tax assets and liabilities on the basis of the future tax consequences attributable to temporary differences that exist between the financial statement carrying value of assets and liabilities and their respective tax values, and net operating losses ("NOL") and tax credit carryforwards on a taxing jurisdiction basis. We measure deferred tax assets and liabilities using enacted tax rates that will apply in the years in which we expect the temporary differences to be recovered or paid.

On December 22, 2017, the Tax Cuts and Jobs Act ("TCJA") was enacted into U.S. law, which, among other provisions, lowered the corporate income tax rate effective January 1, 2018 from the currently applicable 35% rate to a new 21% rate, and implemented significant changes with respect to U.S. tax treatment of earnings originating from outside the U.S. Many of the provisions of TCJA are subject to regulatory interpretation and U.S. state conforming enactment. The TCJA also includes an anti-deferral provision (the Global Intangible Low-Taxed Income tax) effective starting in 2018 wherein taxes on foreign income are imposed in excess of a deemed return on tangible assets of non-U.S. corporations.

We evaluate our deferred income tax assets quarterly to determine if valuation allowances are required or should be adjusted. U.S. GAAP requires that companies assess whether valuation allowances should be established against their deferred tax assets based on consideration of all available evidence, both positive and negative, using a "more likely than not" standard. This assessment considers, among other matters, the nature, frequency and amount of recent losses, the duration of statutory carryforward periods, and tax planning strategies. In making such judgments, significant weight is given to evidence that can be objectively verified.

Valuation allowances are established for deferred tax assets based on a "more likely than not" threshold. The ability to realize deferred tax assets depends on our ability to generate sufficient taxable income within the carryforward periods provided for in the tax law for each tax jurisdiction. We consider the following possible sources of taxable income when assessing the realization of our deferred tax assets and the need for a valuation allowance:

- Future reversals of existing taxable temporary differences;
- Taxable income or loss, based on recent results, exclusive of reversing temporary differences and carryforwards;
- Tax-planning strategies; and
- Taxable income in prior carryback years if carryback is permitted under the relevant tax law.

The valuation allowances recorded against deferred tax assets in certain foreign jurisdictions will impact our provision for income taxes until the valuation allowances are released. Our provision for income taxes will include no tax benefit for losses incurred and no tax expense with respect to income generated in these jurisdictions until the respective valuation allowance is eliminated.

MARKET RISK SENSITIVITY

We are exposed to certain global market risks, including foreign currency exchange risk, commodity price risk, interest rate risk associated with our debt, and equity price risk associated with our share-based compensation awards.

Foreign Currency Exchange Rate Risk

We manufacture and sell our products in North America, South America, Asia, Europe, and Africa. As a result, our financial results could be significantly affected by factors such as changes in foreign currency exchange rates or weak economic conditions in foreign markets in which we manufacture and sell our products. We generally try to use natural hedges within our foreign currency activities, including the matching of revenues and costs, to minimize foreign currency risk. Where natural hedges are not in place, we consider managing certain aspects of our foreign currency activities and larger transactions through the use of foreign currency options or forward contracts. Principal currencies hedged have historically included the U.S. dollar, euro, British pound, Polish zloty, and Mexican peso.

Foreign Currency Forward Contracts — We enter into foreign currency forward purchase and sale contracts to mitigate our exposure to changes in exchange rates on certain intercompany and third-party trade receivables and payables. In managing our foreign currency exposures, we identify and aggregates existing offsetting positions and then hedge residual exposures through third-party derivative contracts. The gain or loss on these contracts is recorded as foreign currency gains (losses) within cost of sales in the consolidated statements of income. The fair value of foreign currency forward contracts are recorded in "Prepayments and other current assets" or "Accrued expenses and other current liabilities" in the consolidated balance sheets. The fair value of the Company's foreign currency forward contracts was a net asset position of less than $1 million at December 31, 2018 and a net liability position of less than $1 million at December 31, 2017 .

The following table summarizes by major currency the notional amounts for foreign currency forward purchase and sale contracts as of December 31, 2018 (all of which mature in 2019):

		Notional Amount in Foreign Currency (Millions)
Canadian dollars	—Sell	(2)
European euro	—Purchase	1
	—Sell	(8)
Polish zloty	—Purchase	35
Mexican pesos	—Purchase	211
U.S. dollars	—Purchase	2
	—Sell	(11)

A hypothetical 10% adverse change in the U.S. relative to all other currencies would not materially affect our consolidated financial position, results of operations or cash flows with regard to changes in the fair values of foreign currency forward contracts.

We are exposed to foreign currency risk due to translation of the results of certain international operations into U.S. dollars as part of the consolidation process. Fluctuations in foreign currency exchange rates can therefore create volatility in the results of operations and may adversely affect our financial condition.

The following table summarizes the amounts of foreign currency translation and transaction losses:

	Years Ended December 31	
	2018	2017
	(Millions)	
Translation gains (losses) recorded in accumulated other comprehensive income (loss)	$ (134)	$ 106
Transaction gains (losses) recorded in earnings	$ (4)	$ 1

Senior Secured Notes — We have foreign currency denominated debt, €752 million of which was designated as a net investment hedge in certain foreign subsidiaries and affiliates of ours. As such, an adverse change in foreign currency exchange rates will have no effect on earnings. For the portion not designated as a net investment hedge, we have other natural hedges in place that will offset any adverse change in foreign currency exchange rates.

A hypothetical 10% adverse change in foreign exchange rates between the euro and U.S. dollar would increase the amount of cash required to settle the these notes by approximately $122 million as of December 31, 2018.

Commodity Price Risk

Commodity rate price forward contracts are executed to offset a portion of our exposure to the potential change in prices for raw materials including copper, nickel, tin, zinc, and aluminum. The fair value of our commodity price forward contracts was a liability of $2 million on an equivalent notional amount of $27 million as of December 31, 2018. A hypothetical 10% adverse change in commodity prices would not materially affect our consolidated financial position, results of operations or cash flows with regard to changes in the fair values of commodity forward contracts.

Interest Rate Risk

Our financial instruments that are sensitive to market risk for changes in interest rates are primarily our debt securities. We use our revolving credit facilities to finance our short-term and long-term capital requirements. We pay a current market rate of interest on these borrowings. Our long-term capital requirements have been financed with long-term debt with original maturity dates ranging from four to ten years. On December 31, 2018 , we had $1.6 billion par value of fixed rate debt and $3.7 billion par value of floating rate debt. Of the fixed rate debt, $476 million is fixed through 2022, $626 million is fixed through 2024, and $500 million is fixed through 2026. For more detailed explanations on our debt structure and senior credit facility refer to "Liquidity and Capital Resources — Capitalization" earlier in this Management's Discussion and Analysis.

We estimate the fair value of our long-term debt at December 31, 2018 was about 102% of its book value. A hypothetical one percentage point increase or decrease in interest rates would increase or decrease the annual interest expense we recognize in the income statement and the cash we pay for interest expense by about $7 million.

Equity Price Risk

We also utilize an equity swap arrangement to offset changes in liabilities related to the equity market risks of our arrangements for deferred compensation and restricted stock unit awards. Gain or losses from changes in the fair value of these equity swaps are generally offset by the losses or gains on the related liabilities. We selectively use cash-settled equity swaps to reduce market risk associated with our deferred compensation liabilities. These equity compensation liabilities increase as our stock price increases and decrease as our stock price decreases. In contrast, the value of the swap agreement moves in the opposite direction of these liabilities, allowing us to fix a portion of the liabilities at a certain amount. The fair value of the equity swap agreement was an asset of $4 million related to approximately 250,000 common share equivalents as of December 31, 2018. A hypothetical 10% adverse change in share prices would not materially affect our consolidated financial position, results of operations or cash flows with regard to the equity swaps as an offsetting change would be applied to the related deferred compensation liability.

ENVIRONMENTAL MATTERS, LEGAL PROCEEDINGS AND PRODUCT WARRANTIES

Note 15 — Commitments and Contingencies of the consolidated financial statements located in Part II Item 8 — Financial Statements and Supplemental Data is incorporated herein by reference.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.

Information required by Item 7A appears in Note 2 - "Summary of Significant Accounting Policies," Note 9 - "Derivatives and Hedging Activities" and Note 10 - "Fair value of Financial Instruments" of Part II, Item 8 "Financial Statements and Supplementary Data." Other information required by Item 7A is included in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations."

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA.

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MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Management of Tenneco Inc. is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a-15(f) and Rule 15d-15(f) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")). Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2018. In making this assessment, management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") in *Internal Control-Integrated Framework* (2013).

Based on our assessment management concluded the Company's internal control over financial reporting was effective as of December 31, 2018.

Management has excluded Federal-Mogul from its assessment of internal control over financial reporting as of December 31, 2018 because it was acquired by the Company in a purchase business combination during 2018. Total assets and total revenues of the acquired Federal-Mogul business represent approximately 41% and 16%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2018.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, our independent registered public accounting firm, as stated in their report, which is included herein.

March 15, 2019

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders of Tenneco Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Tenneco Inc. and its subsidiaries (the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of income, comprehensive income (loss), changes in shareholders' equity and cash flows for each of the three years in the period ended December 31, 2018, including the related notes and financial statement schedule listed in the index appearing under Item 15 (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017 , and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Change in Accounting Principles

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for certain components of net periodic pension and postretirement benefit costs and the manner in which it accounts for the cash received to settle the deferred purchase price of factored receivables in 2018.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As described in Management's Report on Internal Control Over Financial Reporting, management has excluded Federal-Mogul from its assessment of internal control over financial reporting as of December 31, 2018 because it was acquired by the Company in a purchase business combination during 2018. We have also excluded Federal-Mogul from our audit of internal control over financial reporting. Federal-Mogul's total assets and total revenues excluded from management's assessment and our audit of internal control over financial reporting represent approximately 41% and 16%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2018.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/S/ PRICEWATERHOUSECOOPERS LLP
Milwaukee, Wisconsin
March 15, 2019

We have served as the Company's auditor since 2010.

TENNECO INC.

CONSOLIDATED STATEMENTS OF INCOME

	Year Ended December 31		
	2018	2017	2016
	(Millions Except Share and Per Share Amounts)		
Revenues			
Net sales and operating revenues	$ 11,763	$ 9,274	$ 8,597
Costs and expenses			
Cost of sales (exclusive of depreciation and amortization)	10,071	7,812	7,126
Selling, general, and administrative	794	638	514
Depreciation and amortization	345	226	213
Engineering, research, and development	204	158	153
Goodwill impairment charge	3	11	—
	11,417	8,845	8,006
Other expense (income)			
Loss on sale of receivables	16	5	5
Non-service pension and postretirement benefit costs	20	16	84
Loss on extinguishment of debt	10	1	24
Equity in (earnings) losses of nonconsolidated affiliates, net of tax	(18)	1	—
Other expense (income), net	12	(2)	(1)
	40	21	112
Earnings before interest expense, income taxes, and noncontrolling interests	306	408	479
Interest expense	132	72	68
Earnings before income taxes and noncontrolling interests	174	336	411
Income tax expense (benefit)	63	71	(4)
Net income	111	265	415
Less: Net income attributable to noncontrolling interests	56	67	68
Net income attributable to Tenneco Inc.	$ 55	$ 198	$ 347
Earnings per share			
Weighted average shares of common stock outstanding —			
Basic	58,625,087	52,796,184	55,939,135
Diluted	58,758,732	53,026,911	56,407,436
Basic earnings per share of common stock	$ 0.93	$ 3.75	$ 6.20
Diluted earnings per share of common stock	$ 0.93	$ 3.73	$ 6.15

The accompanying notes to the consolidated financial statements are an integral part of these consolidated statements of income.

TENNECO INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

	Year Ended December 31		
	2018	2017	2016
	(Millions)		
Net income	$ 111	$ 265	$ 415
Other comprehensive income (loss)—net of tax			
Foreign currency translation adjustment	(134)	106	(56)
Defined benefit plans	(22)	17	51
	(156)	123	(5)
Comprehensive income (loss)	(45)	388	410
Less: Comprehensive income (loss) attributable to noncontrolling interests	54	69	64
Comprehensive income (loss) attributable to common shareholders	$ (99)	$ 319	$ 346

The accompanying notes to the consolidated financial statements are an integral part of these consolidated statements of comprehensive income (loss).

TENNECO INC.
CONSOLIDATED BALANCE SHEETS

	December 31	
	2018	2017
	(Millions)	
ASSETS		
Current assets:		
Cash and cash equivalents	$ 697	$ 315
Restricted cash	5	3
Receivables:		
Customer notes and accounts, net	2,487	1,294
Other	85	27
Inventories	2,245	820
Prepayments and other current assets	590	288
Total current assets	6,109	2,747
Property, plant and equipment, net	3,501	1,691
Long-term receivables, net	10	9
Goodwill	869	49
Intangibles, net	1,519	22
Investments in nonconsolidated affiliates	544	2
Deferred income taxes	467	213
Other assets	213	63
Total assets	$ 13,232	$ 4,796
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Short-term debt, including current maturities of long-term debt	$ 153	$ 103
Accounts payable	2,759	1,582
Accrued compensation and employee benefits	343	141
Accrued income taxes	64	27
Accrued expenses and other current liabilities	1,001	424
Total current liabilities	4,320	2,277
Long-term debt	5,340	1,358
Deferred income taxes	88	11
Pension and postretirement benefits	1,167	268
Deferred credits and other liabilities	263	158
Commitments and contingencies		
Total liabilities	11,178	4,072
Redeemable noncontrolling interests	138	42
Tenneco Inc. shareholders' equity:		
Preferred stock—$0.01 par value; none issued	—	—
Class A voting common stock—$0.01 par value; shares issued: (2018—71,675,379; 2017—66,033,509)	1	1
Class B non-voting convertible common stock—$0.01 par value; 2018—23,793,669 shares issued	—	—
Additional paid-in capital	4,360	3,112
Accumulated other comprehensive loss	(692)	(538)
Accumulated deficit	(1,013)	(1,009)
	2,656	1,566
Shares held as treasury stock—at cost: 2018 and 2017—14,592,888 shares	(930)	(930)
Total Tenneco Inc. shareholders' equity	1,726	636
Noncontrolling interests	190	46
Total equity	1,916	682
Total liabilities, redeemable noncontrolling interests and equity	$ 13,232	$ 4,796

The accompanying notes to the consolidated financial statements are an integral

part of these consolidated balance sheets.

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TENNECO INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31		
	2018	2017	2016
		(Millions)	
Operating Activities			
Net income	$ 111	$ 265	$ 415
Adjustments to reconcile net income to cash provided by operating activities:			
Goodwill impairment charge	3	11	—
Depreciation and amortization	345	226	213
Deferred income taxes	(65)	(8)	(84)
Stock-based compensation	14	14	14
Restructuring charges and asset impairments, net of cash paid	49	8	(13)
Change in pension and postretirement benefit plans	(8)	(15)	47
Equity in earnings of nonconsolidated affiliates	(18)	1	—
Cash dividends received from nonconsolidated affiliates	2	—	—
Loss on sale of assets	16	5	4
Changes in operating assets and liabilities:			
Receivables	(190)	(81)	(325)
Inventories	27	(94)	(55)
Payables and accrued expenses	291	136	140
Accrued interest and income taxes	(19)	1	13
Other assets and liabilities	(119)	48	5
Net cash provided by operating activities	439	517	374
Investing Activities			
Federal-Mogul acquisition, net of cash acquired	(2,194)	—	—
Proceeds from sale of assets	9	8	6
Proceeds from sale of equity interest		9	—
Cash payments for plant, property, and equipment	(507)	(419)	(345)
Proceeds from deferred purchase price of factored receivables	174	112	110
Other	4	(10)	—
Net cash used by investing activities	(2,514)	(300)	(229)
Financing Activities			
Proceeds from term loans and notes	3,426	160	529
Repayments of term loans and notes	(453)	(36)	(545)
Borrowings on revolving lines of credit	5,149	6,664	5,417
Payments on revolving lines of credit	(5,405)	(6,737)	(5,221)
Issuance (repurchase) of common shares	(1)	(1)	13
Cash dividends	(59)	(53)	—
Debt issuance cost of long-term debt	(95)	(8)	(9)
Purchase of common stock under the share repurchase program	—	(169)	(225)
Net increase (decrease) in bank overdrafts	(5)	(7)	10
Other	(30)	—	—
Distributions to noncontrolling interest partners	(51)	(64)	(55)
Net cash provided (used) by financing activities	2,476	(251)	(86)
Effect of foreign exchange rate changes on cash, cash equivalents and restricted cash	(17)	3	2
Increase (decrease) in cash, cash equivalents and restricted cash	384	(31)	61
Cash, cash equivalents and restricted cash, January 1	318	349	288
Cash, cash equivalents and restricted cash, December 31	$ 702	$ 318	$ 349
Supplemental Cash Flow Information			
Cash paid during the year for interest	$ 143	$ 78	$ 76
Cash paid during the year for income taxes, net of refunds	$ 113	$ 95	$ 113
Non-cash Investing and Financing Activities			
Period end balance of trade payables for plant, property, and equipment	$ 135	$ 59	$ 68

Deferred purchase price of receivables factored in period	$ 154	$ 114	$ 109
Stock issued for acquisition of Federal-Mogul	$ (1,236)	$ —	$ —
Stock transferred for acquisition of Federal-Mogul	$ 1,236	$ —	$ —

The accompanying notes to the consolidated financial statements are an integral part of these consolidated statements of cash flows.

TENNECO INC.
CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

	Tenneco Inc. Shareholders' equity							
	$0.01 Par Value Common Stock	Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Treasury Stock	Total Tenneco Inc. Shareholders' Equity	Noncontrolling Interests	Total Equity
				(Millions)				
Balance as of December 31, 2015	$ 1	$ 3,081	$ (658)	$ (1,501)	$ (536)	$ 387	$ 39	$ 426
Net income	—	—	—	347	—	347	32	379
Other comprehensive loss —net of tax :								
Foreign currency translation adjustment	—	—	(52)	—	—	(52)	(2)	(54)
Defined benefit plans	—	—	51	—	—	51	—	51
Comprehensive income						346	30	376
Stock-based compensation expense	—	17	—	—	—	17	—	17
Purchases of treasury stock	—	—	—	—	(225)	(225)	—	(225)
Distributions declared to noncontrolling interests	—	—	—	—	—	—	(22)	(22)
Balance as of December 31, 2016	1	3,098	(659)	(1,154)	(761)	525	47	572
Net income	—	—	—	198	—	198	31	229
Other comprehensive loss —net of tax								
Foreign currency translation adjustments	—	—	104	—	—	104	(1)	103
Defined benefit plans	—	—	17	—	—	17	—	17
Comprehensive income						319	30	349
Stock-based compensation expense	—	14	—	—	—	14	—	14
Cash dividends ($1.00 per share)	—	—	—	(53)	—	(53)	—	(53)
Purchases of treasury stock	—	—	—	—	(169)	(169)	—	(169)
Distributions declared to noncontrolling interests	—	—	—	—	—	—	(31)	(31)
Balance as of December 31, 2017	1	3,112	(538)	(1,009)	(930)	636	46	682
Net income	—	—	—	55	—	55	27	82
Other comprehensive loss —net of tax :								
Foreign currency translation adjustments	—	—	(132)	—	—	(132)	—	(132)
Defined benefit plans	—	—	(22)	—	—	(22)	—	(22)
Comprehensive income						(99)	27	(72)
Adjustments to adopt new accounting standards (1)	—	—	—	—	—	—	—	—
Common stock issued	—	1,236	—	—	—	1,236	—	1,236
Federal-Mogul Acquisition	—	—	—	—	—	—	143	143
Stock-based compensation expense	—	12	—	—	—	12	—	12
Cash dividends ($1 00 per share)	—	—	—	(59)	—	(59)	—	(59)
Distributions declared to noncontrolling interests	—	—	—	—	—	—	(26)	(26)
Balance as of December 31, 2018	$ 1	$ 4,360	$ (692)	$ (1,013)	$ (930)	$ 1,726	$ 190	$ 1,916

(1) The cumulative effect of the adoption of ASU 2016-16 was an increase to accumulated deficit of $1 million , and the cumulative effect of the adoption of ASC 606 was a decrease to accumulated deficit of $1 million

The accompanying notes to the consolidated financial statements are an integral part of these statements of changes in shareholders' equity.

TENNECO INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Description of Business

Tenneco Inc. ("Tenneco" or "the Company") was formed under the laws of Delaware in 1996. Tenneco designs, manufactures, and sells products and services for light vehicle, commercial truck, off-highway, industrial and aftermarket customers. The Company is one of the world's leading manufacturers of clean air, powertrain, and ride performance products and systems, and serves both original equipment manufacturers ("OEM") and replacement markets worldwide.

Effective October 1, 2018, the Company completed the acquisition (the "Acquisition") of Federal-Mogul LLC ("Federal-Mogul"), a global supplier of technology and innovation in vehicle and industrial products for fuel economy, emissions reductions, and safety systems. Federal-Mogul serves the world's foremost OEM and servicers ("OES", and together with OEM, "OE") of automotive, light, medium and heavy-duty commercial vehicles, off road, agricultural, marine, rail, aerospace, power generation, and industrial equipment, as well as the worldwide aftermarket. The Company expects to separate its businesses to form two new, independent publicly traded companies, an Aftermarket and Ride Performance company and a new Powertrain Technology company, in the second half of 2019.

2. Summary of Significant Accounting Policies

Basis of Presentation
The consolidated financial statements of the Company have been prepared in accordance with accounting principles generally accepted in the United States ("U.S. GAAP").

Revision of Previously Issued Financial Statements
The Company identified an error in the accounting for certain costs capitalized into inventory that did not constitute inventoriable costs in its historical financial statements. Costs incorrectly capitalized in ending inventory were $49 million and $42 million as of December 31, 2017 and 2016.

The Company evaluated the effect of this item as well as the items discussed below on prior periods under the guidance of SEC Staff Accounting Bulletin (SAB) No. 99, "Materiality" and determined the amounts were not material, individually or in the aggregate, to previously issued financial statements. The Company also evaluated the effect of correcting these items through a cumulative adjustment to our financial statements and concluded, based on the guidance within SEC SAB No. 108, "Considering the Effects of Prior Year Misstatements when Quantifying Misstatements in Current Year Financial Statements", it was appropriate to revise our previously issued financial statements to correct these errors. The Company also revised for other immaterial errors including (i) capitalization errors related to construction-in-process; (ii) errors related to the estimation of warranty and rebate liabilities; (iii) errors related to the cash flow presentation for borrowings and repayments on revolving lines of credit (net versus gross); (iv) errors related to currency on certain non-income tax transactions; and (v) errors surrounding the misclassification of translation adjustments within accumulated other comprehensive income. These adjustments related to various line items as shown in the tables below. As a result, certain amounts in the consolidated financial statements have been revised, and will be revised for interim periods in future filings, in order to correct for these errors. These revisions have also been reflected in Note 22, Quarterly Financial Data (Unaudited) to show the effects in the unaudited quarterly financial statements.

Reclassifications: Certain amounts in the prior years have been aggregated or disaggregated to conform to current year presentation. These reclassifications have no effect on previously reported earnings before income taxes and noncontrolling interests or net income, other comprehensive income (loss), current or total assets, current or total liabilities, and the cash provided (used) by operating, investing or financing activities within the consolidated statements of cash flows.

The following tables present the effect of these reclassifications and revisions for the financial statement line items adjusted in the affected periods included within this annual financial report:

	Year Ended December 31, 2017				
	As Reported	Reclasses	As Reclassified	Revisions	As Revised
	(Millions, except per share amounts)				
Consolidated statement of income					
Revenues					
Net sales and operating revenues	$ 9,274	$ —	$ 9,274	$ —	$ 9,274
Costs and expenses					
Cost of sales (exclusive of depreciation and amortization)	7,809	—	7,809	3	7,812
Selling, general, and administrative	636	—	636	2	638
Depreciation and amortization	224	—	224	2	226
Engineering, research, and development	158	—	158	—	158
Goodwill impairment charge	11	—	11	—	11
	8,838	—	8,838	7	8,845
Other expense (income)					
Loss on sale of receivables	5	—	5	—	5
Non-service pension and postretirement benefit costs	—	16	16	—	16
Loss on extinguishment of debt	—	1	1	—	1
Equity in (earnings) losses of nonconsolidated affiliates, net of tax	—	1	1	—	1
Other expense (income), net	14	(17)	(3)	1	(2)
	19	1	20	1	21
Earnings before interest expense, income taxes, and noncontrolling interests	417	(1)	416	(8)	408
Interest expense	73	(1)	72	—	72
Earnings before income taxes and noncontrolling interests	344	—	344	(8)	336
Income tax expense (benefit)	70	—	70	1	71
Net income	274	—	274	(9)	265
Less: Net income attributable to noncontrolling interests	67		67	—	67
Net income attributable to Tenneco Inc.	$ 207	$ —	$ 207	$ (9)	$ 198
Earnings per share					
Weighted average shares of common stock outstanding —					
Basic earnings per share of common stock	$ 3.93	$ —	$ 3.93	$ (0.18)	$ 3.75
Diluted earnings per share of common stock	$ 3.91	$ —	$ 3.91	$ (0.18)	$ 3.73

	Year Ended December 31, 2017				
	As Reported	Reclasses	As Reclassified	Revisions	As Revised
	(Millions)				
Consolidated statement of comprehensive income					
Net income	$ 274	$ —	$ 274	$ (9)	$ 265
Other comprehensive income (loss)—net of tax					
Foreign currency translation adjustment	99	—	99	7	106
Defined benefit plans	27	—	27	(10)	17
	126	—	126	(3)	123
Comprehensive income (loss)	400	—	400	(12)	388
Less: Comprehensive income (loss) attributable to noncontrolling interests	69	—	69	—	69
Comprehensive income (loss) attributable to common shareholders	$ 331	$ —	$ 331	$ (12)	$ 319

	Year Ended December 31, 2016				
	As Reported	Reclasses	As Reclassified	Revisions	As Revised
	(Millions, except per share amounts)				
Consolidated statement of income					
Revenues					
Net sales and operating revenues	$ 8,599	$ —	$ 8,599	$ (2)	$ 8,597
Costs and expenses					
Cost of sales (exclusive of depreciation and amortization)	7,116	—	7,116	10	7,126
Selling, general, and administrative	513	—	513	1	514
Depreciation and amortization	212	—	212	1	213
Engineering, research, and development	154	—	154	(1)	153
	7,995	—	7,995	11	8,006
Other expense (income)					
Loss on sale of receivables	5	—	5	—	5
Non-service pension and postretirement benefit costs	—	84	84	—	84
Loss on extinguishment of debt	—	24	24	—	24
Other expense (income), net	83	(84)	(1)	—	(1
	88	24	112	—	112
Earnings before interest expense, income taxes, and noncontrolling interests	516	(24)	492	(13)	479
Interest expense	92	(24)	68	—	68
Earnings before income taxes and noncontrolling interests	424	—	424	(13)	411
Income tax expense (benefit)	—	—	—	(4)	(4)
Net income	424	—	424	(9)	415
Less: Net income attributable to noncontrolling interests	68	—	68	—	68
Net income attributable to Tenneco Inc.	$ 356	$ —	$ 356	$ (9)	$ 347
Earnings per share					
Weighted average shares of common stock outstanding —					
Basic earnings per share of common stock	$ 6.36	$ —	$ 6.36	$ (0.16)	$ 6.20
Diluted earnings per share of common stock	$ 6.31	$ —	$ 6.31	$ (0.16)	$ 6.15

	Year Ended December 31, 2016				
	As Reported	Reclasses	As Reclassified	Revisions	As Revised
	(Millions)				
Consolidated statement of comprehensive income					
Net income	$ 424	$ —	$ 424	$ (9)	$ 415
Other comprehensive income (loss)—net of tax					
Foreign currency translation adjustment	(45)	—	(45)	(11)	(56)
Defined benefit plans	41	—	41	10	51
	(4)	—	(4)	(1)	(5)
Comprehensive income (loss)	420	—	420	(10)	410
Less: Comprehensive income (loss) attributable to noncontrolling interests	64	—	64	—	64
Comprehensive income (loss) attributable to common shareholders	$ 356	$ —	$ 356	$ (10)	$ 346

	December 31, 2017				
	As Reported	Reclasses	As Reclassified	Revisions	As Revised
			(Millions)		
Consolidated balance sheet					
Current assets:					
Cash and cash equivalents	$ 315	$ —	$ 315	$ —	$ 315
Restricted cash	3	—	3	—	3
Receivables:					
Customer notes and accounts, net	1,294	—	1,294	—	1,294
Other	27	—	27	—	27
Inventories	869	—	869	(49)	820
Prepayments and other current assets	291	—	291	(3)	288
Total current assets	2,799	—	2,799	(52)	2,747
Property, plant and equipment, net	1,615	79	1,694	(3)	1,691
Long-term receivables, net	9	—	9	—	9
Goodwill	49	—	49	—	49
Intangibles, net	22	—	22	—	22
Investments in nonconsolidated affiliates	—	2	2	—	2
Deferred income taxes	204	—	204	9	213
Other assets	144	(81)	63	—	63
Total assets	$ 4,842	$ —	$ 4,842	$ (46)	$ 4,796
Short-term debt, including current maturities of long-term debt	$ 83	$ 20	$ 103	$ —	$ 103
Accounts payable	1,705	(123)	1,582	—	1,582
Accrued compensation and employee benefits		141	141	—	141
Accrued income taxes	45	(20)	25	2	27
Accrued interest	14	(14)	—	—	—
Accrued liabilities	287	(287)	—	—	—
Other	132	(132)	—	—	
Accrued expenses and other current liabilities		415	415	9	424
Total current liabilities	2,266	—	2,266	11	2,277
Long-term debt	1,358	—	1,358	—	1,358
Deferred income taxes	11	—	11	—	11
Pension and postretirement benefits	268	—	268	—	268
Deferred credits and other liabilities	155	—	155	3	158
Commitments and contingencies					
Total liabilities	4,058	—	4,058	14	4,072
Redeemable noncontrolling interests	42		42	—	42
Tenneco Inc. shareholders' equity:					
Preferred stock—$0.01 par value; none issued	—	—	—	—	—
Class A voting common stock—$0.01 par value; shares issued: (2018—71,675,379; 2017—66,033,509)	1	—	1	—	1
Additional paid-in capital	3,112	—	3,112	—	3,112
Accumulated other comprehensive loss	(541)	—	(541)	3	(538)
Accumulated deficit	(946)	—	(946)	(63)	(1,009)
	1,626	—	1,626	(60)	1,566
Shares held as treasury stock—at cost: 2018 and 2017—14,592,888 shares	(930)	—	(930)	—	(930)
Total Tenneco Inc. shareholders' equity	696	—	696	(60)	636
Noncontrolling interests	46	—	46	—	46
Total equity	742	—	742	(60)	682
Total liabilities, redeemable noncontrolling interests and equity	$ 4,842	$ —	$ 4,842	$ (46)	$ 4,796

	Year Ended December 31, 2017				
	As Reported	Reclasses	As Reclassified	Revisions	As Revised
Consolidated statements of cash flow			(Millions)		
Operating Activities					
Net income	$ 274	$ —	$ 274	$ (9)	$ 265
Net cash provided by operating activities	517	—	517	—	517
Investing Activities					
Net cash used by investing activities	(300)	—	(300)	—	(300)
Financing Activities					
Proceeds from term loans and notes	—	137	137	23	160
Repayments of term loans and notes	—	(19)	(19)	(17)	(36)
Retirement of long-term debt	(19)	19	—	—	—
Issuance of long-term debt	137	(137)	—	—	—
Borrowings on revolving lines of credit	—	—	—	6,664	6,664
Payments on revolving lines of credit	—	—	—	(6,737)	(6,737)
Net increase (decrease) in revolver borrowings	(67)	—	(67)	67	—
Net cash provided (used) by financing activities	$ (251)	$ —	$ (251)	$ —	$ (251)

	Year Ended December 31, 2016				
	As Reported	Reclasses	As Reclassified	Revisions	As Revised
Consolidated statements of cash flow			(Millions)		
Operating Activities					
Net income	$ 424	$ —	$ 424	$ (9)	$ 415
Net cash provided by operating activities	374	—	374	—	374
Investing Activities					
Net cash used by investing activities	(229)	—	(229)	—	(229)
Financing Activities					
Proceeds from term loans and notes	—	509	509	20	529
Repayments of term loans and notes	—	(531)	(531)	(14)	(545)
Retirement of long-term debt	(531)	531	—	—	—
Issuance of long-term debt	509	(509)	—	—	—
Borrowings on revolving lines of credit	—	—	—	5,417	5,417
Payments on revolving lines of credit	—	—	—	(5,221)	(5,221)
Net increase (decrease) in revolver borrowings	202	—	202	(202)	—
Net cash provided (used) by financing activities	$ (86)	$ —	$ (86)	$ —	$ (86)

	Year Ended December 31, 2017		
	As Reported	Revisions	As Revised
	(Millions)		
Consolidated statements of shareholders' equity			
Accumulated Deficit			
Balance January 1	$ (1,100)	$ (54)	$ (1,154)
Net income attributable to Tenneco Inc.	207	(9)	198
Cash dividends declared	(53)	—	(53)
Balance December 31	$ (946)	$ (63)	$ (1,009)
Accumulated Other Comprehensive Loss			
Balance January 1	$ (665)	$ 6	$ (659)
Other comprehensive loss —net of tax :			
Foreign currency translation adjustment	97	7	104
Defined benefit plans	27	(10)	17
Balance December 31	$ (541)	$ 3	$ (538)
Total Tenneco Inc. Shareholders' Equity			
Balance January 1	$ 573	$ (48)	$ 525
Net income attributable to Tenneco Inc.	207	(9)	198
Other comprehensive loss—net of tax:			
Foreign currency translation adjustment	97	7	104
Defined benefit plans	27	(10)	17
Comprehensive income	331	(12)	319
Stock-based compensation expense	14	—	14
Cash dividends	(53)	—	(53)
Treasury stock	(169)	—	(169)
Balance December 31	$ 696	$ (60)	$ 636
Total Equity			
Balance January 1	$ 620	$ (48)	$ 572
Net income	238	(9)	229
Other comprehensive loss—net of tax:			
Foreign currency translation adjustment	96	7	103
Defined benefit plans	27	(10)	17
Comprehensive income	361	(12)	349
Stock-based compensation expense	14	—	14
Cash dividends	(53)	—	(53)
Treasury stock	(169)	—	(169)
Distributions declared to noncontrolling interests	(31)	—	(31)
Balance December 31	$ 742	$ (60)	$ 682

	Year Ended December 31, 2016		
	As Reported	Revisions	As Revised
		(Millions)	
Consolidated statements of shareholders' equity			
Accumulated Deficit			
Balance January 1	$ (1,456)	$ (45)	$ (1,501)
Net income attributable to Tenneco Inc.	356	(9)	347
Balance December 31	$ (1,100)	$ (54)	$ (1,154)
Accumulated Other Comprehensive Loss			
Balance January 1	$ (665)	$ 7	$ (658)
Other comprehensive loss—net of tax:			
Foreign currency translation adjustment	(41)	(11)	(52)
Defined benefit plans	41	10	51
Balance December 31	$ (665)	$ 6	$ (659)
Total Tenneco Inc. shareholders' equity			
Balance January 1	$ 425	$ (38)	$ 387
Net income attributable to Tenneco Inc	356	(9)	347
Other comprehensive loss—net of tax:			
Foreign currency translation adjustment	(41)	(11)	(52)
Defined benefit plans	41	10	51
Comprehensive income	356	(10)	346
Stock-based compensation expense	17	—	17
Treasury stock	(225)	—	(225)
Balance December 31	$ 573	$ (48)	$ 525
Total Equity			
Balance January 1	$ 464	$ (38)	$ 426
Net income	388	(9)	379
Other comprehensive loss—net of tax:			
Foreign currency translation adjustment	(43)	(11)	(54)
Defined benefit plans	41	10	51
Comprehensive income	386	(10)	376
Stock-based compensation expense	17	—	17
Treasury stock	(225)	—	(225)
Distribution declared to noncontrolling interests	(22)	—	(22)
Balance December 31	$ 620	$ (48)	$ 572

Summary of Significant Accounting Policies

Principles of Consolidation: The Company consolidates into its financial statements the accounts of the Company, all wholly owned subsidiaries, and any partially owned subsidiary it has the ability to control. Control generally equates to ownership percentage, whereby investments more that 50% owned are consolidated, investments in affiliates of 50% or less but greater than 20% are accounted for using the equity method, and investments in affiliates of 20% or less are accounted for using the cost method. See Note 8, Investment in Nonconsolidated Affiliates .

The Company does not consolidate any entity for which it has a variable interest based solely on the power to direct the activities and significant participation in the entity's expected results that would not otherwise be consolidated based on control through voting interests. Further, its affiliates are businesses established and maintained in connection with its operating strategy and are not special purpose entities. All intercompany transactions and balances have been eliminated.

Use of Estimates: The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the amounts reported therein. Due to the inherent uncertainty involved in making estimates, actual results reported in future periods may be based upon amounts that differ from these estimates.

Cash and Cash Equivalents: The Company considers all highly liquid investments with maturities of 90 days or less from the date of purchase to be cash equivalents. The carrying value of cash and cash equivalents approximate fair value.

Restricted Cash: The Company is required to provide cash collateral in connection with certain contractual arrangements and statutory requirements. The Company has $5 million and $3 million of restricted cash at December 31, 2018 and 2017 in support of these arrangements and requirements.

Notes and Accounts Receivable: Notes and accounts receivable are stated at net realizable value, which approximates fair value. Receivables are reduced by an allowance for amounts that may become uncollectible in the future. The allowance is an estimate based on historical collection experience, current economic and market conditions, and a review of the current status of each customer's trade accounts or notes receivable. A receivable is past due if payments have not been received within the agreed-upon invoice terms. Account balances are charged-off against the allowance when management determines the receivable will not be recovered.

The allowance for doubtful accounts on short-term and long-term accounts receivable was $17 million and $16 million at December 31, 2018 and 2017 . The allowance for doubtful accounts on short-term and long-term notes receivable was zero at both December 31, 2018 and 2017 .

Inventories: Inventories are stated at the lower of cost or net realizable value using the first-in, first-out ("FIFO") or average cost methods. Work in process includes purchased parts such as substrates coated with precious metals. Cost of inventory includes direct materials, labor, and applicable manufacturing overhead costs. The value of inventories are reduced for excess and obsolescence based on management's review of on-hand inventories compared to historical and estimated future sales and usage. Inventory held at consignment locations is included in finished goods inventory as the Company retains full title and rights to the products.

Redeemable Noncontrolling Interests: The Company has noncontrolling interests with redemption features. These redemption features could require the Company to make an offer to purchase the noncontrolling interests at fair value in the event of a change in control of Tenneco Inc. or certain of its subsidiaries. As a result of the Acquisition, the Company acquired $10 million in redeemable noncontrolling interests (exclusive of interests related to a subsidiary in India) and triggered the related redemption features which provide the holders the option to require the Company to redeem the noncontrolling interests. The noncontrolling interest partners have elected not to require the Company to redeem their shares. The redemption of these redeemable noncontrolling interests is not solely within the Company's control. Accordingly, these noncontrolling interests are presented in the temporary equity section of the Company's consolidated balance sheets. The Company does not believe it is probable the redemption features related to these noncontrolling interest securities will be triggered as a change in control event is generally not probable until it occurs. As a result the noncontrolling interests have not been remeasured to redemption value.

In addition, the Company acquired $86 million in redeemable noncontrolling interests related to a subsidiary in India. The Company initiated the process to make a tender offer of the shares it does not own due to the change in control in accordance with local regulations triggered by the Acquisition. It is probable these shares will become redeemable during 2019 under the tender offer at a price that is representative of fair value and as a result the noncontrolling interest is presented in the temporary equity section of the Company's consolidated balance sheets. At the Acquisition date, this redeemable noncontrolling interest was recorded at its estimated fair value based on the preliminary purchase price allocation. The carrying amount for this redeemable noncontrolling interest at December 31, 2018 is currently greater than the redemption value as evidenced by the tender offer price resulting in no adjustment to reflect the noncontrolling interest at redemption value.

At December 31, 2018 , the Company had previously held redeemable noncontrolling interests of $35 million , for which the redemption is not solely within the Company's control and these noncontrolling interests are presented in the temporary equity section of the Company's consolidated balance sheets. The Company does not believe it is probable the redemption features related to these noncontrolling interest securities will be triggered as a change in control event is generally not probable until it occurs. As such, the noncontrolling interests have not been remeasured to redemption value.

The following is a rollforward of the activity in the redeemable noncontrolling interests for the years ended December 31, 2018 , 2017 and 2016 :

	December 31		
	2018	2017	2016
		(Millions)	
Balance January 1	$ 42	$ 40	$ 41
Federal-Mogul acquisition	96	—	—
Net income attributable to redeemable noncontrolling interests	29	36	36
Other comprehensive (loss) income	(2)	3	(2)
Contributions received	6	—	—
Dividends declared	(33)	(37)	(35)
Balance December 31	$ 138	$ 42	$ 40

Long-Lived Assets: Long-lived assets, such as property, plant and equipment and definite-lived intangible assets are recorded at cost or fair value established at acquisition. Definite-lived intangible assets include customer relationships and platforms, patented and unpatented technology, and licensing agreements. Long-lived asset groups are evaluated for impairment when impairment indicators exist. If the carrying value of a long-lived asset group is impaired, an impairment charge is recorded for the amount by which the carrying value of the long-lived asset group exceeds its fair value. Depreciation and amortization are computed principally on a straight-line basis over the estimated useful lives of the assets for financial reporting purposes. Expenditures for maintenance and repairs are expensed as incurred.

Goodwill, net: Goodwill is determined as the excess of fair value over amounts attributable to specific tangible and intangible assets. Goodwill is evaluated for impairment annually, during the fourth quarter, or more frequently, if impairment indicators exist. An impairment indicator exists when a reporting unit's carrying value exceeds its fair value. When performing the goodwill impairment testing, a reporting units' fair value is based on valuation techniques using the best available information. The assessment of fair value utilizes a combination of the income approach and market approach. The impairment charge is the excess of the goodwill carrying value over the implied fair value of goodwill using a one-step quantitative approach.

Trade names and trademarks: Trade names and trademarks are stated at fair value established at acquisition or cost. These indefinite-lived intangible assets will be evaluated for impairment annually during the fourth quarter, or more frequently, if impairment indicators exist. An impairment exists when a trade name and trademarks' carrying value exceeds its fair value. The fair values of these assets are based upon the prospective stream of hypothetical after-tax royalty cost savings discounted at rates that reflect the rates of return appropriate for these intangible assets. The impairment charge is the excess of the assets carrying value over its fair value.

Pre-production Design and Development and Tooling Assets: The Company expenses pre-production design and development costs as incurred unless there is a contractual guarantee for reimbursement from the original equipment customer. Costs for molds, dies and other tools used to make products sold on long-term supply arrangements for which the Company has title to the assets are capitalized in property, plant and equipment and amortized to cost of sales over the shorter of the term of the arrangement or over the estimated useful lives of the assets. Costs for molds, dies and other tools used to make products sold on long-term supply arrangements for which the Company has a contractual guarantee for reimbursement or has the non-cancelable right to use the assets during the term of the supply arrangement from the customer are capitalized in prepayments and other current assets.

Prepayments and other current assets included $193 million and $142 million at December 31, 2018 and 2017 , respectively, for in-process tools and dies being built for OE customers and unbilled pre-production design and development costs.

Internal Use Software Assets: Certain costs related to the purchase and development of software used in the business operations are capitalized. Costs attributable to these software systems are amortized over their estimated useful lives based on various factors such as the effects of obsolescence, technology, and other economic factors. Additions to capitalized software development costs, including payroll and payroll-related costs for those employees directly associated with developing and obtaining the internal use software, are classified as investing activities in the consolidated statements of cash flows.

Income Taxes: Deferred tax assets and liabilities are recognized on the basis of the future tax consequences attributable to temporary differences that exist between the financial statement carrying value of assets and liabilities and the respective tax values, and net operating losses ("NOL") and tax credit carryforwards on a taxing jurisdiction basis. Deferred tax assets and

liabilities are measured using enacted tax rates that will apply in the years in which the temporary differences are expected to be recovered or paid. The effect on deferred tax assets and liabilities of a change in tax rates is recorded in the results of operations in the period that includes the enactment date under the law.

Deferred income tax assets are evaluated quarterly to determine if valuation allowances are required or should be adjusted. Valuation allowances are established in certain jurisdictions based on a more likely than not standard. The ability to realize deferred tax assets depends on the Company's ability to generate sufficient taxable income within the carryback or carryforward periods provided for in the tax law for each tax jurisdiction. The Company considers the various possible sources of taxable income when assessing the realization of its deferred tax assets. The valuation allowances recorded against deferred tax assets generated by taxable losses in certain jurisdictions will effect the provision for income taxes until the valuation allowances are released. The Company's provision for income taxes will include no tax benefit for losses incurred and no tax expense with respect to income generated in these jurisdictions until the respective valuation allowance is eliminated.

The Company records uncertain tax positions on the basis of a two-step process whereby it is determined whether it is more likely than not that the tax positions will be sustained based on the technical merits of the position, and for those tax positions that meet the more likely than not criteria, the largest amount of tax benefit that is greater than 50% likely to be realized upon ultimate settlement with the related tax authority is recognized.

The Company elected to account for Global Intangible Low-Taxed Income ("GILTI") as a current-period expense when incurred. Therefore, the Company has not recorded deferred taxes for basis differences expected to reverse in the future periods.

Pension and other postretirement benefit plan obligations: Pensions and other postretirement employee benefit costs and related liabilities and assets are dependent upon assumptions used in calculating such amounts. These assumptions include discount rates, long term rate of return on plan assets, health care cost trends, compensation, and other factors. Actual results that differ from the assumptions used are accumulated and amortized over future periods, and accordingly, generally affect recognized expense in future periods. The cost of benefits provided by defined benefit pension and other postretirement plans is recorded in the period employees provide service. Future pension expense for certain significant funded benefit plans is calculated using an expected return on plan asset methodology.

Investments with registered investment companies, common and preferred stocks, and certain government debt securities are valued at the closing price reported on the active market on which the securities are traded. Corporate debt securities are valued by third-party pricing sources using the multi-dimensional relational model using instruments with similar characteristics. Hedge funds and the collective trusts are valued at net asset value (NAV) per share which are provided by the respective investment sponsors or investment advisers.

Revenue Recognition: The Company adopted Financial Accounting Standards Board ("FASB") Accounting Standards Update ("ASU") 2014-09 on January 1, 2018, which required it to recognize revenue when a customer obtains control rather than when substantially all risks and rewards of a good or service have been transferred. ASU 2014-09 was adopted by applying the modified retrospective method; see the Recently Adopted Accounting Standards section for additional information pertaining to the adoption of ASU 2014-09. The comparative information has not been adjusted and continues to be reported under the accounting standards in effect for those periods. The following accounting policies became effective upon the adoption of ASU 2014-09:

The Company accounts for a contract with a customer when it has approval and commitment from both parties, the rights of the parties are identified, payment terms are identified, the contract has commercial substance, and collectability of consideration is probable.

Revenue is recognized for sales to OE and aftermarket customers when transfer of control of the related good or service has occurred. Revenue from most OE and aftermarket goods and services is transferred to customers at a point in time. Contract terms with certain OE customers results in products and services being transferred over time due to the customized nature of some of the Company's products together with contractual provisions in certain customer contracts that provide the Company with an enforceable right to payment for performance completed to date. The Company considers an input measure (e.g., costs incurred to date relative to total estimated costs at completion) as a fair measure of progress for the recognition of over time revenue associated with these customized parts. A cost measure best depicts the means of transfer of goods to the customer, which occurs as the Company incurs costs to fulfill contracts.

The customer is invoiced once transfer of control has occurred and the Company has a right to payment. Typical payment

terms vary based on the customer and the type of goods and services in the contract. The period of time between invoicing and when payment is due is not significant. Amounts billed and due from customers are classified as receivables on the consolidated balance sheets. Standard payment terms are less than one year and the Company has elected the practical expedient to not assess whether a contract has a significant financing component if the payment terms are less than one year.

Performance Obligations: The majority of the Company's customer contracts with OE and aftermarket customers are long-term supply arrangements. The performance obligations are established by the enforceable contract, which is generally considered to be the purchase order but in some cases could be the delivery release schedule. The purchase order, or related delivery release schedule, is of a duration of less than one year. As such, the Company applies the practical expedient and does not disclose information about remaining performance obligations that have original expected durations of one year or less, for which work has not yet been performed.

Rebates: The Company accrues for rebates pursuant to specific arrangements with certain customers, primarily in the aftermarket. Rebates generally provide for payments to customers based upon the achievement of specified purchase volumes and are recorded as a reduction of sales as earned by such customers.

Product returns: Certain aftermarket contracts with customers include terms and conditions that result in a customer right of return that is accounted for on a gross basis. For these contracts the Company has recorded a refund liability and return asset within "Prepayments and other current assets."

Shipping and handling costs: Shipping and handling costs associated with outbound freight after control of a product has transferred to a customer are accounted for as a fulfillment cost and are included in cost of sales in the consolidated statements of income.

Sales and sales related taxes: The Company collects and remits taxes assessed by various governmental authorities that are both imposed on and concurrent with revenue-producing transactions with its customers. These taxes may include, but are not limited to, sales, use, value-added, and some excise taxes. The collection and remittance of these taxes is reported on a net basis.

Contract Balances: Contract assets primarily relate to the Company's rights to consideration for work completed but not billed at the reporting date on contracts with customers. The contract assets are transferred to receivables when the rights become unconditional. Contract liabilities primarily relate to contracts where advance payments or deposits have been received, but performance obligations have not yet been met, and therefore, revenue has not been recognized. There have been no impairment losses recognized related to any receivables or contract assets arising from the Company's contracts with customers.

Engineering, Research, and Development: The Company records engineering, research, and development costs ("R&D") net of customer reimbursements as they are considered a recovery of cost.

Advertising and Promotion Expenses: The Company expenses advertising and promotional expenses as incurred and these expenses were $36 million , $40 million , and $40 million for the years ended December 31, 2018 , 2017 , and 2016 .

Foreign currency translation: Exchange adjustments related to foreign currency transactions and translation adjustment for foreign subsidiaries whose functional currency is the U.S. dollar are reflected in the consolidated statements of income. Translation adjustments of foreign subsidiaries for which local currency is functional currency are reflected in the consolidated balance sheets as a component of accumulated other comprehensive income (loss). Transaction gains and losses arising from fluctuations in currency exchange rates on transactions denominated in currencies other than the functional currency are recognized in earnings as incurred, except for those intercompany balances which are designated as long-term investments. The amounts recorded in cost of sales in the consolidated statements of income for foreign currency transactions included $15 million of gains for the year ended December 31, 2018 , $4 million of losses for the year ended December 31, 2017 and $1 million of gains for the year ended December 31, 2016 .

Asset Retirement Obligations: The Company records asset retirement obligations (ARO) when liabilities are probable and amounts can be reasonably estimated. The Company's primary ARO activities relate to the removal of hazardous building materials at its facilities.

Derivative Financial Instruments: For derivative instruments to qualify as hedging instruments, they must be designated as a fair value hedge, cash flow hedge or a hedge of a net investment in a foreign operation. Gains and losses related to a hedge are

either recognized in income immediately to offset the gain or loss on the hedged item or are deferred and reported as a component of accumulated other comprehensive income (loss) and subsequently recognized in earnings when the hedged item affects earnings. The change in fair value of the ineffective portion of a derivative financial instrument, determined using the hypothetical derivative method, is recognized in earnings immediately. The gain or loss related to derivative financial instruments not designated as hedges are recognized immediately in earnings. Cash flows related to hedging activities are included in the operating section of the consolidated statements of cash flows.

New Accounting Pronouncements

Adoption of New Accounting Standards

Revenue recognition: The Company adopted ASU No. 2014-09, as incorporated into Accounting Standards Codification (ASC) Topic 606, *Revenue from Contracts with Customers* ("ASC 606"), on January 1, 2018, using the modified retrospective application method under which the cumulative effect is recognized in equity at the date of initial application. Therefore, the comparative information has not been adjusted and continues to be reported under previous guidance. ASC 606 has been applied to all contracts at the date of initial application. The details of significant changes and quantitative effect of the changes are disclosed below.

Product returns: The Company previously recognized product returns as a reduction in revenue based on the estimated product return rate. Under ASC 606, the Company continues to recognize this liability but also recognizes the value of the inventory to be returned.

Timing of revenue recognition: The Company previously recognized revenue when title and risk of loss passed to the customer. Upon the adoption of ASC 606, there was a change in the pattern of revenue recognition for certain customized parts where the Company has a right to payment. As a result of the adoption, the revenue from these contracts is now being recognized over-time because the customized parts are considered to be assets with limited alternative use and the Company has an enforceable right to payment for work completed to date. The Company considers the costs incurred (input method) as a fair measure of progress for the over-time recognition of revenue associated with these customized parts.

The cumulative effect of the adoption was recognized as a decrease to accumulated deficit of $1 million and the changes made to the consolidated January 1, 2018 opening consolidated balance sheets for the adoption of ASC Topic 606 were as follows:

	Balance at December 31, 2017	Over-time recognition	Balance at January 1, 2018
Consolidated Balance Sheets		(Millions)	
Assets			
Inventory	$ 820	$ (5)	$ 815
Prepayments and other current assets	$ 288	$ 6	$ 294
Equity			
Accumulated deficit	$ (1,009)	$ 1	$ (1,008)

The following tables summarize the effects of adopting ASC Topic 606 on the Company's consolidated financial statements as of and for the year ended December 31, 2018:

	December 31, 2018			
	As Reported	Product returns	Over-time recognition	Balances Without Adoption of ASC Topic 606
			(Millions)	
Consolidated Balance Sheets				
Assets				
Inventory	$ 2,245	$ —	$ 8	$ 2,253
Prepayments and other current assets	$ 590	$ (44)	$ (9)	$ 537
Liabilities				
Accrued expenses and other current liabilities	$ 1,001	$ (44)	$ —	$ 957
Equity				
Accumulated deficit	$ (1,013)	$ —	$ (1)	$ (1,014)

	Year Ended December 31, 2018			
	As Reported	Product returns	Over-time recognition	Balances Without Adoption of ASC Topic 606
	(Millions)			
Consolidated Statements of Income				
Revenues				
Net sales and operating revenues	$ 11,763	$ 2	$ 3	$ 11,768
Cost and expenses				
Cost of sales (exclusive of depreciation and amortization)	$ 10,071	$ (2)	$ (3)	$ 10,066

For the year ended December 31, 2018, there would have been no change to "Net cash provided from (used by) operating activities" under prior accounting principles.

Income taxes: In October 2016, the FASB issued ASU 2016-16, Income Taxes—Intra Entity Transfers of Assets Other Than Inventory (Topic 740). The new standard changes the accounting for income taxes when a company transfers certain tangible and intangible assets, such as equipment or intellectual property, between entities in different tax jurisdictions. The new standard does not change the current accounting for the income taxes related to transfers of inventory. This standard is effective for the Company for its financial statements issued for annual periods beginning after December 15, 2017, and interim periods within those annual periods. The Company adopted this ASU on January 1, 2018 using the modified retrospective method. The cumulative effect of the adoption was recognized as an increase to accumulated deficit of $1 million .

Retirement Benefits: Effective January 1, 2018, the Company adopted FASB ASU 2017-07, Retirement Benefits. As a result of adoption, the non-service cost components of net periodic pension and postretirement benefit cost previously presented in cost of sales and selling, general, and administrative expense have been reclassified to non-service pension and postretirement benefit cost. These financial statements have been retrospectively adjusted to reflect this change in accounting principle for the years ended December 31, 2017 and 2016.

The following tables summarize the effects of adopting the new standard on our consolidated financial statements:

	Year Ended December 31, 2017		
	Prior to Change in Accounting Principle	Effective of Accounting Change	After Change in Accounting Principle
		(Millions)	
Consolidated Statements of Income			
Cost of Sales	$ 7,815	$ (3)	$ 7,812
Selling, general, and administrative	$ 650	$ (12)	$ 638
Non-service pension and postretirement benefit costs	$ —	$ 16	$ 16
Other (income) expense	$ (1)	$ (1)	$ (2)

	Year Ended December 31, 2016		
	Prior to Change in Accounting Principle	Effective of Accounting Change	After Change in Accounting Principle
		(Millions)	
Consolidated Statements of Income			
Cost of Sales	$ 7,133	$ (7)	$ 7,126
Selling, general, and administrative	$ 590	$ (76)	$ 514
Non-service cost pension and other postretirement benefits	$ —	$ 84	$ 84
Other expense	$ —	$ (1)	$ (1)

Deferred Purchase Price: Effective January 1, 2018, the Company adopted ASU 2016-15, Statement of Cash Flow—Classification of certain cash receipts and cash payments (Topic 230). This ASU addresses eight specific cash flow issues with the objective of reducing the existing diversity in practice. The retrospective adoption of this ASU resulted in the reclassification of cash received to settle the deferred purchase price of factored receivables to an investing activity in the

consolidated statement of cash flows. Prior to adoption this amount would have been recorded as an operating activity in the consolidated statement of cash flows. The Company also now presents the transfer of trade receivables in exchange for a beneficial interest in the factored receivables as a non-cash investing activity.

Restricted Cash: Effective January 1, 2018, the Company adopted ASU 2016-18, Statement of Cash Flows—Restricted Cash (Topic 230) to eliminate diversity in practice in the presentation of restricted cash and restricted cash equivalents in the statement of cash flows. Under this standard, the change in restricted cash is no longer presented as an investing activity in the consolidated statement of cash flows.

The following tables summarize the effects of adopting ASU 2016-18 and ASU 2016-15 on our consolidated statements of cash flows for the years ended December 31, 2017 and 2016:.

	Year Ended December 31, 2017			
	Prior to Change in Accounting Principle	Effect of ASU 2016-18	Effect of ASU 2016-15	After Change in Accounting Principle
	(Millions)			
Consolidated Statements of Cash Flows				
Decrease (increase) in receivables	$ 31	$ —	$ (112)	$ (81)
Net cash provided by operating activities	**629**	**—**	**(112)**	**517**
Change in restricted cash	(1)	1	—	—
Proceeds from deferred purchase price of factored receivables	**—**	**—**	**112**	**112**
Net cash used by investing activities	**(413)**	**1**	**112**	**(300)**
Decrease in cash, cash equivalents and restricted cash	**(32)**	**1**	**—**	**(31)**
Cash, cash equivalents and restricted cash, January 1	347	2	—	**349**
Cash, cash equivalents and restricted cash, December 31	**$ 315**	**$ 3**	**$ —**	**$ 318**

	Year Ended December 31, 2016			
	Prior to Change in Accounting Principle	Effect of ASU 2016-18	Effect of ASU 2016-15	After Change in Accounting Principle
	(Millions)			
Consolidated Statements of Cash Flows				
Increase in receivables	$ (215)	$ —	$ (110)	$ (325)
Net cash provided by operating activities	**484**	**—**	**(110)**	**374**
Change in restricted cash	(1)	1	—	—
Proceeds from deferred purchase price of factored receivables	**—**	**—**	**110**	**110**
Net cash used by investing activities	**(340)**	**1**	**110**	**(229)**
Increase in cash, cash equivalents and restricted cash	60	1	—	61
Cash, cash equivalents and restricted cash, January 1	287	1	—	**288**
Cash, cash equivalents and restricted cash, December 31	**$ 347**	**$ 2**	**$ —**	**$ 349**

Accounting Standards Issued But Not Yet Adopted

Intangibles: In August 2018, the FASB issued ASU 2018-15, Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract. The amendments in this update align the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software (and hosting arrangements that include an internal-use software license). The accounting for the service element of a hosting arrangement that is a service contract is not affected by the amendments in this update. The amendments in this update are effective for interim and annual periods for the Company beginning on January 1, 2020, with early adoption permitted. The amendments in this update should be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. The Company is currently evaluating the potential effect of this new guidance on its consolidated financial statements.

Retirement benefits: In August 2018, the FASB issued ASU 2018-14, Compensation-Retirement Benefits-Defined Benefit Plans-General (Subtopic 715-20). The amendments in this update remove disclosures that no longer are considered cost

beneficial, clarify the specific requirements of disclosures, and add disclosure requirements identified as relevant. The amendments in this update are effective for fiscal years ending after December 15, 2020 with early adoption permitted. The Company is currently evaluating the potential effect of this new guidance on its consolidated financial statements.

Fair value measurements: In August 2018, the FASB issued ASU No. 2018-13, Fair Value Measurement (Topic 820). The new guidance modifies disclosure requirements related to fair value measurement. The amendments in this ASU are effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. Implementation on a prospective or retrospective basis varies by specific disclosure requirement. Early adoption is permitted. The standard also allows for early adoption of any removed or modified disclosures upon issuance of this ASU while delaying adoption of the additional disclosures until their effective date. The Company is currently evaluating the potential effect of this new guidance on its consolidated financial statements.

Comprehensive income: In February 2018, the FASB issued ASU 2018-02, Income Statement—Reporting Comprehensive Income (Topic 220). The amendments in this update allow a reclassification from accumulated other comprehensive income (loss) to accumulated deficit for stranded tax effects resulting from the Tax Cuts and Jobs Act ("TCJA"). Consequently, the amendments allow for an election to eliminate the stranded tax effects resulting from the TCJA and will improve the usefulness of information reported to financial statement users. However, because the amendments only relate to the reclassification of the income tax effects of the TCJA, the underlying guidance that requires the effect of a change in tax laws or rates be included in income from continuing operations is not affected. The amendments in this update also require certain disclosures about stranded tax effects. The amendments in this update are effective for all entities for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. The Company has elected not to adopt the optional reclassification.

Leases: In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842). This update supersedes the lease requirements in Topic 840, Leases. The objective of Topic 842 is to establish the principles that lessees and lessors shall apply to report useful information to users of financial statements about the amount, timing, and uncertainty of cash flow arising from a lease. For public business entities, the standard is effective for financial statements issued for annual periods beginning after December 15, 2018, and interim periods within those annual periods. The Company will adopt this update on January 1, 2019 using the modified retrospective method without the recasting of comparative periods' financial information, as permitted by the transition guidance.

The Company is finalizing its implementation efforts including final review of lease arrangements and completion of its system implementations. The Company is still quantifying the effect of adoption but does not anticipate a material effect to the consolidated statements of income; however, it does expect a material effect on the consolidated balance sheets as it recognizes the right-of-use assets and liabilities for operating leases.

The Company intends to adopt the package of practical expedients that allow companies to not reassess and will carry forward historical conclusions related to contracts that contain leases, existing lease classification, and initial direct costs. It does not intend to adopt the hindsight practical expedient and has also made an accounting policy election to exempt leases with an initial term of twelve months or less from balance sheets recognition. Instead, short-term leases will be expensed over the lease term. As a part of the implementation efforts, the Company has reviewed its internal control structure and does not anticipate its internal control framework will materially change, but rather existing internal controls will be modified and augmented, as necessary.

3. Acquisitions and Divestitures

Acquisition of Federal-Mogul
On October 1, 2018, the Company closed on the acquisition of all of the interests in Federal-Mogul (the "Acquisition") pursuant to the Membership Interest Purchase Agreement, dated as of April 10, 2018 (the "Purchase Agreement"), by and among the Company, Federal-Mogul, American Entertainment Properties Corp. ("AEP" and, together with certain affiliated entities, the "Sellers") and Icahn Enterprises L.P. ("IEP"). Total consideration was approximately $3.7 billion . Following the completion of the Acquisition, Federal-Mogul was merged with and into the Company, with the Company continuing as the surviving company.

Following the closing of the Acquisition, the Company has agreed to use its reasonable best efforts to pursue the separation of the combined company's powertrain technology business and its aftermarket and ride performance business into two new independent, publicly traded companies in a spin-off transaction that is expected to be treated as a tax-free reorganization for U.S. federal income tax purposes.

At the effective date of the Acquisition, the Company's certificate of incorporation was amended and restated (the "Amended and Restated Certificate of Incorporation") in order to create a new class of non-voting convertible common stock of the Company called "Class B Non-Voting Common Stock" ("Class B Common Stock") with 25,000,000 shares authorized, and to reclassify the Company's existing common stock as "Class A Voting Common Stock" ("Class A Common Stock" and, together with the Class B Common Stock, the "common stock"). See Note 17, Shareholders' Equity for additional information on the conversion features of the Class B Common Stock. On the same date, the Company also entered into a new credit facility in connection with the Acquisition. The new credit facility includes $4.9 billion of total debt financing, consisting of a five -year $1.5 billion revolving credit facility, a five -year $1.7 billion term loan A

facility and a seven -year $1.7 billion term loan B facility. See Note 11, Debt and Other Financing Arrangements , for additional information.

Under the Amended and Restated Certificate of Incorporation, the authorized number of shares was increased from 185,000,000 shares, divided into 135,000,000 shares of common stock, par value $0.01 , and 50,000,000 shares of preferred stock, par value $0.01 , to 250,000,000 shares, divided into 175,000,000 shares of Class A Common Stock, 25,000,000 shares of Class B Common Stock and 50,000,000 shares of preferred stock, par value $0.01 .

The Company (i) paid to AEP an aggregate amount in cash equal to $800 million (the "Cash Consideration") and (ii) issued and delivered to AEP an aggregate of 29,444,846 shares of common stock at $41.99 per share (the "Stock Consideration"). The $1.2 billion of common stock was comprised of: (a) 5,651,177 shares of Class A Common Stock, par value $0.01 equal to 9.9 percent of the aggregate number of shares of Class A Common Stock issued and outstanding immediately following the closing of the Acquisition, and (b) 23,793,669 shares of newly created Class B Common Stock, par value $0.01 . The remaining consideration of approximately $1.7 billion was comprised primarily of the repayments of certain Federal-Mogul debt obligations.

Advisory costs associated with the Acquisition were $68 million for the year ended December 31, 2018 and were recognized as a component of selling, general, and administrative expenses in the consolidated statements of income.

The following table summarizes the purchase price (in millions, except for share data):

Tenneco shares issued for purchase of Federal-Mogul		29,444,846
Tenneco share price at October 1, 2018	$	41.99
Fair value of the Stock Consideration		1,236
Cash Consideration (1)		811
Repayment of Federal-Mogul debt and accrued interest (2)		1,660
Total consideration	$	3,707

(1) Cash consideration also included $11 million in advisory fees paid to a third-party.

(2) Portion of the proceeds from the issuance of the $4.9 billion new credit facility that was used to repay Federal-Mogul's term loan and revolver loan of $1,455 million and $200 million , respectively, and the related accrued interest of $5 million .

The following table summarizes the preliminary fair values of assets acquired and liabilities assumed as of the acquisition date:

	(Millions)
Cash, cash equivalents and restricted cash	$ 277
Customer notes and accounts receivable	1,258
Other receivables	62
Inventories	1,551
Prepayments and other current assets	198
Property, plant and equipment	1,711
Long-term receivables	48
Goodwill	825
Intangibles	1,530
Investments in nonconsolidated affiliates	528
Deferred income taxes	166
Other assets	55
Total assets acquired	8,209
Short-term debt, including current maturities of long-term debt	130
Accounts payable	957
Accrued compensation and employee benefits	231
Accrued income taxes	49
Accrued expenses and other current liabilities	522
Long-term debt	1,315
Deferred income taxes	56
Pension and postretirement benefits	879
Deferred credits and other liabilities	124
Total liabilities assumed	4,263
Redeemable noncontrolling interests	96
Noncontrolling interests	143
Net assets and noncontrolling interests acquired	**$ 3,707**

The preliminary allocation of the purchase price to the assets acquired and liabilities assumed, including the residual amount recognized as goodwill, is based upon estimated information and is subject to change within the measurement period. The measurement period is a period not to exceed one year from the acquisition date during which the Company may adjust estimated or provisional amounts recorded during purchase accounting if new information is obtained about facts and circumstances that existed as of the acquisition date that, if known, would have resulted in revised estimated values of those assets or liabilities as of that date. Measurement period adjustments are recorded in the period identified. Any adjustments to amounts recorded in purchase accounting that do not qualify as measurement period adjustments are included in earnings in the period identified.

The fair values of the assets acquired and liabilities assumed are based on preliminary estimates and assumptions, as well as other information compiled by management, including valuations that utilize customary valuation procedures and techniques. While the Company believes these preliminary estimates provide a reasonable basis for estimating the fair value of the assets acquired and liabilities assumed, it will continue to evaluate available information prior to finalization of the amounts. The primary areas of the preliminary purchase price allocation that are not yet finalized relate to the fair value of property, plant and equipment; intangible assets; unconsolidated affiliates; deferred income tax assets and liabilities; redeemable noncontrolling interests; and noncontrolling interests.

Goodwill and other assets and liabilities are reflected in the Powertrain and Motorparts segments and are located in all geographic areas. The goodwill resulting from this Acquisition consists largely of the Company's expected future economic benefits to arise from expected future product sales and synergies from combining Federal-Mogul with the Company's existing portfolio of products. Goodwill of $388 million was allocated to the Powertrain segment and $437 million was allocated to the Motorparts segment. None of the goodwill is deductible for tax purposes. Other intangible assets acquired include the following:

	Estimated Fair Value (Millions)	Weighted-Average Useful Lives
Definite-lived intangible assets:		
Customer platforms and relationships	$ 964	10 years
Technology rights	69	10 years
Packaged kits know-how	36	10 years
Licensing agreements	66	4.5 years
Land use rights	30	42.8 years
Total definite-lived intangible assets	1,165	10.5 years
Indefinite-lived intangible assets:		
Trade names and trademarks	365	
Total	$ 1,530	

The Company also recorded a $152 million step-up of inventory to its fair value as of the acquisition date based on the preliminary valuation and recognized $105 million as a non-cash charge to cost of goods sold during the fourth quarter of 2018 related to the amortization of this step-up, as the acquired inventory was sold. The Company expects to recognize the remaining amortization of the inventory step-up during 2019.

The Company's consolidated statements of income for the year ended December 31, 2018 included net sales and operating revenues of $1,886 million and net loss of $69 million associated with the operating results of Federal-Mogul from October 1, 2018 to December 31, 2018.

Pro Forma Results (Unaudited)
The following table summarizes, on a pro forma basis, the combined results of operations of the Company and Federal-Mogul business as though the Acquisition and the related financing had occurred as of January 1, 2017. The pro forma results are not necessarily indicative of either the actual consolidated results had the acquisition of Federal-Mogul occurred on December 31, 2016 or of future consolidated operating results.

	For the Year Ended December 31	
	2018	2017
	(In millions, except per share amounts)	
Net sales and operating revenues	$ 17,860	$ 17,153
Earnings before income taxes and noncontrolling interests	$ 488	$ 235
Net income attributable to Tenneco Inc.	$ 275	$ 372
Basic earnings per share of common stock	$ 3.41	$ 4.52
Diluted earnings per share of common stock	$ 3.40	$ 4.51

These pro forma amounts have been calculated after applying the Company's accounting policies and the results presented above primarily reflect: (i) depreciation adjustments relating to fair value adjustments to property, plant, and equipment; (ii) amortization adjustments relating to fair value estimates of intangible assets; (iii) incremental interest expense, net on assumed indebtedness, the new credit facility, debt issuance costs, and fair value adjustments to debt; and (iv) cost of goods sold adjustments relating to fair value adjustments to inventory. Pro forma adjustments described above have been tax affected using the Company's effective rate during the respective periods.

In 2018, the Company incurred $96 million of acquisition related costs. These expenses are included in Selling, general, and administrative on the Company's consolidated statements of income for the year ended December 31, 2018. These expenses, as

well as $4 million of expenses incurred by Federal-Mogul in 2018 prior to the acquisition, are reflected in the pro forma earnings for the year ended December 31, 2017, in the table above.

Other Matters Related to the Acquisition
On March 3, 2017, and May 1, 2017, certain purported former stockholders of Federal-Mogul Holdings Corporation ("FMHC") filed a petition in the Delaware Court of Chancery seeking an appraisal of the value of common stock they claim to have held at the time of the January 23, 2017 merger of IEH FM Holdings, LLC into FMHC. IEH FM Holdings, LLC was a wholly owned subsidiary of American Entertainment Properties Corp. and a subsidiary of Icahn Enterprises L.P. The two cases were consolidated on May 10, 2017 into: "In re Appraisal of Federal-Mogul Holdings LLC, C.A. No. 2017-0158-AGB."

Federal-Mogul received a capital contribution of $56 million on June 29, 2018 from its then-parent, IEP, in connection with this matter. At October 1, 2018, Federal-Mogul's litigation reserve was $55 million , along with accrued interest of $6 million , which was assumed as part of the Acquisition. On October 19, 2018, the Company reached an agreement with the plaintiffs to settle their claims for $12.01 per share, inclusive of interest payable, or an aggregate of approximately $61 million . The Company paid this settlement in the fourth quarter of 2018.

Assets Held for Sale
The Company classifies assets and liabilities as held for sale ("disposal group") when management, having the authority to approve the action, commits to a plan to sell the disposal group, the sale is probable within one year, and the disposal group is available for immediate sale in its present condition. The Company also considers whether an active program to locate a buyer has been initiated, whether the disposal group is marketed actively for sale at a price that is reasonable in relation to its current fair value, and whether actions required to complete the plan indicate it is unlikely significant changes to the plan will be made or the plan will be withdrawn.

In December 2018, the Company entered into a stock and asset purchase agreement to sell certain assets and liabilities related to its wipers business in the Motorparts segment for a sale price of $29 million , subject to adjustment based on terms of the sale agreement. As of December 31, 2018 , proceeds from the sale would have been $22 million . The related assets and liabilities were classified as held for sale as of December 31, 2018 . The transaction closed on March 1, 2019.

There were no disposal groups classified as held for sale as of December 31, 2017 . The assets and liabilities classified as held for sale as of December 31, 2018 were as follows:

	December 31 2018
	(Millions)
Assets	
Inventories	$ 33
Other current assets	5
Long-lived assets	23
Total assets held for sale	$ 61
Liabilities	
Accounts payable	$ 21
Accrued liabilities	7
Other liabilities	11
Total liabilities held for sale	$ 39

The assets and liabilities held for sale are recorded in " Prepayments and other current assets " and " Accrued expenses and other current liabilities " in the consolidated balance sheets as of December 31, 2018 .

4. Restructuring Charges and Asset Impairments, Net

For the years ended December 31, 2018 , 2017 , and 2016 , restructuring charges, net, by segment, is as follows:

	Year Ended December 31		
	2018	2017	2016
	(Millions)		
Clean Air	$ 14	$ 23	$ 6
Ride Performance	48	16	13
Aftermarket	16	7	9
Powertrain	(2)	—	—
Motorparts	31	—	—
Other	5	1	2
	$ 112	$ 47	$ 30
These amounts are classified in the consolidated statements of income as follows:			
Cost of sales	$ 66	$ 41	$ 17
Engineering, research, and development	4	—	1
Selling, general, and administrative	40	6	12
Other expense	2	—	—
	$ 112	$ 47	$ 30

For the years ended December 31, 2018 , 2017 , and 2016 , asset impairments, by segment, is as follows:

	Year Ended December 31		
	2018	2017	2016
	(Millions)		
Clean Air	$ —	$ 2	$ 1
Ride Performance	6	1	2
Aftermarket	—	—	3
Other	2	—	—
	$ 8	$ 3	$ 6
These amounts are classified in the consolidated statements of income as follows:			
Cost of sales	$ 3	$ —	$ —
Selling, general, and administrative	2	—	—
Depreciation and amortization	3	3	4
Other expense	—	—	2
	$ 8	$ 3	$ 6

In 2018, the Company incurred charges for the following items:

- The Company incurred $25 million in restructuring and related costs, related to the accelerated move of the Beijing Ride Performance plant. The Company anticipates the move out of its Beijing plant will be completed by the first quarter of 2019.
- The Company incurred $ 10 million in restructuring charges related to headcount reductions at a Clean Air manufacturing plant in Germany.
- In October, 2018, the Company announced a plan to close its ride performance plants in Owen Sound, Ontario and Hartwell, Georgia as part of an initiative to realign its manufacturing footprint to enhance operational efficiency and respond to changing market conditions and capacity requirements. The Company expects to complete the closure of the two facilities near the end of the second quarter of 2020. The Company recorded charges of $24 million in 2018, including asset write-downs of $6 million . The charges included severance payments to employees, the cost of decommissioning equipment, and other costs associated with this action.

- The Company incurred a $45 million charge related to a restructuring plan designed to achieve a portion of the synergies the Company anticipates achieving in connection with the acquisition of Federal-Mogul. Pursuant to the plan, the Company will reduce its headcount globally across all segments. The Company began implementing headcount reductions in January 2019 and these actions will continue through 2019. The Company's acquisition of Federal-Mogul is discussed further in Note 3, Acquisitions and Divestitures.

- The Company incurred an additional $16 million in restructuring and related costs, including asset write-downs of $ 2 million, for cost improvement initiatives at various other operations around the world.

In 2017, the Company incurred charges for the following items:

- On June 29, 2017, the Company announced a restructuring initiative to close its Clean Air manufacturing plant in O'Sullivan Beach, Australia and downsize its Ride Performance plant in Clovelly Park, Australia when General Motors and Toyota ended vehicle production in the country in October 2017. All such restructuring activities related to this initiative were completed in 2018. The Company recorded total charges related to this initiative of $21 million in 2017 including asset write-downs of $2 million . The charges included severance payments to employees, the cost of decommissioning equipment, a lease termination payment and other costs associated with this action.

- In the fourth quarter of 2017, the Company began to accelerate a required move of its Beijing Ride Performance plant outside of Beijing area. The Company incurred $6 million of restructuring and related costs due to this relocation.

- The Company recognized a $10 million charge, including asset write-downs of $1 million , related to the planned closing of its Clean Air plant in Ghent, Belgium due to the scheduled end of production on a customer platform in 2020.

- The Company incurred an additional $13 million in restructuring and related costs for cost improvement initiatives at various other operations around the world.

In 2016, the Company incurred $36 million in restructuring and related costs including asset write-downs of $ 6 million , primarily related to manufacturing footprint improvements in North America, headcount reduction and cost improvement initiatives in Europe, China, South America and Australia.

Restructuring Reserve Rollforward
Amounts related to activities that were charged to restructuring reserves, including costs incurred to support future structural cost reductions, by reportable segments are as follows:

	Reportable Segments							
	Clean Air	Ride Performance	Aftermarket	Powertrain	Motorparts	Total Reportable Segments	Other	Total
				(Millions)				
Balance at December 31, 2015	$ 2	$ 24	$ 4	$ —	$ —	$ 30	$ —	$ 30
Provisions	6	13	9	—	—	28	2	30
Payments	(6)	(31)	(7)	—	—	(44)	(1)	(45)
Balance at December 31, 2016	2	6	6	—	—	14	1	15
Provisions	23	16	7	—	—	46	1	47
Payments	(12)	(16)	(9)	—	—	(37)	(2)	(39)
Foreign currency	1	1	—	—	—	2	—	2
Balance at December 31, 2017	14	7	4	—	—	25	—	25
Federal-Mogul Acquisition	—	—	—	22	15	37	—	37
Provisions	14	48	16	1	31	110	5	115
Held for sale	—	—	—	—	(2)	(2)	—	(2)
Revisions to estimates	—	—	—	(3)	—	(3)	—	(3)
Payments	(10)	(35)	(12)	(5)	(4)	(66)	(2)	(68)
Foreign currency	(1)	—	—	—	—	(1)	—	(1)
Balance at December 31, 2018	$ 17	$ 20	$ 8	$ 15	$ 40	$ 100	$ 3	$ 103

The following table provides a summary of the Company's consolidated restructuring liabilities and related activity for each type of exit costs:

	Employee Costs	Facility Closure and Other Costs	Total
		(Millions)	
Balance at December 31, 2015	$ 20	$ 10	$ 30
Provisions	19	11	30
Revisions to estimates	(15)	15	—
Payments	(16)	(29)	(45)
Balance at December 31, 2016	8	7	15
Provisions	31	16	47
Payments	(22)	(17)	(39)
Foreign currency	2	—	2
Balance at December 31, 2017	19	6	25
Federal-Mogul Acquisition	37	—	37
Provisions	90	25	115
Held for sale	(2)	—	(2)
Revisions to estimates	(4)	1	(3)
Payments	(41)	(27)	(68)
Foreign currency	(1)	—	(1)
Balance at December 31, 2018	$ 98	$ 5	$ 103

5. Inventories

At December 31, 2018 and 2017, inventory by major classification was as follows:

	December 31	
	2018	2017
	(Millions)	
Finished goods	$ 1,116	$ 300
Work in process	562	268
Raw materials	457	178
Materials and supplies	110	74
Total inventories	$ 2,245	$ 820

6. Property, Plant and Equipment, Net

The components of property, plant and equipment — net were as follows:

	December 31		Useful Life
	2018	2017	
	(Millions)		
Land	$ 293	$ 20	—
Buildings and improvements	1,023	615	10 to 50 years
Machinery, equipment and tooling	4,041	2,992	3 to 25 years
Capitalized software	378	346	3 to 12 years
Other, including construction in progress	568	396	—
Property, plant and equipment, cost	6,303	4,369	
Less: Accumulated depreciation and amortization	(2,802)	(2,678)	
Property, plant and equipment, net	$ 3,501	$ 1,691	

Depreciation and amortization related to property, plant and equipment was $313 million, $223 million and $210 million for the years ended December 31, 2018, 2017 and 2016, respectively.

7. Goodwill and Other Intangible Assets

At December 31, 2018 and 2017, goodwill consists of the following:

	December 31, 2018					
	Clean Air Segment	Ride Performance Segment	Aftermarket Segment	Powertrain	Motorparts	Total
			(Millions)			
Gross carrying amount, January 1	$ 23	$ 156	$ 229	$ —	$ —	$ 408
Acquisition of Federal-Mogul (1)	—	—	—	388	437	825
Currency translation	(1)	(1)	—	—	—	(2)
Gross carrying amount, December 31	22	155	229	388	437	1,231
Accumulated impairment loss, January 1	$ —	$ (140)	$ (219)	$ —	$ —	$ (359)
Impairment	—	(3)	—	—	—	(3)
Currency translation	—	—	—	—	—	—
Accumulated impairment loss, December 31	—	(143)	(219)	—	—	(362)
Net carrying value, December 31	$ 22	$ 12	$ 10	$ 388	$ 437	$ 869

	December 31, 2017					
	Clean Air Segment	Ride Performance Segment	Aftermarket Segment	Powertrain	Motorparts	Total
			(Millions)			
Gross carrying amount, January 1	$ 21	$ 155	$ 229	$ —	$ —	$ 405
Currency translation	2	1	—	—	—	3
Gross carrying amount, December 31	23	156	229	—	—	408
Accumulated impairment loss, January 1	$ —	$ (133)	$ (215)	$ —	$ —	$ (348)
Impairment	—	(7)	(4)	—	—	(11)
Currency translation	—	—	—	—	—	—
Accumulated impairment loss, December 31	—	(140)	(219)	—	—	(359)
Net carrying value, December 31	$ 23	$ 16	$ 10	$ —	$ —	$ 49

(1) The acquisition on October 1, 2018 of Federal-Mogul resulted in goodwill of $825 million. See Note 3, Acquisitions and Divestitures for additional information.

As a result of the goodwill impairment evaluation in the fourth quarter of 2018, the estimated fair value of the Ride Performance North America reporting unit was lower than its carrying value. Accordingly, a full goodwill impairment charge of $3 million for Ride Performance was recorded for the year ended December 31, 2018.

As a result of the goodwill impairment evaluation in the fourth quarter of 2017, the estimated fair value of the Europe and South America Ride Performance and Aftermarket reporting units were lower than their carrying value. Accordingly, a full goodwill impairment charge of $7 million for Ride Performance and $4 million for Aftermarket was recorded for the year ended December 31, 2017.

At December 31, 2018 and 2017 , the Company's intangible assets consist of the following:

		December 31, 2018			December 31, 2017		
	Useful Lives	Gross Carrying Value	Accumulated Amortization	Net Carrying Value	Gross Carrying Value	Accumulated Amortization	Net Carrying Value
		(Millions)					
Definite-lived intangible assets:							
Customer relationships and platforms	10 years	$ 964	$ (24)	$ 940	$ —	$ —	$ —
Customer contract	10 years	8	(5)	3	8	(5)	3
Patents	10 to 17 years	1	(1)	—	1	(1)	—
Technology rights	10 to 30 years	98	(27)	71	29	(23)	6
Packaged kits know-how	10 years	36	(1)	35	—	—	—
Licensing agreements	3 to 5 years	66	(3)	63	—	—	—
Land use rights	28 to 46 years	44	(2)	42	15	(2)	13
		1,217	(63)	1,154	53	(31)	22
Indefinite-lived intangible assets:							
Trade names and trademarks		365	—	365	—	—	—
Total		$ 1,582	$ (63)	$ 1,519	$ 53	$ (31)	$ 22

Included in the table above are definite-lived and indefinite-lived intangible assets of $1,165 million and $365 million , respectively, identified in connection with the October 1, 2018 acquisition of Federal-Mogul. See Note 3, Acquisitions and Divestitures for additional information.

Amortization of intangibles amounted to $32 million in 2018 and $3 million in both 2017 and 2016 , and are included in the consolidated statements of income caption "Depreciation and amortization."

The expected future amortization expense for the Company's definite-lived intangible assets is as follows:

	2019	2020	2021	2022	2023	2024 and thereafter	Total
	(Millions)						
Expected Amortization Expense	$ 124	$ 125	$ 124	$ 119	$ 116	$ 546	$ 1,154

8. Investment in Nonconsolidated Affiliates

The Company maintains investments in several nonconsolidated affiliates, which are primarily located in China, Korea, Turkey, and the U.S. The Company generally equates control to ownership percentage whereby investments more than 50% owned are consolidated.

As of December 31, 2018 and 2017 , the Company's investment in affiliates was $544 million and $2 million , respectively.
The Company's ownership interests in affiliates, not including the acquisition of Federal-Mogul, accounted for under the equity method is as follows:

	Year Ended December 31		
	2018	2017	2016
Futaba Tenneco U.K. Ltd. (UK)	—%	—%	49.0%
Montagewerk Abgastechnik Emden GmbH (Germany)	50.0%	50.0%	50.0%

The Company sold its share of Futaba Tenneco U.K. Limited on April 28, 2017. Additionally, the Company acquired the following ownership interests accounted for under the equity method as a result of the acquisition of Federal-Mogul:

	Year Ended December 31
	2018
Anqing TP Goetze Piston Ring Company Limited (China)	35.7%
Anqing TP Powder Metallurgy Co., Ltd (China)	20.0%
Dongsuh Federal-Mogul Industrial Co. Ltd. (Korea)	50.0%
Farloc Argentina SAIC Y F (Argentina)	23.9%
Federal-Mogul Powertrain Otomotiv A.S. (Turkey)	50.0%
Federal-Mogul TP Liner Europe Otomotiv Ltd. Sti. (Turkey)	25.0%
Federal-Mogul TP Liners, Inc. (USA)	46.0%
Frenos Hidraulicos Automotrices, S.A. de C.V. (Mexico)	49.0%
JURID do Brasil Sistemas Automotivos Ltda. (Brazil)	19.9%
KB Autosys Co., Ltd. (Korea)	33.6%

The following table represents amounts reflected in the Company's consolidated financial statements related to nonconsolidated affiliates:

	Year Ended December 31		
	2018	2017	2016
		(Millions)	
Equity earnings (losses) of nonconsolidated affiliates, net of tax	$ 18	$ (1)	$ —
Cash dividends received from nonconsolidated affiliates	$ 2	$ —	$ —

At December 31, 2018 , the carrying amount of the Company's investments in nonconsolidated affiliates accounted for under the equity method exceeded its share of the underlying net assets by $207 million . This is based on the preliminary estimate of the fair value performed as part of the Acquisition and is subject to allocation between identifiable tangible, intangible assets, and goodwill. This amount is subject to change as part of finalizing purchase accounting related to the Acquisition.

The following tables present summarized aggregated financial information of the Company's nonconsolidated affiliates as of and for the period ended December 31, 2018 :

Statements of Income	Otomotiv A.S.	Anqing TP Goetze	Other	Total
		(Millions)		
Sales	$ 92	$ 41	$ 137	$ 270
Gross profit	$ 23	$ 13	$ 33	$ 69
Income from continuing operations	$ 26	$ 13	$ 10	$ 49
Net income	$ 22	$ 12	$ 8	$ 42

Balance Sheets	Otomotiv A.S.	Anqing TP Goetze	Other	Total
		(Millions)		
Current assets	$ 129	$ 164	$ 249	$ 542
Noncurrent assets	$ 300	$ 132	$ 200	$ 632
Current liabilities	$ 70	$ 40	$ 131	$ 241
Noncurrent liabilities	$ 82	$ —	$ 11	$ 93

See Note 21, Related Party Transactions for additional information on balances and transactions with equity method investments.

9. Derivatives and Hedging Activities

The Company is exposed to market risk, such as fluctuations in foreign currency exchange rates, commodity prices, equity compensation liabilities, and changes in interest rates, which may result in cash flow risks. For exposures not offset within its operations, the Company enters into various derivative transactions pursuant to its risk management policies, which prohibit holding or issuing derivative financial instruments for speculative purposes. Designation of derivative instruments is performed on a transaction basis to support hedge accounting. The changes in fair value of these hedging instruments are offset in part or in whole by corresponding changes in the fair value or cash flows of the underlying exposures being hedged. The Company assesses the initial and ongoing effectiveness of its hedging relationships in accordance with its documented policy.

Foreign Currency Risk
The Company manufactures and sells its products in North America, South America, Asia, Europe, and Africa. As a result, the Company's financial results could be significantly affected by factors such as changes in foreign currency exchange rates or weak economic conditions in foreign markets in which the Company manufactures and sells its products. The Company generally tries to use natural hedges within its foreign currency activities, including the matching of revenues and costs, to minimize foreign currency risk. Where natural hedges are not in place, the Company considers managing certain aspects of its foreign currency activities and larger transactions through the use of foreign currency options or forward contracts. Principal currencies hedged have historically included the U.S. dollar, euro, British pound, Polish zloty, and Mexican peso.

Concentrations of Credit Risk
Financial instruments including cash equivalents and derivative contracts expose the Company to counterparty credit risk for non-performance. The Company's counterparties for cash equivalents and derivative contracts are banks and financial institutions that meet the Company's requirement of high credit standing. The Company's counterparties for derivative contracts are substantial investment and commercial banks with significant experience using such derivatives. The Company manages its credit risk through policies requiring minimum credit standing and limiting credit exposure to any one counterparty and through monitoring counterparty credit risks. The Company's concentration of credit risk related to derivative contracts at December 31, 2018 and 2017 is not material.

Other
The Company presents its derivative positions and any related material collateral under master netting agreements on a net basis. For derivatives designated as cash flow hedges, changes in the time value are excluded from the assessment of hedge effectiveness. Unrealized gains and losses associated with ineffective hedges, determined using the hypothetical derivative method, are recognized in "Other (income) expense, net." Derivative gains and losses included in accumulated other comprehensive loss for effective hedges are reclassified into operations upon recognition of the hedged transaction. Derivative gains and losses associated with undesignated hedges are recognized in "Other (income) expense, net" for outstanding hedges and "Cost of sales" or "Other (income) expense, net" upon hedge maturity.

Derivative Instruments
Foreign currency forward contracts — The Company enters into foreign currency forward purchase and sale contracts to mitigate its exposure to changes in exchange rates on certain intercompany and third-party trade receivables and payables. In managing its foreign currency exposures, the Company identifies and aggregates existing offsetting positions and then hedges residual exposures through third-party derivative contracts. The gain or loss on these contracts is recorded as foreign currency gains (losses) within cost of sales in the consolidated statements of income. The fair value of foreign currency forward contracts are recorded in "Prepayments and other current assets" or "Accrued expenses and other current liabilities" in the consolidated balance sheets. The fair value of the Company's foreign currency forward contracts was a net asset position of less than $1 million at December 31, 2018 and a net liability position of less than $1 million at December 31, 2017 .

The following table summarizes by major currency the notional amounts for foreign currency forward purchase and sale contracts as of December 31, 2018 (all of which mature in 2019):

		Notional Amount in Foreign Currency (Millions)
Canadian dollars	—Sell	(2)
European euro	—Purchase	1
	—Sell	(8)
Polish zloty	—Purchase	35
Mexican pesos	—Purchase	211
U.S. dollars	—Purchase	2
	—Sell	(11)

Cash-settled Share Swap Transactions — In the second quarter of 2017, the Company entered into an equity swap agreement. The Company selectively uses cash-settled share swaps to reduce market risk associated with its deferred compensation liabilities. These equity deferred compensation liabilities increase as the Company's stock price increases and decrease as the Company's stock price decreases. In contrast, the value of the swap agreement moves in the opposite direction of these liabilities, allowing the Company to fix a portion of the liabilities at a stated amount. As of December 31, 2018 , the Company had hedged its deferred compensation liability related to approximately 250,000 common share equivalents. The fair value of the equity swap agreement is recorded in "Prepayments and other current assets" in the consolidated balance sheets. The fair value of the Company's equity swap agreement was a net asset position of $4 million at December 31, 2018 and $4 million at December 31, 2017.

Hedging Instruments
Cash Flow Hedges—Commodity Price Risk — The Company's production processes are dependent upon the supply of certain raw materials that are exposed to price fluctuations on the open market. The primary purpose of the Company's commodity price forward contract activity is to manage the volatility associated with forecasted purchases for up to eighteen months in the future. The Company monitors its commodity price risk exposures regularly to maximize the overall effectiveness of its commodity forward contracts. Principal raw materials hedged include copper, nickel, tin, zinc, and aluminum. In certain instances within this program, foreign currency forwards may be used in order to match critical terms for commodity exposure.

The Company has designated these contracts as cash flow hedging instruments. The Company records unrecognized gains and losses in other comprehensive income (loss) ("OCI or OCL") and makes regular reclassifying adjustments into "Cost of sales" within the consolidated statements of income when the underlying hedged transaction is recognized in earnings. The Company had commodity derivatives outstanding with an equivalent notional amount of $27 million as of December 31, 2018 and none as of December 31, 2017. Substantially all of the commodity price hedge contracts mature within one year.

Net Investment Hedge – Foreign Currency Borrowings — The Company has foreign currency denominated debt, €752 million of which was designated as a net investment hedge in certain foreign subsidiaries and affiliates of the Company. Changes to its carrying value are included in shareholders' equity in the foreign currency translation component of OCL and offset against the translation adjustment on the underlying net assets of those foreign subsidiaries and affiliates, which are also recorded in OCL. The Company's debt instruments are discussed further in Note 11 — Debt and Other Financing Arrangements .

The following table is a summary of the carrying value of derivative and non-derivative instruments designated as hedges as of December 31, 2018 :

	Balance sheets classification	Carrying Value December 31 2018 (Millions)
Commodity price hedge contracts designated as cash flow hedges	Accrued expenses and other current liabilities	$(2)
Foreign currency borrowings designated as net investment hedges	**Long-term debt**	**$863**

The following table represents the effects before reclassification into net income of derivative and non-derivative instruments designated as hedges in accumulated other comprehensive loss as of December 31, 2018:

	Amount of gain (loss) recognized in accumulated OCI or OCL (effective portion) December 31 2018 (Millions)
Foreign currency borrowings designated as net investment hedges	$(3)

The Company estimates less than $1 million of net derivative losses included in AOCI as of December 31, 2018 will be reclassified into earnings within the following 12 months. See Note 18 — Changes in Accumulated Other Comprehensive Income (Loss) by Component for amounts recognized in OCL and amounts reclassified out of OCL for the year ended December 31, 2018 for these hedging instruments.

10. Fair Value of Financial Instruments

A three-level valuation hierarchy, based upon observable and unobservable inputs, is used for fair value measurements. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect market assumptions based on the best evidence available. A financial instrument's categorization within the hierarchy is based on the lowest level of input that is significant to the fair value measurement. The fair value hierarchy definition prioritizes the inputs used in measuring fair value into the following levels:

Level 1	—	Quoted prices in active markets for identical assets or liabilities.
Level 2	—	Inputs, other than quoted prices in active markets, that are observable either directly or indirectly.
Level 3	—	Unobservable inputs based on the Company's own assumptions.

Assets and Liabilities Measured at Fair Value on a Recurring Basis
The following table presents assets and liabilities included in the Company's consolidated balance sheets as of December 31, 2018 and 2017 that are recognized at fair value on a recurring basis, and indicate the fair value hierarchy utilized to determine such fair value:

		December 31, 2018		December 31, 2017	
	Fair value hierarchy	Carrying Amount	Fair Value	Carrying Amount	Fair Value
		(Millions)			
Derivative instruments:					
Equity swap agreement	Level 2	$ 4	$ 4	$ 4	$ 4
Commodity contracts	Level 2	$ (2)	$ (2)	$ —	$ —

Asset and Liability Instruments — The carrying value of cash and cash equivalents, restricted cash, short and long-term receivables, accounts payable, and short-term debt approximates fair value.

Cash-settled Share Swap Transactions — The fair value of the equity swap agreement is recorded in "Prepayments and other current assets" in the consolidated balance sheets. The fair value of the Company's equity swap agreement was a net asset position of $4 million at December 31, 2018 and 2017.

Commodity contracts — The Company calculates the fair value of its commodity contracts and foreign currency contracts using quoted commodity forward rates and quoted currency forward rates, to calculate forward values, and then discounts the forward values. The discount rates for all derivative contracts are based on quoted bank deposit rates.

Assets and Liabilities Measured at Fair Value on a Nonrecurring Basis
In addition to items measured at fair value on a recurring basis, assets may be measured at fair value on a nonrecurring basis. These assets include long-lived assets and intangible assets which may be written down to fair value as a result of impairment.

The Company has determined the fair value measurements related to each of these rely primarily on Company-specific inputs and the Company's assumptions about the use of the assets, as observable inputs are not available (level 3). To determine the fair value of long-lived asset groups, the Company utilizes discounted cash flows expected to be generated by the long-lived asset group.

The Company evaluates the carrying value of its goodwill and indefinite-lived intangible assets for impairment annually in the fourth quarter of each year. These fair value measurements require the Company to make significant assumptions and estimates about the extent and timing of future cash flows, discount rates, and growth rates, which are subject to a high degree of uncertainty. The Company believes the assumptions and estimates used to determine the estimated fair value are reasonable, but different assumptions could materially affect the estimated fair value.

During the year ended December 31, 2018, the Company recorded a $3 million impairment charge for one of its reporting units. See Note 7, Goodwill and Other Intangible Assets .

Financial Instruments Not Carried at Fair Value

Estimated fair values of the Company's outstanding debt were:

	Fair value hierarchy	December 31, 2018 Carrying Amount	December 31, 2018 Fair Value	December 31, 2017 Carrying Amount	December 31, 2017 Fair Value
		(Millions)			
Long-term debt (including current maturities):					
Term loans and senior notes	Level 2	$ 5,307	$ 5,218	$ 1,346	$ 1,383

The fair value of the Company's public senior notes and private borrowings under its senior credit facility is based on observable inputs. The Company also had $106 million and $15 million in other debt whose carrying value approximates fair value, which consists primarily of foreign debt with maturities of one year or less.

11. Debt and Other Financing Arrangements

Long-Term Debt

A summary of the Company's long-term debt obligations at December 31, 2018 and 2017, is set forth in the following table:

	2018 Principal	2018 Carrying Amount (1)	2018 Effective Interest Rate	2017 Principal	2017 Carrying Amount (1)	2017 Effective Interest Rate
		(Millions)				
Credit Facilities						
Revolver Borrowings Due 2023	$ —	$ —	—	$ 244	$ 244	
Term Loans						
LIBOR plus 1.75% Term Loan A due 2019 through 2023 (2)	1,700	1,691	6.160%	—	—	—
LIBOR plus 2.75% Term Loan B due 2019 through 2025 (3)	1,700	1,629	8.880%	—	—	—
Senior Tranche A Term Loan	—	—	—	390	388	2.900%
Senior Unsecured Notes						
$225 million of 5.375% Senior Notes due 2024 (4)	225	222	5.609%	225	222	5.609%
$500 million of 5.000% Senior Notes due 2026 (5)	500	493	5.219%	500	492	5.219%
Senior Secured Notes (9)						
€415 million 4.875% Euro Fixed Rate Notes due 2022 (6)	476	496	3.599%	—	—	—
€300 million of Euribor plus 4.875% Euro Floating Rate Notes due 2024 (7)	344	349	4.620%	—	—	—
€350 million of 5.000% Euro Fixed Rate Notes due 2024 (8)	401	427	3.823%	—	—	—
Other Debt, primarily foreign instruments	108	106		17	15	
		5,413			1,361	
Less — maturities classified as current		73			3	
Total long-term debt		$ 5,340			$ 1,358	

(1) Carrying amount is net of unamortized debt issuance costs and debt discounts or premiums. Total unamortized debt issuance costs were $90 million and $13 million as of December 31, 2018 and 2017. Total unamortized debt (premium) discount, net was $(49) million and $2 million as of December 31, 2018 and 2017.
(2) Principal and interest payable in 19 consecutive quarterly installments beginning March 31, 2019, with $21 million being paid quarterly in the seven quarters, followed by $32 million paid in the subsequent four quarters followed by $43 million in the subsequent eight quarters and the remainder at maturity
(3) Principal and interest payable in 27 consecutive quarterly installments beginning March 31, 2019 with $4 million paid quarterly and the remainder at maturity
(4) Interest payable semiannually beginning on June 30, 2015 with principal due at maturity.
(5) Interest payable semiannually beginning on January 31, 2017 with principal due at maturity.
(6) Interest is payable quarterly on April 15 and October 15 of each year with principal due at maturity.

(7) Interest accrues at the three-month EURIBOR rate (with 0% floor) plus 4.875% per annum and payable quarterly on January 15, April 15, July 15 and October 15.
(8) Interest payable semiannually on January 15 and July 15 of each year beginning on July 17, 2017 with principal due at maturity.
(9) Rank equally in right of payment to all indebtedness under the New Credit Facility (as subsequently defined).

The Company has excluded the required payments, within the next twelve months, under the Term Loan A and Term Loan B facilities totaling $85 million and $17 million , respectively, from current liabilities as of December 31, 2018 , because the Company has the intent and ability to refinance the obligations on a long-term basis by using its revolving credit facility.

The aggregate maturities applicable to the long-term debt outstanding at December 31, 2018 :

	Aggregate Maturities (Millions)
2019	$ 175
2020	$ 114
2021	$ 154
2022	$ 692
2023	$ 1,249

Interest expense associated with the amortization of the debt issuance costs and original issue discounts recognized in the Company's consolidated statements of income consists of the following:

	2018	2017	2016
		(Millions)	
Amortization of debt issuance fees	$ 8	$ 4	$ 4

Included in the table above, is the amortization of debt issuance costs on the revolver. These are $9 million at December 31, 2018 and are recorded in "Prepayments and other current assets." As a result of the Acquisition, the Senior Secured Notes listed in the table were acquired at fair value, which resulted in recognizing a debt premium of $54 million on these notes, of which $3 million was recognized as interest income during the year ended December 31, 2018.

Short-Term Debt
The Company's short-term debt as of December 31, 2018 and 2017 is as follows:

	At December 31	
	2018	2017
	(Millions)	
Maturities classified as current	$ 73	$ 3
Short-term borrowings (a)	66	80
Bank overdrafts	14	20
Total short-term debt	$ 153	$ 103
Weighted average interest rate on outstanding short-term borrowings at end of year	4.4%	2.9%

(a) Includes borrowings under both committed credit facilities and uncommitted lines of credit and similar arrangements.

Credit Facilities
Financing Arrangements

	Committed Credit Facilities (a) as of December 31, 2018				
	Term	Commitments	Borrowings	Letters of Credit (b)	Available
			(Millions)		
Tenneco Inc. revolving credit agreement	2023	$ 1,500	$ —	$ 24	$ 1,476
Tenneco Inc. Term Loan A	2023	1,700	1,700	—	—
Tenneco Inc. Term Loan B	2025	1,700	1,700	—	—
Subsidiaries' credit agreements	2018-2028	154	51	3	100
		$ 5,054	$ 3,451	$ 27	$ 1,576

(a) The Company generally is required to pay commitment fees on the unused portion of the total commitment.
(b) Letters of credit reduce the available borrowings under the revolving credit agreement.

On October 1, 2018, the Company entered into a new credit agreement with JPMorgan Chase Bank, N.A., as administrative agent and other lenders (the " New Credit Facility") in connection with the acquisition of Federal-Mogul. The New Credit Facility consists of $4.9 billion of total debt financing, consisting of a five -year $1.5 billion revolving credit facility, a five -year $1.7 billion term loan A facility ("Term Loan A") and a seven -year $1.7 billion term loan B facility ("Term Loan B"). Proceeds from the New Credit Facility were used to finance the cash consideration portion of the Acquisition purchase price, to refinance the Company's then existing senior credit facilities inclusive of the revolver and the tranche A term loan then outstanding (the "Old Credit Facility"), certain senior credit facilities of Federal-Mogul, and to pay fees and expenses relating to the Acquisition and the financing thereof. The remainder, including future borrowings under the revolving credit facility, will be used for general corporate purposes.

The Company and Tenneco Automotive Operating Company Inc., a wholly-owned subsidiary, are borrowers under the New Credit Facility, and the Company is the sole borrower under the Term Loan A and Term Loan B facilities. The New Credit Facility is guaranteed on a senior basis by certain material domestic subsidiaries of the Company. Drawings under the revolving credit facility may be in U.S. dollars, British pounds or euros.

The New Credit Facility is secured by substantially all domestic assets of the Company, the subsidiary guarantors, and by pledges of up to 66% of the stock of certain first-tier foreign subsidiaries. The security for the New Credit Facility is pari passu with the security for the outstanding senior secured notes of Federal-Mogul that were assumed by the Company in connection with the Acquisition. If any foreign subsidiary of the Company is added to the revolving credit facility as a borrower, the obligations of such foreign borrower will be secured by the assets of such foreign borrower, and also will be secured by the assets of, and guaranteed by, the domestic borrowers and domestic guarantors as well as certain foreign subsidiaries of the Company in the chain of ownership of such foreign borrower.

As a result of the refinancing of the revolving credit agreement and tranche A term loan under the Old Credit Facility, the Company recorded a loss on extinguishment of debt of $10 million for the year-ended December 31, 2018, primarily consisting of debt issuance costs incurred at the transaction date and write-off of deferred debt issuance costs related to the refinanced revolving credit loan and tranche A term loan. The Company also recorded $1 million of loss on extinguishment of debt for the year ended December 31, 2017 related to amendment and restatement of the Old Credit Facility and the write-off of deferred debt issuance costs related to the Old Credit Facility. The Company recorded a $24 million loss on extinguishment of debt for the year ended December 31, 2016 for the repurchase and redemption of senior notes due 2020 and the write-off of debt issuance costs relating to those notes.

New Credit Facility — Interest Rates and Fees
The interest rate on borrowings under the revolving credit facility and the Term Loan A facility will initially be LIBOR plus 1.75% , which interest rate will be subject to change if the Company's consolidated net leverage ratio changes. Initially, and so long as the Company's corporate family rating is Ba3 (with a stable outlook) or higher from Moody's Investors Service, Inc. ("Moody's") and BB- (with a stable outlook) or higher from Standard & Poor's Financial Services LLC ("S&P"), the interest rate on borrowings under the Term Loan B facility will be LIBOR plus 2.75% ; at any time the foregoing conditions are not satisfied, the interest rate on the Term Loan B facility will be LIBOR plus 3.00% . When the Term Loan B facility is no longer outstanding and the Company and its subsidiaries have no other secured indebtedness (with certain exceptions set forth in the New Credit Facility), and upon the Company achieving and maintaining two or more corporate credit and/or corporate family ratings higher than or equal to BBB- from S&P, BBB- from Fitch Ratings Inc. ("Fitch") and/or Baa3 from Moody's (in each case, with a stable or positive outlook), the collateral under the New Credit Facility may be released.

New Credit Facility — Other Terms and Conditions
The New Credit Facility contains representations and warranties, and covenants which are customary for debt facilities of this type. The covenants limit the ability of the Company and its restricted subsidiaries to, among other things, to (i) incur additional indebtedness or issue preferred stock, (ii) pay dividends or make distributions to the Company's stockholders, (iii) purchase or redeem the Company's equity interests, (iv) make investments, (v) create liens on their assets, (vi) enter into transactions with the Company's affiliates, (vii) sell assets and (viii) merge or consolidate with, or dispose of substantially all of the Company's assets to, other companies.

The New Credit Facility includes customary events of default and other provisions that could require all amounts due thereunder to become immediately due and payable, either automatically or at the option of the lenders, if the Company fails to comply with the terms of the New Credit Facility or if other customary events occur.

The New Credit Facility also contains two financial maintenance covenants for the revolving credit facility and the Term Loan A facility including a requirement to have a consolidated net leverage ratio (as defined in the New Credit Facility) as of the end of each fiscal quarter of not greater than 4.0 to 1 through September 30, 2019, 3.75 to 1 through September 30, 2020 and 3.5 to 1 thereafter; and a requirement to maintain a consolidated interest coverage ratio (as defined in the New Credit Facility) for any period of four consecutive fiscal quarters of not less than 2.75 to 1.

The covenants in the New Credit Facility generally prohibit the Company from repaying or refinancing its senior unsecured notes. So long as no default exists, the Company would, under its New Credit Facility, be permitted to repay or refinance our senior unsecured notes (i) with the net cash proceeds of permitted refinancing indebtedness (as defined in the New Credit Facility); (ii) in an amount equal to the net cash proceeds of qualified capital stock (as defined in the New Credit Facility) issued after October 1, 2018 and (iii) in exchange for qualified capital stock issued after October 1, 2018; and (iv) with additional payments provided that such additional payments are capped as follows based on a pro forma consolidated leverage ratio after giving effect to such additional payments.

As of December 31, 2018, the Company was in compliance with all the financial covenants of the New Credit Facility.

Senior Notes
Senior Unsecured Notes
The Company has outstanding 5.375% senior unsecured notes due December 15, 2024 ("2024 Senior Notes") and 5.000% senior unsecured notes due July 15, 2026 ("2026 Senior Notes" and together with the 2024 Senior Notes, the "Senior Unsecured Notes") at December 31, 2018. The Company is permitted to redeem some or all of the outstanding Senior Unsecured Notes, at specified redemption prices that decline to par over a specified period, at any time (a) on or after December 15, 2019, in the case of the 2024 Senior Notes and (b) on or after July 15, 2021, in the case of the 2026 Senior Notes. In addition, the Senior Unsecured Notes may also be redeemed at a price generally equal to 100% of the principal amount thereof plus a premium based on the present values of the remaining payments due to the note holders. Further, the Company may redeem up to 35% of each Senior Unsecured Notes with the proceeds of certain equity offerings on or before July 15, 2019 at a redemption price equal to 105% , in the case of the 2026 Senior Notes.

If the Company experiences specified kinds of changes in control, the Company must offer to repurchase the Senior Unsecured Notes at 101% of the principal amount thereof plus accrued and unpaid interest. In addition, if the Company sells certain of its assets and does not apply the proceeds from the sale in a certain manner within 365 days of the sale, the Company must offer to repurchase the 2024 Senior Notes at 100% of the principal amount thereof plus accrued and unpaid interest.

Senior Secured Notes
In connection with the Acquisition of Federal-Mogul on October 1, 2018, the Company assumed an aggregate principal amount of €350 million ($401 million) 5.000% euro denominated fixed rate notes which are due July 15, 2024 (" 5.000% Euro Fixed Rate Notes"), €415 million ($476 million) 4.875% euro denominated fixed rate notes due April 15, 2022 (" 4.875% Euro Fixed Rate Notes"), and an aggregate principal amount of €300 million ($344 million) floating rate notes due April 15, 2024 ("Euro Floating Rate Notes" and together with the 5.000% Euro Fixed Rate Notes and the 4.875% Euro Fixed Rate Notes, the "Senior Secured Notes").

The Company is permitted to redeem some or all of the outstanding Senior Secured Notes at specified redemption prices that decline to par over a specified period, at any time (a) on or after July 15, 2020, in the case of the 5.000% Euro Fixed Rate Notes, (b) on or after April 15, 2019, in the case of the 4.875% Euro Fixed Rate Notes and (c) on or after April 15, 2018, in the case of the Euro Floating Rate Notes. In addition, the Senior Secured Notes may also be redeemed at a price generally equal to 100% of the principal amount thereof plus a premium based on the present values of the remaining payments due to the note

holders. Further, the Company may also redeem up to 40% of the 5.000% Euro Fixed Rate Notes and the 4.875% Euro Fixed Rate Notes with the proceeds of certain equity offerings at any time prior to (a) July 15, 2020 at a redemption price of 105.0% in the case of the 5.000% Euro Fixed Rate Notes, and (b) April 15, 2019 at a redemption price of 104.875% in the case of the 4.875% Euro Fixed Rate Notes.

If the Company experiences specified kinds of changes in control, the Company must offer to repurchase the Senior Secured Notes at 101% of the principal amount thereof plus accrued and unpaid interest. In addition, if the Company sells certain of its assets and does not apply the proceeds from the sale in a certain manner within 365 days of the sale, the Company must offer to repurchase the Senior Secured Notes at 100% of the principal amount thereof plus accrued and unpaid interest.

The Company has designated a portion of the Senior Secured Notes as a net investment hedge of its European operations. As such, the fluctuations in foreign currency exchange rates on the value of the Senior Secured Notes is recorded to cumulative translation adjustment. See Note 9, Derivatives and Hedging Activities for further details .

Senior Unsecured Notes and Senior Secured Notes - Other Terms and Conditions
The Senior Unsecured Notes and Senior Secured Notes contain covenants that will, among other things, limit the Company's ability to create liens and enter into sale and leaseback transactions. In addition, the Senior Secured Notes and 2024 Unsecured Senior Notes also require that, as a condition precedent to incurring certain types of indebtedness not otherwise permitted, our consolidated fixed charge coverage ratio, as calculated on a pro forma basis, be greater than 2.00, as well as containing restrictions on its operations, including limitations on: (i) incurring additional indebtedness; (ii) paying dividends; (iii) distributions and stock repurchases; (iv) investments; (v) asset sales and (vi) mergers and consolidations.

Subject to limited exceptions, all of the Company's existing and future material domestic wholly owned subsidiaries fully and unconditionally guarantee its Senior Unsecured Notes and Senior Secured Notes on a joint and several basis. There are no significant restrictions on the ability of the subsidiaries that have guaranteed the Company's Senior Notes to make distributions to the Company.

Other Debt
Other debt consists primarily of foreign debt with maturities of one year or less.

Accounts Receivable Securitization and Factoring
On-Balance Sheet Arrangements
The Company has securitization programs for some of its accounts receivable, with limited recourse provisions. Borrowings on these securitization programs are recorded in short-term debt.

Borrowings on these securitization programs at December 31, 2018 and 2017 are as follows:

	As of December 31	
	2018	2017
	(Millions)	
Borrowings on securitization programs	$ 6	$ 30

The Company had an accounts receivable securitization program in which original equipment and aftermarket receivables were securitized on a daily basis. The Company was responsible for performing all accounts receivable administration functions for these securitized financial assets including collections and processing of customer invoice adjustments. In October 2018, this program was terminated. As of December 31, 2017, the carrying amount of assets pledged as collateral for this securitization program was $343 million .

Off-Balance Sheet Arrangements
In the Company's European and U.S. accounts receivable factoring programs, accounts receivables are transferred in their entirety to the acquiring entities and are accounted for as a sale. Due to the Acquisition, additional factoring arrangements in the U.S. and Europe were acquired which are also accounted for as a sale and have been included in the tables below. The fair value of assets received as proceeds in exchange for the transfer of accounts receivable under these factoring programs approximates the fair value of such receivables. Certain programs in Europe have deferred purchase price arrangements with the banks.

The Company is the servicer of the receivables under some of these arrangements and is responsible for performing all accounts receivable administration functions. Where the Company receives a fee to service and monitor these transferred

accounts receivables, such fees are sufficient to offset the costs and as such, a servicing asset or liability is not recorded as a result of such activities.

In the U.S and Canada, the Company participates in supply chain financing programs with certain of the Company's aftermarket customers through a drafting program.

The amounts outstanding for these factoring and drafting arrangements as of December 31, 2018 and 2017 are as follows:

	As of December 31	
	2018	2017
	(Millions)	
Accounts receivable outstanding and derecognized	$ 1,011	$ 406
Deferred purchase price receivable	$ 154	$ 114

Proceeds from the factoring of accounts receivable qualifying as sales and drafting programs, and expenses associated with these arrangements for the years ended December 31, 2018, 2017, and 2016 are as follows:

	Year Ended December 31		
	2018	2017	2016
		(Millions)	
Proceeds from factoring qualifying as sales	$ 3,390	$ 1,984	$ 1,770
Loss on sale of receivables	$ 16	$ 5	$ 5

If the Company were not able to factor receivables or sell drafts under either of these programs, its borrowings under its revolving credit agreement might increase. These programs provide the Company with access to cash at costs that are generally favorable to alternative sources of financing and allow the Company to reduce borrowings under its revolving credit agreement.

12. Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities at December 31, 2018 and 2017 included the following:

	December 31	
	2018	2017
	(Millions)	
Accrued rebates	$ 189	$ 68
Product return reserves	95	16
Restructuring liabilities	91	16
Legal reserves	71	88
Non-income tax payable	67	52
Pension and postretirement benefits liability	50	14
Accrued freight	48	26
Liabilities held for sale	39	—
Accrued warranty	39	23
Accrued interest	33	14
Accrued professional services	31	8
Environmental reserve	12	2
Other	236	97
	$ 1,001	$ 424

13. Pension Plans, Postretirement and Other Employee Benefits

Defined Contribution Plans
Effective January 1, 2012, the Tenneco Employee Stock Ownership Plan for Hourly Employees and the Tenneco Employee Stock Ownership Plan for Salaried Employees were merged into one plan called the Tenneco 401(k) Retirement Savings Plan (the "Retirement Savings Plan"). The Retirement Savings Plan allows for an enhanced company match and contributions for all eligible salaried and hourly employees. As a result of the Acquisition, the Company acquired Federal-Mogul's 401(k) Retirement Savings Plan. The Company recorded expense for contributions to its plans of approximately $43 million , $29 million and $28 million in 2018 , 2017 and 2016 , respectively.

Defined Benefit Plans
The Company sponsors defined benefit pension plans, and health care and life insurance benefits for certain employees and retirees around the world. There is also an unfunded nonqualified pension plan primarily covering U.S. executives.
The funding policy for defined benefit pension plans is to contribute the minimum required by applicable laws and regulations or to directly pay benefit payments where appropriate. At December 31, 2018, all legal funding requirements had been met. The Company expects to contribute $26 million to its U.S. pension plans, $42 million to its non-U.S. pension plans, and $28 million to its other postretirement plans in 2019.

Other Benefits
The Company also provides benefits to former or inactive employees paid after employment but before retirement. The liabilities for such U.S. and European postemployment benefits were $75 million and $9 million as of December 31, 2018 and 2017 .

Significant Events
As a result of the Acquisition, the Company assumed $848 million in underfunded defined benefit pension and other postretirement benefit obligations.

In December 2018, the Company approved an amendment for one of its U.S. postretirement medical benefit plans. Beginning June 1, 2019, eligible retirees that opt to receive benefits will receive a fixed subsidiary payment to purchase health care benefits on a marketplace exchange in lieu of the original plan's medical benefits. The amendments to the plan resulted in a plan remeasurement and recognition of a negative plan amendment, which reduced the Company's obligation by $66 million with a corresponding increase of $51 million in AOCI (net of taxes of $16 million) as of December 31, 2018. The $66 million is being amortized on a straight-line basis as a reduction to net periodic postretirement benefit cost over participants' average remaining service periods.

In February 2016, the Company launched a voluntary program to buy out active employees and retirees who had earned benefits in the U.S. pension plans. As of December 31, 2016, this program had been substantially completed with cash payments to those who elected to take the buyout made from pension plan assets in the fourth quarter of 2016. In connection with this program the Company contributed $18 million into the pension trust and recognized a non-cash charge of $72 million . The program was completed in the first quarter of 2017, at which time we contributed another $10 million and recognize a non-cash charge of $6 million during the year ended December 31, 2017.

The measurement date for all defined benefit plans is December 31. The following provides a reconciliation of the plans' benefit obligations, plan assets, and funded status as of December 31, 2018 and 2017:

	Pension Plans				Other Postretirement Benefits Plans	
	U.S.		Non-U.S.			
	2018	2017	2018	2017	2018	2017
	(Millions)					
Change in benefit obligation:						
Benefit obligation, beginning of year	$ 263	$ 272	$ 471	$ 438	$ 151	$ 143
Federal-Mogul acquisition	1,064	—	545	—	263	—
Service cost	1	1	13	9	—	—
Interest cost	21	10	15	13	8	5
Settlement	(1)	(7)	(13)	(3)	—	—
Curtailment	—	—	—	—	(1)	—
Administrative expenses/taxes paid	—	—	(3)	(2)	—	—
Plan amendments	—	—	2	—	(66)	—
Actuarial (gain)/loss	(12)	10	(16)	(9)	(24)	12
Benefits paid	(34)	(23)	(22)	(18)	(15)	(10)
Medicare subsidies received	—	—	—	—	1	—
Participants' contributions	—	—	1	1	1	—
Held for sale	—	—	(16)	—	—	—
Currency rate conversion and other	—	—	(31)	42	4	1
Benefit obligation, end of year	1,302	263	946	471	322	151
Change in plan assets:						
Fair value of plan assets, beginning of year	202	192	438	369	—	—
Federal-Mogul acquisition	943	—	81	—	—	—
Settlement	(1)	(7)	(14)	(3)	—	—
Actual return on plan assets	(122)	22	(1)	42	—	—
Administrative expenses/taxes paid	—	—	—	(2)	—	—
Employer contributions	6	18	21	14	13	10
Medicare subsidies received	—	—	—	—	1	—
Participants' contributions	—	—	1	1	1	—
Benefits paid	(33)	(23)	(25)	(18)	(15)	(10)
Held for sale	—	—	(10)	—	—	—
Currency rate conversion and other	—	—	(25)	35	—	—
Fair value of plan assets, end of year	995	202	466	438	—	—
Funded status of the plans	$ (307)	$ (61)	$ (480)	$ (33)	$ (322)	$ (151)

Amounts recognized on the consolidated balance sheets consist of the following as of December 31, 2018 and 2017:

	Pension Plans				Other Postretirement Benefits Plans	
	U.S.		Non-U.S.			
	2018	2017	2018	2017	2018	2017
	(Millions)					
Noncurrent assets	$ —	$ —	$ 33	$ 28	$ —	$ —
Current liabilities	(5)	(2)	(17)	(3)	(28)	(9)
Noncurrent liabilities (a)	(302)	(59)	(496)	(58)	(294)	(142)
	$ (307)	$ (61)	$ (480)	$ (33)	$ (322)	$ (151)

(a) The "pension and postretirement benefits" line in the consolidated balance sheets includes $75 million and $9 million as of December 31, 2018 and 2017 of postemployment benefits which are not included in the table above.

Amounts recognized in accumulated other comprehensive loss for pension and postretirement benefits, inclusive of tax effects, consist of the following components as of December 31, 2018 and 2017:

	Pension Plans				Other Postretirement Benefits Plans	
	U.S.		Non-U.S.			
	2018	2017	2018	2017	2018	2017
	(Millions)					
Actuarial loss	$ 255	$ 130	$ 80	$ 91	$ 31	$ 51
Prior service cost/(credit)	—	—	4	3	(73)	—
Total	$ 255	$ 130	$ 84	$ 94	$ (42)	$ 51

Information for defined benefit plans with projected benefit obligations in excess of plan assets:

	Pension Plans				Other Postretirement Benefits Plans	
	2018		2017			
	U.S.	Non-U.S.	U.S.	Non-U.S.	2018	2017
	(Millions)					
Projected benefit obligation	$ 1,302	$ 652	$ 263	$ 130	$ 322	$ 151
Fair value of plan assets	$ 995	$ 138	$ 202	$ 69	$ —	$ —

Information for pension plans with accumulated benefit obligations in excess of plan assets:

	December 31, 2018		December 31, 2017	
	U.S.	Non-U.S.	U.S.	Non-U.S.
	(Millions)			
Projected benefit obligation	$ 1,302	$ 620	$ 263	$ 117
Accumulated benefit obligation	$ 1,302	$ 606	$ 263	$ 112
Fair value of plan assets	$ 995	$ 111	$ 202	$ 56

The accumulated benefit obligation for all pension plans is $2,225 million and $728 million as of December 31, 2018 and 2017 .

Net periodic pension and postretirement benefits costs for the years 2018 , 2017 and 2016 , consist of the following components:

	Pension Plans						Other Postretirement Benefits Plans		
	U.S.			Non-U.S.					
	2018	2017	2016	2018	2017	2016	2018	2017	2016
	(Millions)								
Service cost	$ 1	$ 1	$ 1	$ 14	$ 9	$ 8	$ —	$ —	$ —
Interest cost	21	10	15	15	13	14	8	5	6
Expected return on plan assets	(28)	(14)	(23)	(18)	(25)	(20)	—	—	—
Curtailment loss	—	—	—	—	—	—	1	—	—
Settlement loss	1	8	72	3	1	—	—	—	—
Net amortization:									
Actuarial loss	5	5	8	6	9	7	5	4	5
Prior service cost (credit)	—	—	—	1	1	1	—	(1)	(1)
Net periodic costs	$ —	$ 10	$ 73	$ 21	$ 8	$ 10	$ 14	$ 8	$ 10

The following assumptions were used in the accounting for the pension and other postretirement benefits plans for the years of 2018 , 2017 , and 2016 :

	Pension Plans						Other Postretirement Benefits Plans		
	U.S.			Non-U.S.					
	2018	2017	2016	2018	2017	2016	2018	2017	2016
Weighted-average assumptions used to determine benefit obligations:									
Discount rate	4.2%	3.8%	4.2%	2.6%	2.6%	2.8%	4.3%	3.8%	4.2%
Rate of compensation increase	n/a	n/a	n/a	—%	2.5%	2.5%	n/a	n/a	n/a
Weighted-average assumptions used to determine net periodic benefit cost:									
Discount rate	4.1%	4.2%	4.3%	2.4%	2.8%	3.5%	4.2%	4.2%	4.3%
Expected long-term return on plan assets	6.0%	7.8%	7.6%	4.2%	5.2%	5.7%	n/a	n/a	n/a
Rate of compensation increase	n/a	n/a	n/a	2.9%	2.5%	2.7%	n/a	n/a	n/a

Estimated amounts to be amortized from accumulated other comprehensive loss into net periodic benefit cost in the year ending December 31, 2019 based on December 31, 2018 plan measurements:

	2019		
	Pension Plans		Other Postretirement Benefits Plans
	U.S.	Non-U.S	
		(Millions)	
Net actuarial loss	$ 5	$ 5	$ 4
Prior service cost	—	1	(8)
	$ 5	$ 6	$ (4)

Estimated future benefit payments are as follows:

Year	Pension Plans		Other Postretirement Benefits Plans
	U.S.	Non-U.S.	
		(Millions)	
2019	$ 100	$ 43	$ 28
2020	$ 99	$ 44	$ 28
2021	$ 99	$ 43	$ 27
2022	$ 101	$ 45	$ 26
2023	$ 100	$ 49	$ 26
2024-2028	$ 442	$ 243	$ 113

Health Care Trend

The weighted-average assumed health care cost trend rate used in determining next year's postretirement health care benefits are as follows:

	Other Postretirement Benefits Plans		
	2018	2017	2016
Initial health care cost trend rate	6.9%	6.8%	7.0%
Ultimate health care cost trend rate	4.9%	4.5%	4.5%
Year ultimate health care cost trend rate reached	2027	2027	2026

The assumed health care cost trend rate has a significant effect on the amounts reported for other postretirement benefits plans. The following table illustrates the sensitivity to a change in the assumed health care cost trend rate:

	Total Service and Interest Cost	Postretirement Benefits Obligation
	(Millions)	
100 basis point ("bp") increase in health care cost trend rate	$ 1	$ 23
100 bp decrease in health care cost trend rate	**$ (1)**	**$ (20)**

Long-term Rate of Return

The Company's expected return on assets is established annually through analysis of anticipated future long-term investment performance for the plan based upon the asset allocation strategy and is primarily a long-term prospective rate.

An analysis was performed in December 2018 resulting in changes to the expected long-term rate of return on assets. The weighted-average long-term rate of return on assets for the U.S. pension plans decreased from 7.75% at December 31, 2017 to 6.00% at December 31, 2018. The expected long-term rate of return on plan assets used in determining pension expense for non-U.S. plans is determined in a similar manner to the U.S. plans and decreased from 5.25% at December 31, 2017 to 4.2% at December 31, 2018.

Plan Assets

Certain pension plans sponsored by the Company invest in a diversified portfolio consisting of an array of asset classes that attempts to maximize returns while minimizing volatility. These asset classes include developed market equities, emerging market equities, private equity, global high quality and high yield fixed income, real estate, and absolute return strategies.

U.S. Plan

The U.S. investment strategy mitigates risk by incorporating diversification across appropriate asset classes to meet the plan's objectives. It is intended to reduce risk, provide long-term financial stability for the plan, and maintain funded levels that meet long-term plan obligations while preserving sufficient liquidity for near-term benefit payments. Risk assumed is considered appropriate for the return anticipated and consistent with the diversification of plan assets. Approximately 49% of the U.S. plan assets were invested in actively managed investment funds. The Company's investment strategy includes a target asset allocation of 60% equity investments, 15% fixed income investments, 15% debt securities, and 10% in other investment types including hedge funds.

Non-U.S. Plans

The Company's non-U.S. plans are individually managed to different target levels depending on the investing environment in each country and the funded status of each plan, with an increased allocation of assets to equity and fixed income securities at higher funded ratios. The insurance contracts guarantee a minimum rate of return. The Company has no input into the investment strategy of the assets underlying the contracts, but they are typically heavily invested in active bond markets and are highly regulated by local law.

Pension plan assets were invested in the following classes of securities:

	Percentage of Fair Market Value	
	December 31, 2018	
	U.S.	Non-U.S.
Equity securities	62%	32%
Fixed income securities	17%	5%
Debt securities	11%	43%
Insurance contracts	—%	15%
Other	10%	5%

The assets of some of the Company's pension plans are invested in trusts that permit commingling of the assets of more than one employee benefit plan for investment and administrative purposes. Each of the plans participating in the trust has interests in the net assets of the underlying investment pools.

The following table presents the Company's defined benefit plan assets measured at fair value by asset class:

	Fair Value Level as of December 31, 2018							
	U.S.				Non-U.S.			
Asset Category	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
				(Millions)				
Investments with registered investment companies:								
Equity securities	$ 323	$ —	$ —	$ 323	$ 1	$ —	$ —	$ 1
Fixed income securities	167	—	—	167	21	—	—	21
Real estate and other	41	—	—	41	—	—	—	—
Equity securities	194	—	—	194	14	55	—	69
Debt securities:								
Corporate and other	—	18	—	18	8	—	—	8
Government	12	21	—	33	2	147	—	149
Real Estate and other	—	—	—	—	1	4	—	5
Insurance contracts	—	—	—	—	—	—	71	71
Hedge funds	—	—	28	28	—	—	—	—
Cash and equivalents	33	—	—	33	17	—	—	17
Total	$ 770	$ 39	$ 28	$ 837	$ 64	$ 206	$ 71	$ 341
Plan assets measured at net asset value								
Equity securities				$ 104				$ 81
Government debt securities				—				30
Corporate and other debt securities				54				14
Total plan assets measured at net asset value				158				125
Net plan assets				$ 995				$ 466

	Fair Value Level as of December 31, 2017							
	U.S.				Non-U.S.			
Asset Category	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
				(Millions)				
Equity securities	$ 21	$ —	$ —	$ 21	$ 16	$ 101	$ —	$ 117
Debt securities:								
Corporate and other	—	—	—	—	6	16	—	22
Government	—	—	—	—	2	112	—	114
Real Estate and other	—	—	—	—	1	6	—	7
Insurance contracts	—	—	—	—	—	16	9	25
Cash and equivalents	2	—	—	2	9	1	—	10
Total	$ 23	$ —	$ —	$ 23	$ 34	$ 252	$ 9	$ 295
Plan assets measured at net asset value								
Equity securities				$ 120				$ 97
Government debt securities				—				32
Corporate and other debt securities				59				14
Total plan assets measured at net asset value				179				143
Net plan assets				$ 202				$ 438

The Company's level 1 assets were valued using market prices based on daily net asset value ("NAV") or prices available daily through a public stock exchange. Its level 2 assets were valued primarily using market prices, sometimes net of estimated realization expenses, and based on broker/dealer markets or in commingled funds where NAV is not available daily or publicly. For insurance contracts, the estimated surrender value of the policy was used to estimate fair market value.

The table below summarizes the changes in the fair value of the Level 3 assets:

	December 31, 2018		December 31, 2017	
	Level 3 Assets		Level 3 Assets	
	U.S.	Non-U.S.	U.S.	Non-U.S.
	(Millions)		(Millions)	
Balance at December 31 of the previous year	$ —	$ 9	$ —	$ 9
Federal-Mogul acquisition	30	56	—	—
Net realized/unrealized gains (loss)	(2)	1	—	—
Purchases and settlements, net	—	—	—	—
Sales, net	—	—	—	—
Transfers into (out) of Level 3	—	15	—	—
Held for sale	—	(10)		
Foreign currency exchange rate movements	—	—	—	—
Ending Balance at December 31	$ 28	$ 71	$ —	$ 9

The following table contains information about significant concentrations of risk, including all individual assets that make up more than 5% of the total assets and any direct investments in Tenneco stock:

Asset Category	Fair Value Level	Value (Millions)	Percentage of Total Assets
2018:			
Tenneco stock	1	$ 10	0.7%
2017:			
Tenneco stock	1	$ 21	3.3%

The Company's approach to determining expected return on plan asset assumptions evaluates both historical returns as well as estimates of future returns, and adjusts for any expected changes in the long-term outlook for the equity and fixed income markets for both its U.S. and Non-U.S. plans.

14. Income Taxes

The domestic and foreign components of the Company's earnings before income taxes and noncontrolling interests are as follows:

	Year Ended December 31,		
	2018	2017	2016
	(Millions)		
U.S. income earnings (loss) before income taxes	$ (138)	$ (28)	$ 52
Foreign earnings (loss) before income taxes	312	364	359
Earnings (loss) before income taxes and noncontrolling interests	$ 174	$ 336	$ 411

Following is a comparative analysis of the components of income tax expense (benefit):

	Year Ended December 31,		
	2018	2017	2016
	(Millions)		
Current —			
U.S. federal	$ 8	$ (23)	$ (9)
State and local	1	1	4
Foreign	119	101	85
	128	79	80
Deferred —			
U.S. federal	(35)	16	(95)
State and local	(5)	(3)	(1)
Foreign	(25)	(21)	12
	(65)	(8)	(84)
Income tax expense (benefit)	$ 63	$ 71	$ (4)

Following is a reconciliation of income taxes computed at the statutory U.S. federal income tax rate (21% for 2018 and 35% for 2017 and 2016) to the income tax expense (benefit) reflected in the consolidated statements of income:

	Year Ended December 31,		
	2018	2017	2016
	(Millions)		
Income tax expense computed at the statutory U.S. federal income tax rate	$ 37	$ 117	$ 144
Increases (reductions) in income tax expense resulting from:			
Foreign income taxed at different rates	19	(48)	(42)
Transition Tax under Tax Cuts and Jobs Act ("TCJA")	11	43	—
Re-measurement of Worldwide Deferred Taxes	—	53	—
State and local taxes on income, net of U.S. federal income tax benefit	(6)	(2)	3
Changes in valuation allowance for tax loss carryforwards and credits	—	(1)	18
Investment and R&D tax credits	(12)	(6)	(6)
Foreign earnings subject to U.S. federal income tax	9	(74)	(101)
Tax contingencies	1	(1)	(7)
Other	4	(10)	(13)
Income tax expense (benefit)	$ 63	$ 71	$ (4)

The Company reported income tax expense of $63 million in 2018 , $71 million in 2017 and a tax benefit of $4 million in 2016 . The tax expense recorded in 2018 included tax benefits of $10 million relating to a valuation allowance release at its Australian entities and $11 million of tax expense for changes in the toll tax as discussed below. The tax expense recorded in 2017 includes a net provisional tax expense of $43 million for one-time transition tax on deemed repatriation of previously deferred foreign earnings under the Tax Cuts and Jobs Act ("TCJA") as discussed below. The Company remeasured U.S. deferred taxes from an applicable federal rate of 35% to the new statutory rate of 21% at which they are expected to be utilized, recording a $51 million provisional expense. The tax expense recorded in 2017 included a net tax benefit of $74 million relating to recognizing a U.S. tax benefit for foreign taxes. The tax expense recorded in 2016 included a net tax benefit of $110 million primarily relating to the recognition of a U.S. tax benefit for foreign taxes. In 2016, the Company completed its detailed analysis of its ability to recognize and utilize foreign tax credits within the carryforward period. As a result, the Company amended its U.S. federal tax returns for the years 2006 to 2012 to claim foreign tax credits in lieu of deducting foreign taxes paid. The U.S. foreign tax credit law provides for a credit against U.S. taxes otherwise payable for foreign taxes paid with regard to dividends, interest and royalties paid to the Company in the U.S. Income tax expense also decreased in 2016 as a result of the mix of earnings in the Company's various tax jurisdictions.

On December 22, 2017, the TCJA was enacted into U.S. law, which, among other provisions, lowered the corporate income tax rate effective January 1, 2018 from 35% to 21% , and implemented significant changes with respect to U.S. tax treatment of earnings originating from outside the U.S. Many of the provisions of TCJA are subject to regulatory interpretation and U.S. state conforming enactments. The Internal Revenue Service (IRS) issued Notice 2018-26 on April 2, 2018 and issued proposed regulations under Section 965 on August 1, 2018, which provided additional guidance to assist taxpayers in computing the toll tax. Based on the new guidance, an $11 million discrete charge was recorded in income tax expense in 2018. The Company has completed our accounting for the tax effects of the enactment as of December 31, 2018.

The Company elected to account for Global Intangible Low-Taxed Income ("GILTI") as a current-period expense when incurred. Therefore, the Company has not recorded deferred taxes for basis differences expected to reverse in the future periods.

The components of the Company's net deferred tax assets were as follows:

	December 31,	
	2018	2017
	(Millions)	
Deferred tax assets —		
Tax loss carryforwards:		
State	$ 18	$ 19
Foreign	364	114
Tax credits	159	118
Postretirement benefits other than pensions	21	37
Pensions	158	24
Payroll accruals	24	18
Book over tax depreciation	68	(45)
Other accruals	163	80
Valuation allowance	(514)	(163)
Total deferred tax assets	461	202
Deferred tax liabilities —		
Amortization of intangibles	82	—
Total deferred tax liabilities	82	—
Net deferred tax assets	$ 379	$ 202

State tax loss carryforwards have been presented net of uncertain tax positions that, if realized, would reduce tax loss carryforwards in both 2018 and 2017 by $2 million . Additionally, foreign tax loss carryforwards, have been presented net of uncertain tax positions that, if realized, would reduce tax loss carryforwards in 2018 and 2017 by $68 million and $7 million , respectively.

	December 31,	
	2018	2017
	(Millions)	
Consolidated Balance Sheets:		
Non-current portion — deferred tax asset	$ 467	$ 213
Non-current portion — deferred tax liability	(88)	(11)
Net deferred tax assets	$ 379	$ 202

We evaluate our deferred income taxes quarterly to determine if valuation allowances are required or should be adjusted. This assessment considers, among other matters, the nature, frequency and amount of recent losses, the duration of statutory carryforward periods, and tax planning strategies. In making such judgments, significant weight is given to evidence that can be objectively verified. If recent operational improvements continue in our foreign subsidiaries or if certain restructuring steps are completed as part of the Federal-Mogul acquisition and future spin of the Ride Performance / Aftermarket company, we believe it is reasonably possible that sufficient positive evidence may be available to release all, or a portion, of its valuation allowance in the next twelve months. This may result in a one-time tax benefit of up to $51 million , primarily related to Spain, China, and Czech Republic.

As a result of the valuation allowances recorded of $514 million and $163 million at December 31, 2018 and 2017 , respectively, the Company has potential tax assets that were not recognized on its consolidated balance sheets. These unrecognized tax assets resulted primarily from foreign tax loss carryforwards, foreign investment tax credits, foreign research and development credits and U.S. state net operating losses ("NOLs") that are available to reduce future tax liabilities.

The Company's state NOLs expire in various tax years through 2039. The Company's non-U.S. NOLs expire in various tax years through 2038, or have unlimited carryforward potential.

The Company does not provide for U.S. income taxes on unremitted earnings of foreign subsidiaries, except for the earnings of certain of its China operations and in certain of its joint ventures in Spain, South Korea, and India, as its present intention is to reinvest the unremitted earnings in its foreign operations. Unremitted earnings of foreign subsidiaries were approximately $2.6 billion at December 31, 2018 . The Company estimated that the amount of U.S. and foreign income taxes that would be accrued or paid upon remittance of the assets that represent those unremitted earnings was $117 million .

A tax benefit from an uncertain tax position may be recognized when it is "more likely than not" that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, based on the technical merits.

A reconciliation of the Company's uncertain tax positions is as follows:

	2018	2017	2016
		(Millions)	
Uncertain tax positions —			
Balance January 1	$ 112	$ 111	$ 123
Gross increases in tax positions due to acquisition	110	—	—
Gross increases in tax positions in current period	8	6	6
Gross increases in tax positions in prior period	7	2	2
Gross decreases in tax positions in prior period	(1)	(2)	(5)
Gross decreases — settlements	(2)	—	—
Gross decreases — statute of limitations expired	(10)	(5)	(15)
Balance December 31	$ 224	$ 112	$ 111

Included in the balance of uncertain tax positions were $134 million in 2018 , $108 million in 2017 , $108 million in 2016 , of tax benefits, that if recognized, would affect the effective tax rate. The Company recognizes accrued interest and penalties related to unrecognized tax benefits as income tax expense. Penalties of less than $1 million were accrued in 2018 , 2017 and 2016 . Additionally, the Company accrued interest expense related to uncertain tax positions of $2 million in 2018 , and interest expense of less than $1 million in both 2017 and 2016 . The Company's liability for penalties was $12 million at December 31, 2018 , and $1 million at both December 31, 2017 and December 31, 2016 , and its liability for interest was $11 million at December 31, 2018 and $4 million at both December 31, 2017 and December 31, 2016 .

The Company's uncertain tax position at December 31, 2018 and 2017 included exposures relating to the disallowance of deductions, global transfer pricing and various other issues. The Company believes it is reasonably possible that a decrease of up to $14 million in unrecognized tax benefits related to the expiration of U.S. and foreign statute of limitations and the conclusion of income tax examinations may occur within the next twelve months.

The Company is subject to taxation in the U.S. and various state and foreign jurisdictions. As of December 31, 2018 , the Company's tax years open to examination in primary jurisdictions are as follows:

	Open To Tax Year
United States	2003
Belgium	2016
Brazil	2014
China	2009
Germany	2009
Mexico	2013
Poland	2013
Spain	2000
United Kingdom	2015
Italy	2013
France	2009
India	1995

15. Commitments and Contingencies

Capital Commitments
The Company estimates expenditures aggregating to approximately $181 million will be required after December 31, 2018 to complete facilities and projects authorized at such date, and it has made substantial commitments in connection with these facilities and projects.

Lease Commitments
The Company's facilities and equipment are generally leased under arrangements that are accounted for as operating leases. Total rental expense for the years ended December 31, 2018, 2017 and 2016 was $111 million, $81 million and $74 million, respectively. Future minimum operating lease payments at December 31, 2018 are as follows:

	(Millions)
2019	$ 120
2020	100
2021	86
2022	68
2023	56
Beyond 2023	53
Total minimum lease payments	**$ 483**

Certain equipment is leased under long term agreements. Capital assets for these agreements were $2 million and $1 million at December 31, 2018 and 2017. The minimum lease payments under our non-cancellable capital leases with lease terms in excess of one year are less than $1 million in each of the next five years.

Environmental Matters
The Company is subject to a variety of environmental and pollution control laws and regulations in all jurisdictions in which it operates. The Company has been notified by the U.S. Environmental Protection Agency, other national environmental agencies, and various provincial and state agencies it may be a potentially responsible party ("PRP") under such laws for the cost of remediating hazardous substances pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") and other national and state or provincial environmental laws. PRP designation typically requires the funding of site investigations and subsequent remedial activities. Many of the sites that are likely to be the costliest to remediate are often current or former commercial waste disposal facilities to which numerous companies sent wastes. Despite the potential joint and several liability which might be imposed on the Company under CERCLA and some of the other laws pertaining to these sites, its share of the total waste sent to these sites generally has been small. The Company believes its exposure for liability at these sites is limited.

On a global basis, the Company has also identified certain other present and former properties at which it may be responsible for cleaning up or addressing environmental contamination, in some cases as a result of contractual commitments and/or federal or state environmental laws. The Company is actively seeking to resolve these actual and potential statutory, regulatory, and contractual obligations.

The Company expenses or capitalizes, as appropriate, expenditures for ongoing compliance with environmental regulations. As of December 31, 2018, the Company has an obligation to remediate or contribute towards the remediation of certain sites, including the sites discussed above at which it may be a PRP. The Company's aggregated estimated share of environmental remediation costs for all these sites on a discounted basis was approximately $40 million as of December 31, 2018, of which $12 million is recorded in accrued expenses and other current liabilities and $28 million is recorded in deferred credits and other liabilities in the consolidated balance sheets. For those locations where the liability was discounted, the weighted average discount rate used was 2.9%. The undiscounted value of the estimated remediation costs was $46 million as of December 31, 2018. The Company's expected payments of environmental remediation costs for non-indemnified locations are estimated to be approximately $10 million in 2019, $6 million in 2020, $3 million in both 2021 and 2022, $2 million in 2023 and $16 million in the aggregate thereafter.

In addition to amounts described above, the Company estimates it will make expenditures for property, plant and equipment for environmental matters of approximately $14 million in 2019 and $7 million in 2020.

Based on information known to the Company from site investigations and the professional judgment of consultants, the Company has established reserves it believes are adequate for these costs. Although the Company believes these estimates of remediation costs are reasonable and are based on the latest available information, the costs are estimates, difficult to quantify based on the complexity of the issues, and are subject to revision as more information becomes available about the extent of remediation required. At some sites, the Company expects other parties will contribute to the remediation costs. In addition, certain environmental statutes provide that the Company's liability could be joint and several, meaning that the Company could be required to pay amounts in excess of its share of remediation costs. The financial strength of the other PRPs at these sites has been considered, where appropriate, in the determination of the estimated liability. The Company does not believe any potential costs associated with its current status as a PRP, or as a liable party at the other locations referenced herein, will be material to its annual consolidated financial position, results of operations, or liquidity.

Antitrust Investigations and Litigation

On March 25, 2014, representatives of the European Commission (EC) were at Tenneco GmbH's Edenkoben, Germany administrative facility to gather information in connection with an ongoing global antitrust investigation concerning multiple automotive suppliers. On the same date, the Company also received a related subpoena from the U.S. Department of Justice ("DOJ").

On November 5, 2014, the DOJ granted conditional leniency to Tenneco, its subsidiaries and its 50% affiliates as of such date ("2014 Tenneco Entities") pursuant to an agreement the Company entered into under the Antitrust Division's Corporate Leniency Policy. This agreement provides important benefits to the 2014 Tenneco Entities in exchange for the Company's self-reporting of matters to the DOJ and its continuing full cooperation with the DOJ's resulting investigation. For example, the DOJ will not bring any criminal antitrust prosecution against the 2014 Tenneco Entities, nor seek any criminal fines or penalties, in connection with the matters the Company reported to the DOJ. Additionally, there are limits on the liability of the 2014 Tenneco Entities related to any follow-on civil antitrust litigation in the United States. The limits include single rather than treble damages, as well as relief from joint and several antitrust liability with other relevant civil antitrust action defendants. These limits are subject to the Company satisfying the DOJ and any court presiding over such follow-on civil litigation.

On April 27, 2017, the Company received notification from the EC that it has administratively closed its global antitrust inquiry regarding the production, assembly, and supply of complete exhaust systems. No charges against the Company or any other competitor were initiated at any time and the EC inquiry is now closed.

Certain other competition agencies are also investigating possible violations of antitrust laws relating to products supplied by the Company and its subsidiaries, including Federal-Mogul. The Company has cooperated and continues to cooperate fully with all of these antitrust investigations, and take other actions to minimize its potential exposure.

The Company and certain of its competitors are also currently defendants in civil putative class action litigation, and are subject to similar claims filed by other plaintiffs, in the United States and Canada. More related lawsuits may be filed, including in other jurisdictions. Plaintiffs in these cases generally allege that defendants have engaged in anticompetitive conduct, in violation of federal and state laws, relating to the sale of automotive exhaust systems or components thereof. Plaintiffs seek to recover, on behalf of themselves and various purported classes of purchasers, injunctive relief, damages and attorneys' fees. However, as explained above, because the DOJ granted conditional leniency to the 2014 Tenneco Entities, the Company's civil liability in U.S. follow-on actions with respect to these entities is limited to single damages and the Company will not be jointly and severally liable with the other defendants, provided that the Company has satisfied its obligations under the DOJ leniency agreement and approval is granted by the presiding court. Typically, exposure for follow-on actions in Canada is less than the exposure for U.S. follow-on actions.

Following the EC's decision to administratively close its antitrust inquiry into exhaust systems in 2017, receipt by the 2014 Tenneco Entities of conditional leniency from the DOJ and discussions during the third quarter of 2017 following the appointment of a special settlement master in the civil putative class action cases pending against the Company and/or certain of its competitors in the United States, the Company continues to vigorously defend itself and/or take actions to minimize its potential exposure to matters pertaining to the global antitrust investigation, including engaging in settlement discussions when it is in the best interests of the Company and its stockholders. For example, in October 2017, the Company settled an administrative action brought by Brazil's competition authority for an amount that was not material. In December 2018, the Company settled a separate administrative action brought by Brazil's competition authority against a Federal-Mogul subsidiary, also for an amount that was not material.

Additionally, in February 2018, the Company settled civil putative class action litigation in the United States brought by classes of direct purchasers, end-payors and auto dealers. No other classes of plaintiffs have brought claims against the Company in the United States. Based upon those earlier developments, including settlement discussions, The Company established a reserve of $132 million in its second quarter 2017 financial results for settlement costs that were probable, reasonably estimable, and expected to be necessary to resolve its antitrust matters globally, which primarily involves the resolution of civil suits and

related claims. Of the $132 million reserve that was established, $79 million was paid through December 31, 2018 resulting in a remaining reserve of $53 million as of December 31, 2018, which is recorded in accrued expenses and other current liabilities in the Company's consolidated balance sheets. While the Company, including its Federal-Mogul subsidiaries, continues to cooperate with certain competition agencies investigating possible violations of antitrust laws relating to products supplied by the Company, and the Company may be subject to other civil lawsuits and/or related claims, no amount of this reserve is attributable to matters with the DOJ or the EC, and no such amount is expected based on current information.

The Company's reserve for its antitrust matters is based upon all currently available information and an assessment of the probability of events for those matters where the Company can make a reasonable estimate of the costs to resolve such outstanding matters. The Company's estimate involves significant judgment, given the number, variety and potential outcomes of actual and potential claims, the uncertainty of future rulings and approvals by a court or other authority, the behavior or incentives of adverse parties or regulatory authorities, and other factors outside of its control. As a result, the Company's reserve may change from time to time, and actual costs may vary. Although the ultimate outcome of any legal matter cannot be predicted with certainty, based on current information, the Company does not expect that any such change in the reserve will have a material adverse impact on the Company's annual consolidated financial position, results of operations or liquidity.

Other Legal Proceedings, Claims and Investigations

For many years the Company has been and continues to be subject to lawsuits initiated by claimants alleging health problems as a result of exposure to asbestos. The Company's current docket of active and inactive cases is less than 500 cases in the United States and less than 50 in Europe.

With respect to the claims filed in the United States, the substantial majority of the claims are related to alleged exposure to asbestos in the Company's line of Walker® exhaust automotive products although a significant number of those claims appear also to involve occupational exposures sustained in industries other than automotive. A small number of claims have been asserted against one of the Company's subsidiaries by railroad workers alleging exposure to asbestos products in railroad cars. The Company believes, based on scientific and other evidence, it is unlikely that U.S. claimants were exposed to asbestos by the Company's former products and that, in any event, they would not be at increased risk of asbestos-related disease based on their work with these products. Further, many of these cases involve numerous defendants, with the number in some cases exceeding 100 defendants from a variety of industries. Additionally, in many cases the plaintiffs either do not specify any, or specify the jurisdictional minimum, dollar amount for damages.

With respect to the claims filed in Europe, the substantial majority relate to occupational exposure claims brought by current and former employees of Federal-Mogul facilities in France and amounts paid out were not material. A small number of occupational exposure claims have also been asserted against Federal-Mogul entities in Italy and Spain.

As major asbestos manufacturers and/or users continue to go out of business or file for bankruptcy, the Company may experience an increased number of these claims. The Company vigorously defends itself against these claims as part of its ordinary course of business. In future periods, the Company could be subject to cash costs or charges to earnings if any of these matters are resolved unfavorably to the Company. To date, with respect to claims that have proceeded sufficiently through the judicial process, the Company has regularly achieved favorable resolutions. Accordingly, the Company presently believes that these asbestos-related claims will not have a material adverse impact on the Company's annual consolidated financial position, results of operations or liquidity.

In connection with Federal-Mogul's emergence from bankruptcy in 2008, trusts were funded and established to assume liability for and resolve Federal-Mogul's legacy asbestos liabilities in the United States and United Kingdom. Accordingly, those legacy liabilities in the United States and United Kingdom have had no ongoing impact on Federal-Mogul, Tenneco or their operations.

The Company is also from time to time involved in other legal proceedings, claims or investigations. Some of these matters involve allegations of damages against the Company relating to environmental liabilities (including toxic tort, property damage and remediation), intellectual property matters (including patent, trademark and copyright infringement, and licensing disputes), personal injury claims (including injuries due to product failure, design or warning issues, and other product liability related matters), taxes, unclaimed property, employment matters, and commercial or contractual disputes, sometimes related to acquisitions or divestitures. Additionally, some of these matters involve allegations relating to legal compliance.

While the Company vigorously defends itself against all of these legal proceedings, claims and investigations and take other actions to minimize its potential exposure, in future periods, the Company could be subject to cash costs or charges to earnings if any of these matters are resolved on unfavorable terms. Although the ultimate outcome of any legal matter cannot be predicted with certainty, based on current information, including the Company's assessment of the merits of the particular claim, except as described above under "Antitrust Investigations", the Company does expect the legal proceedings, claims or investigations currently pending against it will have any material adverse impact on its annual consolidated financial position, results of operations or liquidity.

Asset Retirement Obligations

As a result of the Acquisition, the Company acquired liabilities related to asset retirement obligations (ARO). The Company did not have ARO liabilities as of December 31, 2017. The Company's primary ARO activities relate to the removal of hazardous building materials at its facilities. The Company records an ARO at fair value upon initial recognition when the amount is probable and can be reasonably estimated. ARO fair values are determined based on the Company's determination of what a third party would charge to perform the remediation activities, generally using a present value technique.

The Company maintains ARO liabilities in the consolidated balance sheets as follows:

	December 31 2018
	(Millions)
Accrued expenses and other current liabilities	$ 3
Deferred credits and other liabilities	12
	$ 15

The following is a rollforward of the Company's ARO liability for the year ended December 31, 2018 (in millions):

	December 31 2018
	(Millions)
Balance as of December 31, 2017	$ —
Acquisition of Federal-Mogul	12
Liabilities incurred	3
Liabilities settled/adjustments	—
Balance as of December 31, 2018	$ 15

Warranty Matters

The Company provides warranties on some of its products. The warranty terms vary but range from one year up to limited lifetime warranties on some of its premium aftermarket products. Provisions for estimated expenses related to product warranty are made at the time products are sold or when specific warranty issues are identified with the Company's products. These estimates are established using historical information about the nature, frequency, and average cost of warranty claims. The Company believes the warranty reserve is appropriate; however, actual claims incurred could differ from the original estimates, requiring adjustments to the reserve. The reserve is included in both current and long-term liabilities on the consolidated balance sheets.

Below is a table that shows the activity in the warranty accrual accounts:

	Year Ended December 31		
	2018	2017	2016
		(Millions)	
Beginning balance	$ 32	$ 27	$ 23
Acquisition of Federal-Mogul	17	—	—
Accruals related to product warranties	14	15	19
Reductions for payments made	(18)	(10)	(15)
Ending balance	$ 45	$ 32	$ 27

16 . Share-Based Compensation

The Company's current long-term incentive compensation plan, which was originally adopted in 2006 and amended in 2009, 2013 and 2018, is known as the Tenneco Inc. 2006 Long-Term Incentive Plan (2006 LTIP). The types of awards that may be granted under the 2006 LTIP are stock-options (both incentive and non-qualified stock options), stock appreciation rights (SARs), Full Value Awards (including bonus stock, stock units, restricted stock, restricted stock units (RSUs), deferred stock units, performance stock, and performance stock units (PSUs), and cash incentive awards (including long-term performance units (LTPUs) and cash settled RSUs).

On September 12, 2018, the stockholders of the Company approved an amendment to the 2006 LTIP to increase the shares of common stock available thereunder to 3.0 million . Share-settled awards are settled through the issuance of new shares of Class A Common Stock. As of December 31, 2018 , up to 14.8 million shares of the Company's Class A Common Stock are authorized to be issued under its 2006 LTIP, of which approximately 4,034,413 shares remain authorized for granting under the plan.

In 2018, the Company prospectively changed its vesting policy regarding retirement eligibility and now require a retirement eligible employee (or an employee who becomes retirement eligible) to provide at least one year of service from the grant date in order for the award to vest. If an employee becomes retirement eligible after the first year of vesting but before completion of the three -year term, the Company amortizes the expense for the share-based awards over a period starting at the grant date to the date an employee becomes retirement eligible. Prior to 2018, for employees eligible to retire at grant date, the Company immediately expensed the granted awards.

Director restricted stock awards generally vest on the date of grant. Stock options, RSUs (both cash-settled and share-settled) and restricted stock are time-based service awards and generally vest according to a three -year graded vesting schedule. One-third of the award will vest on the first anniversary of the grant date, one-third of the award will vest on the second anniversary and one-third of the award will vest on the third anniversary.

LTPU and PSU awards generally have a three -year performance period and cliff vest at the end of the period based upon achievement of performance and market targets established at the time of grant. Generally 50% of the award is based on performance targets and 50% is based on market targets. The market target for both LTPUs and PSU is Company total shareholder return (TSR) percentile ranking among peer companies with TSR defined as change in stock price plus dividends paid divided by beginning stock price. The LTPUs have two performance targets, Cumulative EBITDA and Cumulative free cash flow, which are defined in the award. The PSUs have one performance target, Cumulative economic value added, which is defined in the award.

Director restricted stock, restricted stock and RSUs (cash-settled and share-settled) will participate in any dividends during the vesting period, which are subject to the same vesting terms of the award. The dividends are generally paid in cash on the settlement date of the award.

The fair value of restricted stock and RSUs (cash-settled and share-settled) are determined using the average of the high and low trading price of our common stock on the date of measurement. The fair value of LTPU's and PSUs are determined using the probability weighted factors for performance conditions combined with Monte Carlo simulation model for market conditions. The Monte Carlo model utilizes multiple input variables that determine the probability of satisfying the market condition stipulated in the award and calculated the fair value of the award. The starting stock price is based on the trailing 20-day closing stock price as of the beginning of the performance period and the closing stock price on the valuation date, as well as the respective stock prices for component companies. The risk-free rate is based on yields observed on the U.S. Treasury constant maturity notes with a term equal to the remaining term of the award being measured. Expected volatilities utilized in the model are based on historical volatility of the Company and the companies in the S&P 500 index using daily stock price returns prior to the valuation date, commensurate with the remaining performance period at the measurement date. The cross correlation among stock price returns of the Company and each of the component companies in the S&P 500 with the S&P 500 Index are calculated based on daily returns over the trailing period commensurate with the remainder of the performance period at the valuation date.

For our restricted stock, share-settled RSUs and PSUs that have not yet vested, we estimate forfeitures by taking the average of the past actual forfeiture rate for these grants.

Cash-Settled Awards

Prior to 2018, the Company has granted RSUs and LTPUs to certain key employees that are payable in cash. These awards are classified as liabilities and are valued based on the fair value of the award at the grant date and are remeasured at each reporting date until settlement with compensation expense being recognized in proportion to the completed requisite period up until date of settlement. At December 31, 2018 , the LTPUs outstanding included a three -year grant for 2016-2018 payable in the first quarter of 2019, and a three -year grant for 2017-2019 payable in the first quarter of 2020.

Total share-based compensation expense (net of taxes) for the cash-settled awards was a benefit of $1 million in 2018 , and an expense of $4 million and $10 million in 2017 and 2016 , respectively. Share-based compensation expense is included in selling, general and administrative expenses in the consolidated statements of income. As of December 31, 2018 , $2 million of total unrecognized compensation costs is expected to be recognized on the cash-settled awards over a weighted-average period of approximately 1 year.

Share-Settled Awards

The Company has granted restricted stock and stock options to its directors and certain key employees. In addition, beginning in 2018, the Company has granted RSUs and PSUs that are payable in common stock to certain key employees. These awards are settled in shares upon vesting with compensation expense being recognized based on the grant date fair value recognized ratably over the requisite service period if it is probable that the performance target related to the PSUs will be achieved and subsequently adjusted if the probability assessment changes.

Total share-based compensation expense (net of taxes) for the share-settled awards for the years ended December 31, 2018 , 2017 , and 2016 was $11 million , $11 million and $9 million , respectively. Share-based compensation expense is included in selling, general and administrative expenses in the consolidated statements of income.

Stock Options

The Company's nonqualified stock options generally have seven -year terms. There have been no stock options granted since 2014 and all options are currently vested. As such, there was no unrecognized compensation cost related to the Company's stock option awards as of December 31, 2018 .

The following table reflects the status and activity for all options to purchase common stock for the period indicated:

	Year Ended December 31, 2018			
	Shares Under Option	Weighted Avg. Exercise Prices	Weighted Avg. Remaining Life in Years	Aggregate Intrinsic Value
				(Millions)
Options outstanding, January 1, 2018	318,016	$ 46.18	2.3	$ 5
Granted	—	—		
Exercised	(21,823)	29.79		
Forfeited/expired	(2,196)	55.50		
Options outstanding, December 31, 2018	293,997	46.89	1.4	$ —

Cash received from stock option exercises was $1 million in 2018 , $8 million in 2017 , and $16 million in 2016 . Stock options exercised generated a tax shortfall of less than $1 million in 2018 , and an excess tax benefit of $2 million in 2017 and $1 million in 2016 .

As of December 31, 2018 , all outstanding options are exercisable. The total intrinsic value of options exercised during the years ended December 31, 2018 , 2017 , and 2016 was less than $1 million , $ 6 million and $ 11 million , respectively.

As mentioned above, there have been no stock options granted since 2014. Accordingly, no options vested in 2018 . The total fair value of shares vested from options that were granted prior to 2015 was $2 million in 2017 and $4 million in 2016 .

Restricted Stock, Share-Settled RSUs and PSUs
The following table reflects the status for all nonvested restricted stock, share-settled RSUs and PSUs for the period indicated:

	Restricted Stock		Share-Settled RSUs		PSUs	
	Shares	Weighted Avg. Grant Date Fair Value	Units	Weighted Avg. Grant Date Fair Value	Units	Weighted Avg. Grant Date Fair Value
Nonvested balance at January 1, 2018	410,251	$ 53.36	—	$ —	—	$ —
Granted	19,727	54.19	467,358	48.48	248,928	49.32
Vested	(237,342)	51.17	(192)	55.04	—	—
Forfeited	(14,086)	60.87	(26,763)	55.04	(21,879)	50.75
Nonvested balance at December 31, 2018	178,550	55.46	440,403	47.99	227,049	49.18

At December 31, 2018, the PSUs outstanding represent a three-year grant for 2018-2020 payable in the first quarter of 2021.

The total fair value of restricted stock vested was $11 million in 2018 , $14 million in 2017 , and $9 million in 2016 .

As of December 31, 2018 , approximately $25 million of total unrecognized compensation costs is expected to be recognized on the share-settled awards over a weighted-average period of approximately two years.

17 . Shareholders' Equity

Common Stock

Common Stock Outstanding
As discussed in Note 3, Acquisitions and Divestitures , and pursuant to the Amended and Restated Certificate of Incorporation, Class B Common Stock was created, and the Company's existing common stock was reclassified as Class A Common Stock.

The Company has authorized 175,000,000 shares and 135,000,000 shares ($0.01 par value) of Class A Common Stock at December 31, 2018 and 2017 . The Company has authorized 25,000,000 shares ($0.01 par value) of Class B Common Stock at December 31, 2018 .

Total common stock outstanding and changes in common stock issued are as follows:

	Class A Common Stock			Class B Common Stock
	Year Ended December 31			Year Ended December 31
	2018	2017	2016	2018
Shares issued, beginning balance	66,033,509	65,891,930	65,067,132	—
Share issuances (1)	5,651,177	—	—	23,793,669
Issuance pursuant to benefit plans	19,919	34,760	292,514	—
Restricted stock forfeited and withheld for taxes	(51,049)	(126,682)	—	—
Stock options exercised	21,823	233,501	532,284	—
Shares issued, ending balance	71,675,379	66,033,509	65,891,930	23,793,669
Treasury stock	14,592,888	14,592,888	11,655,938	—
Total shares outstanding	57,082,491	51,440,621	54,235,992	23,793,669

(1) Represents an aggregate of 29,444,846 shares of Common Stock delivered to AEP as the Stock Consideration related to Federal-Mogul Acquisition. See Note 3, Acquisitions and Divestitures for additional information.

The rights of the Class A Common Stock and Class B Common Stock are the same, except with respect to voting and conversion. Holders of Class A Common Stock are entitled to one vote per share and holders of Class B Common Stock are not entitled to vote unless a proposed action would diminish their rights, powers or privileges, in which case such action must be unanimously approved by the holders of the Class B Common Stock. Holders of Class A Common Stock have no right to

convert their shares into other securities. Each share of Class B Common Stock will automatically convert into a share of Class A Common Stock upon transfer, with limited exceptions. In addition, if the proposed spin-off of the Company's aftermarket and ride performance business (the "Spin-Off") does not occur by April 1, 2020, each holder of Class B Common Stock may convert its shares into an equal number of shares of Class A Common Stock, provided that the initial Class B holders would not own, in the aggregate, more than 15 percent of the Class A Common Stock following such conversion.

Shareholder Agreement
In connection with the closing of the Federal-Mogul acquisition, on October 1, 2018, the Company, AEP, IEP, and Icahn Enterprises Holdings L.P. ("IEH") entered into a Shareholders Agreement (the "Shareholders Agreement").

Pursuant to the Shareholders Agreement, a designee of IEP will be nominated to the Company's board of directors (the "Board") at each annual meeting of stockholders until the earlier of the Spin-Off date and the date IEP and its affiliates own less than 10% of the outstanding Class A Common Stock and Class B Common Stock, measured as a single class (the "Outstanding Shares").

The Shareholders Agreement prohibits IEP and its affiliates from taking certain actions until the earlier of (i) April 1, 2020, if the Spin-Off has not occurred, and (ii) one year after the date on which IEP and its affiliates cease to own at least 5% of the Outstanding Shares. Prohibited actions include: (i) acquisitions of stock or other securities or any material assets of the Company or any subsidiaries (subject to some exceptions); (ii) participating in a proxy solicitation; (iii) announcing or proposing any extraordinary business combination transaction; and (iv) otherwise seeking to control or influence control of the management, the Board or the policies of the Company.

Until the later of (i) the expiration of the standstill restrictions discussed above and (ii) the time when IEP and its affiliates cease to own at least 10% of the Outstanding Shares, IEP and its affiliates may not transfer any shares (a) to certain specified types of investors and (b) in an amount equal to 5% or more of the Class A Common Stock issued and outstanding (subject to certain carve outs for transfers to certain passive institutional investors).

For so long as IEP and its affiliates own at least 10% of the Outstanding Shares, if the Company proposes to issue any equity securities (other than in an excluded issuance), IEP and its affiliates have certain preemptive rights. The Shareholders Agreement also includes registration rights for IEP.

Share Repurchase Program
During 2015, the Company's Board of Directors approved a share repurchase program, authorizing it to repurchase up to $550 million of its outstanding class A common stock over a three-year period ("2015 Program"). The Company purchased 4,182,613 shares in 2016 through open market purchases, which were funded through cash from operations, at a total cost of $225 million , at an average price of $53.89 per share. These repurchased shares are held as part of the Company's treasury stock.

In February 2017, the Company's Board of Directors authorized the repurchase of up to $400 million of its outstanding common stock over the next three years ("2017 Program"). The 2017 Program included $112 million that remained authorized under the 2015 Program. The Company generally acquires the shares through open market or privately negotiated transactions, and has historically utilized cash from operations. The repurchase program does not obligate the Company to repurchase shares within any specific time or situations.

The Company purchased 2,936,950 shares in 2017 through open market purchases at a total cost of $169 million , at an average price of $57.57 per share. These repurchased shares are held as part of the Company's treasury stock which increased to 14,592,888 at December 31, 2017 from 11,655,938 at December 31, 2016. As of December 31, 2018 , approximately $231 million remained authorized for share repurchases under the 2017 Program.

In 2018, no shares were repurchased under the 2017 Program. No new share repurchase programs were authorized by the Board of Directors in 2018.

Preferred Stock
The Company had 50,000,000 shares of preferred stock ($0.01 par value) authorized at both December 31, 2018 and 2017 . No shares of preferred stock were issued or outstanding at those dates.

18. Changes in Accumulated Other Comprehensive Income (Loss) by Component

The following represents the Company's changes in accumulated other comprehensive income (loss) by component for the years ended December 31, 2018 , 2017, and 2016:

	Year Ended December 31		
	2018	2017	2016
		(In millions)	
Foreign currency translation adjustment:			
Balance at beginning of year	$ (263)	$ (367)	$ (315)
Other comprehensive income (loss) before reclassifications	(134)	104	(49)
Income tax provision (benefit)	2	—	(3)
Other comprehensive income (loss), net of tax	(132)	104	(52)
Balance at end of period	(395)	(263)	(367)
Pension and postretirement benefits:			
Balance at beginning of year	(275)	(292)	(343)
Other comprehensive income (loss) before reclassifications	(47)	2	61
Reclassification to earnings	22	26	19
Other comprehensive income (loss) before tax	(25)	28	80
Income tax provision (benefit)	3	(11)	(29)
Other comprehensive income (loss), net of tax	(22)	17	51
Balance at end of period	$ (297)	$ (275)	$ (292)
Other comprehensive income (loss) attributable to noncontrolling interests, net of tax	$ (2)	$ 2	$ (4)

19. Earnings per Share

The Company computes basic earnings per share by dividing income available to common shareholders by the weighted average number of common shares outstanding. The computation of diluted earnings per share is similar to the computation of basic earnings per share, except that the Company adjusts the weighted average number of shares outstanding to include estimates of additional shares that would be issued if potentially dilutive common shares had been issued. In addition, the Company adjusts income available to common shareholders to include any changes in income or loss that would result from the assumed issuance of the dilutive common shares.

Earnings per share of common stock outstanding were computed as follows:

	Year Ended December 31		
	2018	2017	2016
	(Millions Except Share and Per Share Amounts)		
Net income attributable to Tenneco Inc.	$ 55	$ 198	$ 347
Basic earnings per share —			
Average shares of common stock outstanding	58,625,087	52,796,184	55,939,135
Earnings per average share of common stock	$ 0.93	$ 3.75	$ 6.20
Diluted earnings per share —			
Average shares of common stock outstanding	58,625,087	52,796,184	55,939,135
Effect of dilutive securities:			
Restricted stock and RSUs	93,546	111,062	175,513
Stock options	40,099	119,665	292,788
Average shares of common stock outstanding including dilutive securities	58,758,732	53,026,911	56,407,436
Earnings per average share of common stock	$ 0.93	$ 3.73	$ 6.15

For the years ended December 31, 2018 , 2017 and 2016 , the weighted average number of anti-dilutive potential common shares excluded from the calculation above totaled 257,567 shares, 834 shares and 134,361 shares, respectively.

20 . Segment and Geographic Area Information

In the first quarter of 2018, the Company's reportable segments were revised to reflect the Clean Air, Ride Performance, and Aftermarket businesses. Until the fourth quarter of 2018, the three reportable segments were also the Company's operating segments, and aligned with how the Chief Operating Decision Maker ("CODM") allocated resources and assessed performance against key growth strategies.

As discussed in Note 3, Acquisitions and Divestitures , the Company completed the Acquisition of Federal-Mogul on October 1, 2018 and its results are included in the Powertrain and Motorparts segments. As a result, it was determined the Company has five operating segments consisting of Clean Air, Ride Performance, Aftermarket, Powertrain, and Motorparts businesses. This structure is consistent with how the CODM allocates resources and assesses performance.

With respect to the five segments:

- The Clean Air segment designs, manufactures and distributes a variety of products and systems designed to reduce pollution and optimize engine performance, acoustic tuning and weight on a vehicle for OEMs.
- The Ride Performance segment designs, manufactures and distributes a variety of products and systems designed to reduce and control excessive roll, pitch and bounce of a vehicle through the suspension system for OEM customers.
- The Aftermarket segment designs, manufactures and distributes replacement products for the automotive parts industry including ride performance and clean air products.
- The Powertrain segment focuses on original equipment powertrain products for automotive, heavy duty, and industrial applications.
- The Motorparts segment sells and distributes a broad portfolio of products in the global aftermarket, while also serving OEMs with products including, braking, wipers, and a limited range of chassis components.

As a result of the Acquisition, management changed its key performance measure of segment profitability. Management now uses EBITDA including noncontrolling interests as the key performance measure of segment profitability and uses the measure in its financial and operational decision making processes, for internal reporting, and for planning and forecasting purposes to effectively allocate resources. EBITDA including noncontrolling interests is defined as earnings before interest expense, income taxes, noncontrolling interests, and depreciation and amortization. Prior period operating segment results have been retrospectively recast to reflect the Company's current operating segments and change in key performance measure for segment profitability. Segment assets are not presented as it is not a measure reviewed by the CODM in allocating resources and assessing performance.

EBITDA including noncontrolling interests should not be considered a substitute for results prepared in accordance with US GAAP and should not be considered an alternative to net income, which is the most directly comparable financial measure to EBITDA including noncontrolling interests that is in accordance with US GAAP. EBITDA including noncontrolling interests, as determined and measured by the Company, should not be compared to similarly titled measures reported by other companies.

Segment results for 2018 , 2017 and 2016 are as follows:

	Reportable Segments								
	Clean Air	Ride Performance	Aftermarket	Powertrain	Motorparts	Total	Other	Reclass & Elims	Total
	(Millions)								
At December 31, 2018, and for the Year Ended									
Revenues from external customers	$ 6,707	$ 1,949	$ 1,221	$ 1,112	$ 774	$ 11,763	$ —	$ —	$ 11,763
Intersegment revenues	—	22	—	40	10	72	—	(72)	—
EBITDA including noncontrolling interests	597	66	169	92	(39)	885	(234)	—	651
At December 31, 2017, and for the Year Ended									
Revenues from external customers	$ 6,216	$ 1,807	$ 1,251	$ —	$ —	$ 9,274	$ —	$ —	$ 9,274
Intersegment revenues	—	22	—	—	—	22	—	(22)	—
EBITDA including noncontrolling interests	562	124	193	—	—	879	(245)	—	634
At December 31, 2016, and for the Year Ended									
Revenues from external customers	$ 5,764	$ 1,593	$ 1,240	$ —	$ —	$ 8,597	$ —	$ —	$ 8,597
Intersegment revenues	—	26	—	—	—	26	—	(26)	—
EBITDA including noncontrolling interests	561	153	207	—	—	921	(229)	—	692

Segment EBITDA including noncontrolling interests and the reconciliation to earnings before interest expense, income taxes, and noncontrolling interests are as follow:

	Year Ended December 31		
	2018	2017	2016
	(Millions)		
EBITDA including noncontrolling interests by Segments:			
Clean Air	$ 597	$ 562	$ 561
Ride Performance	66	124	153
Aftermarket	169	193	207
Powertrain	92	—	—
Motorparts	(39)	—	—
Other	(234)	(245)	(229)
Total EBITDA including noncontrolling interests	651	634	692
Less: Depreciation and amortization	(345)	(226)	(213)
Earnings before interest expense, income taxes, and noncontrolling interests	$ 306	$ 408	$ 479
Less: Interest expense	132	72	68
Less: Income tax expense (benefit)	63	71	(4)
Net income	$ 111	$ 265	$ 415

The following customers accounted for 10% or more of the Company's net sales in the last three years. The net sales to both customers were across all segments.

Customer	2018	2017	2016
General Motors Company	12%	14%	17%
Ford Motor Company	12%	13%	13%

	Revenues from external customers (b)			Long-lived assets (c)	
	Year Ended December 31			December 31	
	2018	2017	2016	2018	2017
			(Millions)		
United States	$ 4,488	$ 3,632	$ 3,512	$ 1,341	$ 655
China	1,553	1,283	1,186	687	280
Germany	1,212	798	764	543	144
Poland	731	488	385	319	219
United Kingdom	499	482	387	116	48
Mexico	543	416	352	239	75
India	316	216	159	167	46
Turkey	7	9	9	276	—
Other Foreign (a)	2,414	1,950	1,843	687	298
Reclass & Elims	—	—	—	(107)	—
Consolidated	$ 11,763	$ 9,274	$ 8,597	$ 4,268	$ 1,765

(a) Revenues from external customers and long-lived assets for individual foreign countries other than China, Germany, Poland, United Kingdom, Mexico, India, and Turkey are not material.
(b) Revenues are attributed to countries based on location of the shipper.
(c) Long-lived assets include all long-term assets except goodwill, intangibles and deferred tax assets.

Disaggregation of revenue

Original Equipment

Value added: OE revenue is generated from providing original equipment manufacturers and servicers with products for automotive, heavy duty, and industrial applications. Supply relationships typically extend over the life of the related vehicle, subject to interim design and technical specification revisions, and do not require the customer to purchase a minimum quantity.

Substrate/Pass through sales: Generally, in connection with the sale of exhaust systems to certain OE manufacturers, the Company purchases catalytic converters and diesel particulate filters or components thereof including precious metals ("substrates") on behalf of its customers which are used in the assembled system. These substrates are included in inventory and are "passed through" to the customer at cost, plus a small margin. Since the Company takes title to the substrate inventory and has responsibility for both the delivery and quality of the finished product including the substrates, the revenues and related expenses are recorded at gross amounts. Revenues recognized for substrate sales were $2,500 million , $2,187 million , and $2,028 million for the years ended December 31, 2018 , 2017 and 2016 .

Aftermarket

Aftermarket revenue is generated from providing products for the global vehicle aftermarket to a wide range of warehouse distributors, retail parts stores, and mass merchants that distribute these products to customers ranging from professional service providers to "do-it-yourself" consumers.

Revenue from contracts with customers is disaggregated by product lines, as it depicts the nature and amount of the Company's revenue that is aligned with the Company's key growth strategies. In the following table, revenue is disaggregated accordingly:

	Reportable Segments					
By Customer Type	**Clean Air**	**Ride Performance**	**Aftermarket**	**Powertrain**	**Motorparts**	**Total**
			(Millions)			
Year Ended December 31, 2018						
OE - Substrate	$ 2,500	$ —	$ —	$ —	$ —	$ 2,500
OE - Value add	4,207	1,949	—	1,112	—	7,268
Aftermarket	—	—	1,221	—	774	1,995
Total	$ 6,707	$ 1,949	$ 1,221	$ 1,112	$ 774	$ 11,763
Year Ended December 31, 2017						
OE - Substrate	$ 2,187	$ —	$ —	$ —	$ —	$ 2,187
OE - Value add	4,029	1,807	—	—	—	5,836
Aftermarket	—	—	1,251	—	—	1,251
Total	$ 6,216	$ 1,807	$ 1,251	$ —	$ —	$ 9,274
Year Ended December 31, 2016						
OE - Substrate	$ 2,028	$ —	$ —	$ —	$ —	$ 2,028
OE - Value add	3,736	1,593	—	—	—	5,329
Aftermarket	—	—	1,240	—	—	1,240
Total	$ 5,764	$ 1,593	$ 1,240	$ —	$ —	$ 8,597

	Reportable Segments					
By Geography	**Clean Air**	**Ride Performance**	**Aftermarket**	**Powertrain**	**Motorparts**	**Total**
			(Millions)			
Year Ended December 31, 2018						
North America	$ 2,981	$ 721	$ 758	$ 386	$ 408	$ 5,254
EMEA	2,415	801	399	498	290	4,403
ROW	1,311	427	64	228	76	2,106
Total	$ 6,707	$ 1,949	$ 1,221	$ 1,112	$ 774	$ 11,763
Year Ended December 31, 2017						
North America	$ 2,866	$ 674	$ 786	$ —	$ —	$ 4,326
EMEA	2,143	736	404	—	—	3,283
ROW	1,207	397	61	—	—	1,665
Total	$ 6,216	$ 1,807	$ 1,251	$ —	$ —	$ 9,274
Year Ended December 31, 2016						
North America	$ 2,767	$ 652	$ 818	$ —	$ —	$ 4,237
EMEA	1,872	604	370	—	—	2,846
ROW	1,125	337	52	—	—	1,514
Total	$ 5,764	$ 1,593	$ 1,240	$ —	$ —	$ 8,597

The following table shows the asset expenditure information by reportable segments:

	Year Ended December 31, 2018						
	Clean Air	Ride Performance	Aftermarket	Powertrain	Motorparts	Other unallocated assets	Total
				(Millions)			
Prior year payable on assets	$ 33	$ 22	$ 4	$ —	$ —	$ —	$ 59
Asset additions	202	121	38	81	43	56	541
Less: Current year payable on assets	(38)	(23)	(7)	(23)	(2)	—	(93)
Cash payments for property, plant, and equipment	$ 197	$ 120	$ 35	$ 58	$ 41	$ 56	$ 507

	Year Ended December 31, 2017						
	Clean Air	Ride Performance	Aftermarket	Powertrain	Motorparts	Other unallocated assets	Total
				(Millions)			
Prior year payable on assets	$ 43	$ 19	$ 5	$ —	$ —	$ 1	$ 68
Asset additions	212	145	27	—	—	26	410
Less: Current year payable on assets	(33)	(22)	(4)	—	—	—	(59)
Cash payments for property, plant, and equipment	$ 222	$ 142	$ 28	$ —	$ —	$ 27	$ 419

	Year Ended December 31, 2016						
	Clean Air	Ride Performance	Aftermarket	Powertrain	Motorparts	Other unallocated assets	Total
				(Millions)			
Prior year payable on assets	$ 35	$ 11	$ 4	$ —	$ —	$ —	$ 50
Asset additions	217	96	26	—	—	24	363
Less: Current year payable on assets	(43)	(19)	(5)	—	—	(1)	(68)
Cash payments for property, plant, and equipment	$ 209	$ 88	$ 25	$ —	$ —	$ 23	$ 345

The Other unallocated assets are comprised of software additions not included in segment information.

21. Related Party Transactions

The parties presented in the tables below, other than Montagewerk Abgastechnik Emden GmbH, became related parties of the Company as a result of the Acquisition discussed in Note 3, Acquisitions and Divestitures , with net sales and purchases presented being reflective of activity post acquisition date. Amounts presented as Icahn Automotive Group LLC represent the Company's activity with Auto Plus and Pep Boys. See Note 8, Investment in Nonconsolidated Affiliates , for further information for companies within the tables below that represent equity method investments.

The following table is a summary of net sales to the Company's related parties for the year ended December 31, 2018:

	Year Ended December 31 2018 (Millions)
Net Sales:	
Icahn Automotive Group LLC	$ 52
Anqing TP Powder Metallurgy Company Limited	$ 1
Dongsuh Federal-Mogul Industrial Co., Ltd.	$ 1
Federal-Mogul Powertrain Otomotiv A.S.	$ 11
Federal-Mogul TP Liners, Inc.	$ 2
Montagewerk Abgastechnik Emden GmbH	$ 1

The following table is a summary of purchases made by the Company from its related parties for the year ended December 31, 2018:

	Year Ended December 31 2018 (Millions)
Purchases:	
Anqing TP Goetze Piston Ring Company Limited	$ 16
Anqing TP Powder Metallurgy Company Limited	$ 1
Dongsuh Federal-Mogul Industrial Co., Ltd.	$ 2
Federal-Mogul Powertrain Otomotiv A.S.	$ 53
Federal-Mogul TP Liner Europe Otomotiv Ltd. Sti.	$ 13
Federal-Mogul TP Liners, Inc.	$ 14

The following table is a summary of royalty and other income from the Company's related parties for the year ended December 31, 2018:

	Year Ended December 31 2018 (Millions)
Royalty and Other Income:	
Icahn Automotive Group LLC	$ 1
Federal-Mogul Powertrain Otomotiv A.S.	$ 4
Federal-Mogul TP Liners, Inc.	$ 4

The following table is a summary of amounts due to and from the Company's related parties as of December 31, 2018:

	December 31 2018 (Millions)
Receivables:	
Icahn Automotive Group LLC	$ 60
Anqing TP Goetze Piston Ring Company Limited	$ 1
Anqing TP Powder Metallurgy Company Limited	$ 1
Dongsuh Federal-Mogul Industrial Co., Ltd.	$ 1
Federal-Mogul Powertrain Otomotiv A.S.	$ 9
Federal-Mogul TP Liners, Inc.	$ 2
Payables and accruals:	
Icahn Automotive Group LLC	$ 12
Anqing TP Goetze Piston Ring Company Limited	$ 22
Anqing TP Powder Metallurgy Company Limited	$ 1
Dongsuh Federal-Mogul Industrial Co., Ltd.	$ 2
Federal-Mogul Powertrain Otomotiv A.S.	$ 16
Federal-Mogul TP Liner Europe Otomotiv Ltd. Sti.	$ 1
Federal-Mogul TP Liners, Inc.	$ 7

22 . Quarterly Financial Data (Unaudited)

The following tables present the unaudited quarterly results of operations for the eight quarters ended December 31, 2018 . This quarterly information has been prepared on the same basis as the consolidated financial statements and, in the opinion of management, reflects all adjustments necessary for the fair statement of the information for the periods presented. This data should be read in conjunction with the consolidated financial statements and related disclosures. Operating results for any quarter apply to that quarter only and are not necessarily indicative of results for any future period. The amounts below reflect the revisions as discussed in Note 2, Summary of Significant Accounting Policies and the 2018 amounts will be revised for interim periods in future filings and were not material to the previously issued financial statements.

	Net sales and operating revenues			Cost of sales (exclusive of depreciation and amortization)		
	As Reported	Revision	As Revised	As Reported	Revision	As Revised
Quarter		(Millions)			(Millions)	
2018						
1st	$ 2,574	$ 7	$ 2,581	$ 2,198	$ 4	$ 2,202
2nd	2,537	(4)	2,533	2,159	(2)	2,157
3rd	2,372	(1)	2,371	2,014	—	2,014
4th			4,278			3,698
Full Year			$ 11,763			$ 10,071
2017						
1st	$ 2,292	$ 6	$ 2,298	$ 1,929	$ 3	$ 1,932
2nd	2,317	(3)	2,314	1,949	—	1,949
3rd	2,274	(1)	2,273	1,911	1	1,912
4th	2,391	(2)	2,389	2,020	(1)	2,019
Full Year	$ 9,274	$ —	$ 9,274	$ 7,809	$ 3	$ 7,812

	Earnings before interest expense, income taxes, and noncontrolling interests					Net Income		
	As Reported	Reclass	As Reclassified	Revision	As Revised	As Reported	Revision	As Revised
Quarter			(Millions)				(Millions)	
2018								
1st	$ 117	$ —	$ 117	$ 2	$ 119	$ 58	$ 2	$ 60
2nd	113	—	113	(4)	109	50	(3)	47
3rd	104	—	104	5	109	54	3	57
4th					(31)			(109)
Full Year					$ 306			$ 55
2017								
1st	$ 121	—	$ 121	$ 1	$ 122	$ 59	$ 2	$ 61
2nd	27	(1)	26	(3)	23	(3)	(2)	(5)
3rd	134	—	134	(3)	131	83	(3)	80
4th	135	—	135	(3)	132	68	(6)	62
Full Year	$ 417	$ (1)	$ 416	$ (8)	$ 408	$ 207	$ (9)	$ 198

Quarter	Basic earnings (loss) per share of common stock (1)			Diluted earnings (loss) per share of common stock (1)		
	As Reported	Revision	As Revised	As Reported	Revision	As Revised
		(Millions)			(Millions)	
2018						
1st	$ 1.13	$ 0.04	$ 1.17	$ 1.13	$ 0.04	$ 1.17
2nd	0.98	(0.06)	0.92	0.98	(0.06)	0.92
3rd	1.05	0.06	1.11	1.05	0.06	1.11
4th			(1.35)			(1.35)
Full Year			$ 0.93			$ 0.93
2017						
1st	$ 1.10	$ 0.03	$ 1.13	$ 1.09	$ 0.03	$ 1.12
2nd	(0.05)	(0.04)	(0.09)	(0.05)	(0.04)	(0.09)
3rd	1.57	(0.04)	1.53	1.57	(0.04)	1.53
4th	1.33	(0.14)	1.19	1.33	(0.14)	1.19
Full Year	$ 3.93	$ (0.18)	$ 3.75	$ 3.91	$ (0.18)	$ 3.73

(1) The sum of the quarters may not equal the total of the respective year's earnings per share on either a basic or diluted basis due to changes in the weighted average shares outstanding throughout the year.

23 . Supplemental Guarantor Condensed Consolidating Financial Statements

Basis of Presentation

Substantially all of the Company's existing and future material domestic 100% owned subsidiaries (which are referred to as the Guarantor Subsidiaries) fully and unconditionally guarantee its senior notes on a joint and several basis. However, a subsidiary's guarantee may be released in certain customary circumstances such as a sale of the subsidiary or all or substantially all of its assets in accordance with the indenture applicable to the notes. The Guarantor Subsidiaries are combined in the presentation below.

These consolidating financial statements are presented on the equity method. Under this method, the Company's investments are recorded at cost and adjusted for its ownership share of a subsidiary's cumulative results of operations, capital contributions and distributions, and other equity changes. You should read the condensed consolidating financial information of the Guarantor Subsidiaries in connection with the Company's condensed consolidated financial statements and related notes of which this note is an integral part. These consolidating financial statements have been updated subsequent to the filing of the Form 10-K for the year ended December 31, 2017 to reflect the adoption of certain new accounting standards in the first quarter of 2018.

The accompanying supplemental guarantor consolidating financial statements have been updated to reflect the revision as described in Note 2, Summary of Significant Accounting Policies .

As discussed in Note 3, Acquisitions and Divestitures , the allocation of the purchase price to the assets acquired and liabilities assumed, including the entities to which it is allocated, is preliminary and subject to change during the measurement period.

Distributions

There are no significant restrictions on the ability of the Guarantor Subsidiaries to make distributions to the Company.

STATEMENT OF COMPREHENSIVE INCOME (LOSS)

	Year Ended December 31, 2018				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
Revenues					
Net sales and operating revenues:					
External	$ 4,678	$ 7,085	$ —	$ —	$ 11,763
Affiliated companies	606	725	—	(1,331)	—
	5,284	7,810	—	(1,331)	11,763
Costs and expenses					
Cost of sales (exclusive of depreciation and amortization)	4,570	6,845	(13)	(1,331)	10,071
Selling, general, and administrative	384	377	33	—	794
Depreciation and amortization	153	192	—	—	345
Engineering, research, and development	95	109	—	—	204
Goodwill impairment charge	3	—	—	—	3
	5,205	7,523	20	(1,331)	11,417
Equity earnings of nonconsolidated affiliates	—	—	—	—	—
Other expense (income)					
Loss on sale of receivables	8	8	—	—	16
Non-service postretirement benefit costs	13	9	(2)	—	20
Loss on extinguishment of debt	—	—	10	—	10
Equity in (earnings) losses of nonconsolidated affiliates, net of tax	—	(18)	—	—	(18)
Other (income) expense, net	29	(36)	1	18	12
	50	(37)	9	18	40
Earnings (loss) before interest expense, income taxes and noncontrolling interests	29	324	(29)	(18)	306
Interest expense:					
External, net of interest capitalized	26	12	94	—	132
Affiliated companies, net of interest income	(14)	7	7	—	—
Earnings (loss) before income taxes and noncontrolling interests	17	305	(130)	(18)	174
Income tax expense (benefit)	(30)	93	—	—	63
Equity in net income from affiliated companies	135	—	184	(319)	—
Net income	182	212	54	(337)	111
Less: Net income attributable to noncontrolling interests	—	56	—	—	56
Net income attributable to Tenneco Inc.	$ 182	$ 156	$ 54	$ (337)	$ 55
Comprehensive income (loss) attributable to Tenneco Inc.	$ 159	$ 24	$ (31)	$ (251)	$ (99)

STATEMENT OF COMPREHENSIVE INCOME (LOSS)

	Year Ended December 31, 2017				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
Revenues					
Net sales and operating revenues:					
External	$ 3,889	$ 5,385	$ —	$ —	$ 9,274
Affiliated companies	540	640	—	(1,180)	—
	4,429	6,025	—	(1,180)	9,274
Costs and expenses					
Cost of sales (exclusive of depreciation and amortization)	3,771	5,221	—	(1,180)	7,812
Selling, general, and administrative	352	286	—	—	638
Depreciation and amortization	90	136	—	—	226
Engineering, research, and development	77	81	—	—	158
Goodwill impairment charge	—	11	—	—	11
	4,290	5,735	—	(1,180)	8,845
Other expense (income)					
Loss on sale of receivables	2	3	—	—	5
Non-service postretirement benefit costs	18	(2)	—	—	16
Loss on extinguishment of debt	1	—	—	—	1
Equity in losses of nonconsolidated affiliates, net of tax	—	1	—	—	1
Other (income) expense, net	(2)	(53)	—	53	(2)
	19	(51)	—	53	21
Earnings (loss) before interest expense, income taxes, noncontrolling interests and equity in net income from affiliated companies	120	341	—	(53)	408
Interest expense:					
External, net of interest capitalized	18	5	49	—	72
Affiliated companies, net of interest income	(15)	6	9	—	—
Earnings (loss) before income taxes, noncontrolling interests and equity in net income from affiliated companies	117	330	(58)	(53)	336
Income tax (benefit) expense	(10)	81	—	—	71
Equity in net income from affiliated companies	149	—	265	(414)	—
Net income	276	249	207	(467)	265
Less: Net income attributable to noncontrolling interests	—	67	—	—	67
Net income attributable to Tenneco Inc.	$ 276	$ 182	$ 207	$ (467)	$ 198
Comprehensive income attributable to Tenneco Inc.	$ 282	$ 173	$ 331	$ (467)	$ 319

STATEMENT OF COMPREHENSIVE INCOME (LOSS)

	Year Ended December 31, 2016				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
Revenues					
Net sales and operating revenues:					
External	$ 3,863	$ 4,734	$ —	$ —	$ 8,597
Affiliated companies	526	747	—	(1,273)	—
	4,389	5,481	—	(1,273)	8,597
Costs and expenses					
Cost of sales (exclusive of depreciation and amortization)	3,724	4,675	—	(1,273)	7,126
Selling, general, and administrative	235	278	1	—	514
Depreciation and amortization	87	126	—	—	213
Engineering, research, and development	76	77	—	—	153
	4,122	5,156	1	(1,273)	8,006
Other expense (income)					
Loss on sale of receivables	2	3	—	—	5
Non-service postretirement benefit costs	83	1	—	—	84
Loss on extinguishment of debt	24	—	—	—	24
Other (income) expense, net	8	(24)	—	15	(1)
	117	(20)	—	15	112
Earnings (loss) before interest expense, income taxes, noncontrolling interests and equity in net income from affiliated companies	150	345	(1)	(15)	479
Interest expense:					
External, net of interest capitalized	(26)	4	90	—	68
Affiliated companies, net of interest income	(12)	7	5	—	—
Earnings (loss) before income taxes, noncontrolling interests and equity in net income from affiliated companies	188	334	(96)	(15)	411
Income tax (income) expense	(101)	97	—	—	(4)
Equity in net income from affiliated companies	166	—	452	(618)	—
Net income	455	237	356	(633)	415
Less: Net income attributable to noncontrolling interests	—	68	—	—	68
Net income attributable to Tenneco Inc.	$ 455	$ 169	$ 356	$ (633)	$ 347
Comprehensive income attributable to Tenneco Inc.	$ 464	$ 159	$ 356	$ (633)	$ 346

BALANCE SHEETS

	December 31, 2018				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
ASSETS					
Current assets:					
Cash and cash equivalents	$ 329	$ 364	$ 4	$ —	$ 697
Restricted cash		5	—	—	5
Receivables, net	943	1,629	—	—	2,572
Inventories, net	958	1,287	—	—	2,245
Prepayments and other current assets	254	311	25	—	590
Total current assets	2,484	3,596	29	—	6,109
Property, plant and equipment, net	1,131	2,361	9	—	3,501
Investment in affiliated companies	1,421	—	4,856	(6,277)	—
Long-term receivables, net	9	1	—	—	10
Goodwill	263	383	223	—	869
Intangibles, net	1,007	510	2	—	1,519
Investments in nonconsolidated affiliates	43	501	—	—	544
Deferred income taxes	255	200	12	—	467
Other assets	48	180	—	(15)	213
Total assets	$ 6,661	$ 7,732	$ 5,131	$ (6,292)	$ 13,232
LIABILITIES AND SHAREHOLDERS' EQUITY					
Current liabilities:					
Short-term debt, including current maturities of long-term debt	$ 1	$ 152	$ —	$ —	$ 153
Accounts payable	858	1,894	7	—	2,759
Accrued compensation and employee benefits	88	255	—	—	343
Accrued income taxes	—	52	27	(15)	64
Accrued expenses and other current liabilities	436	488	77	—	1,001
Total current liabilities	1,383	2,841	111	(15)	4,320
Long-term debt	3	32	5,305	—	5,340
Intercompany due to (due from)	2,726	(215)	(2,511)	—	—
Deferred income taxes	—	88	—	—	88
Pension, postretirement benefits and other liabilities	225	705	500	—	1,430
Commitments and contingencies					
Total liabilities	4,337	3,451	3,405	(15)	11,178
Redeemable noncontrolling interests	—	138	—	—	138
Tenneco Inc. shareholders' equity	2,324	3,953	1,726	(6,277)	1,726
Noncontrolling interests	—	190	—	—	190
Total equity	2,324	4,143	1,726	(6,277)	1,916
Total liabilities, redeemable noncontrolling interests and equity	$ 6,661	$ 7,732	$ 5,131	$ (6,292)	$ 13,232

BALANCE SHEETS

	December 31, 2017				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
ASSETS					
Current assets:					
Cash and cash equivalents	$ 7	$ 308	$ —	$ —	$ 315
Restricted cash	—	3	—	—	3
Receivables, net	208	1,113	—	—	1,321
Inventories, net	359	461	—	—	820
Prepayments and other current assets	99	189	—	—	288
Total current assets	673	2,074	—	—	2,747
Property, plant and equipment, net	594	1,097	—	—	1,691
Investment in affiliated companies	1,385	—	1,198	(2,583)	—
Long-term receivables, net	8	1	—	—	9
Goodwill	22	27	—	—	49
Intangibles, net	5	17	—	—	22
Investments in nonconsolidated affiliates	1	1	—	—	2
Deferred income taxes	169	44	—	—	213
Other assets	12	51	—	—	63
Total assets	$ 2,869	$ 3,312	$ 1,198	$ (2,583)	$ 4,796
LIABILITIES AND SHAREHOLDERS' EQUITY					
Current liabilities:					
Short-term debt, including current maturities of long-term debt	$ —	$ 103	$ —	$ —	$ 103
Accounts payable	496	1,086	—	—	1,582
Accrued compensation and employee benefits	24	117	—	—	141
Accrued income taxes	2	25	—	—	27
Accrued expenses and other current liabilities	208	204	12	—	424
Total current liabilities	730	1,535	12	—	2,277
Long-term debt	632	12	714	—	1,358
Intercompany due to (due from)	561	(397)	(164)	—	—
Deferred income taxes	—	11	—	—	11
Postretirement benefits and other liabilities	299	127	—	—	426
Commitments and contingencies					
Total liabilities	2,222	1,288	562	—	4,072
Redeemable noncontrolling interests	—	42	—	—	42
Tenneco Inc. shareholders' equity	647	1,936	636	(2,583)	636
Noncontrolling interests	—	46	—	—	46
Total equity	647	1,982	636	(2,583)	682
Total liabilities, redeemable noncontrolling interests and equity	$ 2,869	$ 3,312	$ 1,198	$ (2,583)	$ 4,796

STATEMENT OF CASH FLOWS

	Year Ended December 31, 2018				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
Operating Activities					
Net cash provided by (used in) operating activities	$ 248	$ 246	$ (36)	$ (19)	$ 439
Investing Activities					
Federal-Mogul acquisition	151	124	(2,469)	—	(2,194)
Proceeds from sale of assets	2	7	—	—	9
Cash payments for property, plant and equipment	(196)	(311)	—	—	(507)
Proceeds from deferred purchase price of factored receivables	—	174	—	—	174
Other	1	3	—	—	4
Net cash used in investing activities	(42)	(3)	(2,469)	—	(2,514)
Financing Activities					
Cash dividends	—	—	(59)	—	(59)
Repayment of term loans and notes	(391)	(62)	—	—	(453)
Proceeds from term loans and notes	—	26	3,400	—	3,426
Debt issuance cost on long-term debt	(15)	—	(80)	—	(95)
Tax impact from stock-based compensation	—	—	—	—	—
Issuance (repurchase) of common shares	—	—	(1)	—	(1)
Decrease in bank overdrafts	—	(5)	—	—	(5)
Borrowings on revolving lines of credit	4,411	114	624	—	5,149
Payments on revolving lines of credit	(4,654)	(127)	(624)	—	(5,405)
Net increase (decrease) in short-term borrowings secured by accounts receivable	—	(30)	—	—	(30)
Intercompany dividends and net (decrease) increase in intercompany obligations	765	(33)	(751)	19	—
Distribution to noncontrolling interests partners	—	(51)	—	—	(51)
Net cash (used in) provided by financing activities	116	(168)	2,509	19	2,476
Effect of foreign exchange rate changes on cash, cash equivalents and restricted cash	—	(17)	—	—	(17)
Increase in cash, cash equivalents and restricted cash	322	58	4	—	384
Cash, cash equivalents and restricted cash, January 1	7	311	—	—	318
Cash, cash equivalents and restricted cash, December 31	$ 329	$ 369	$ 4	$ —	$ 702

STATEMENT OF CASH FLOWS

	Year Ended December 31, 2017				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
Operating Activities					
Net cash provided by (used in) operating activities	$ 284	$ 290	$ (4)	$ (53)	$ 517
Investing Activities					
Proceeds from sale of assets	3	5	—	—	8
Proceeds from sale of equity interest	—	9			9
Cash payments for property, plant and equipment	(164)	(255)	—	—	(419)
Proceeds from deferred purchase price of factored receivables	—	112	—	—	112
Other	(4)	(6)	—	—	(10)
Net cash used in investing activities	(165)	(135)	—	—	(300)
Financing Activities					
Cash dividends	—	—	(53)	—	(53)
Payments of term loans and notes	(10)	(20)	(6)	—	(36)
Proceeds from term loans and notes	136	24	—	—	160
Debt issuance cost on long-term debt	(8)	—	—	—	(8)
Purchase of common stock under the share repurchase program	—	—	(169)	—	(169)
Issuance of common shares	—	—	(1)	—	(1)
Decrease in bank overdrafts	—	(7)	—	—	(7)
Borrowings on revolving lines of credits	3,956	48	2,660	—	6,664
Payments on revolving lines of credits	(3,710)	(49)	(2,978)		(6,737)
Intercompany dividends and net (decrease) increase in intercompany obligations	(485)	(119)	551	53	—
Distribution to noncontrolling interests partners	—	(64)	—	—	(64)
Net cash (used in) provided by financing activities	(121)	(187)	4	53	(251)
Effect of foreign exchange rate changes on cash, cash equivalents and restricted cash	—	3	—	—	3
Decrease in cash, cash equivalents and restricted cash	(2)	(29)	—	—	(31)
Cash, cash equivalents and restricted cash, January 1	9	340	—	—	349
Cash, cash equivalents and restricted cash, December 31	$ 7	$ 311	$ —	$ —	$ 318

STATEMENT OF CASH FLOWS

	Year Ended December 31, 2016				
	Guarantor Subsidiaries	Nonguarantor Subsidiaries	Tenneco Inc. (Parent Company)	Reclass & Elims	Consolidated
			(Millions)		
Operating Activities					
Net cash provided by (used in) operating activities	$ 176	$ 190	$ 23	$ (15)	$ 374
Investing Activities					
Proceeds from sale of assets	—	6	—	—	6
Cash payments for property, plant and equipment	(130)	(215)	—	—	(345)
Proceeds from deferred purchase price of factored receivables	—	110			110
Net cash used in investing activities	(130)	(99)	—	—	(229)
Financing Activities					
Repayments of term loans and notes	—	(29)	(516)	—	(545)
Proceeds from term loans and notes	—	29	500	—	529
Debt issuance cost on long-term debt	—	—	(9)	—	(9)
Purchase of common stock under the share repurchase program	—	—	(225)	—	(225)
Issuance of common shares	—	—	13	—	13
Increase in bank overdrafts	—	10	—	—	10
Borrowings on revolving lines of credit	—	101	5,316	—	5,417
Payments on revolving lines of credit	—	(103)	(5,118)	—	(5,221)
Intercompany dividends and net (decrease) increase in intercompany obligations	(39)	8	16	15	—
Distribution to noncontrolling interests partners	—	(55)	—	—	(55)
Net cash used in financing activities	(39)	(39)	(23)	15	(86)
Effect of foreign exchange rate changes on cash, cash equivalents and restricted cash	—	2	—	—	2
Increase in cash, cash equivalents and restricted cash	7	54	—	—	61
Cash, cash equivalents and restricted cash, January 1	2	286	—	—	288
Cash, cash equivalents and restricted cash, December 31	$ 9	$ 340	$ —	$ —	$ 349

24 . Subsequent Events

Dividend

On February 6, 2019, the Company's Board of Directors declared a cash dividend of $0.25 per share on its Class A Common Stock and Class B Common Stock, payable on March 21, 2019 to shareholders of record as of March 5, 2019.

Öhlins Racing A.B Acquisition

On January 10, 2019 , the Company closed on its acquisition of Öhlins Racing A.B. ("Öhlins"), a Swedish technology company that develops premium suspension systems and components for the automotive and motorsport industries. The purchase price was approximately $160 million . The agreement to acquire Öhlins was signed and announced on November 15, 2018. Given the timing of the acquisition, the Company is in the process of completing the preliminary purchase accounting.

(The preceding notes are an integral part of the foregoing consolidated financial statements.)

SCHEDULE II

TENNECO INC. AND CONSOLIDATED SUBSIDIARIES
SCHEDULE II — VALUATION AND QUALIFYING ACCOUNTS

Description	Balance at Beginning of Year	Additions: Charged to Costs and Expenses	Additions: Charged to Other Accounts	Deductions	Balance at End of Year
			(Millions)		
Allowance for Doubtful Accounts and Notes Receivable Deducted from Assets to Which it Applies:					
Year Ended December 31, 2018	$ 16	5	—	4	$ 17
Year Ended December 31, 2017	$ 16	1	—	1	$ 16
Year Ended December 31, 2016	$ 16	1	—	1	$ 16

Description	Balance at Beginning of Year	Provision Charged (Credited) to Expense	Allowance Changes	Other Additions (Deductions) (a)	Balance at End of Year
			(Millions)		
Deferred Tax Assets- Valuation Allowance:					
Year Ended December 31, 2018	$ 163	—	—	351	$ 514
Year Ended December 31, 2017	$ 145	(1)	—	19	$ 163
Year Ended December 31, 2016	$ 127	18	—	—	$ 145

(a) This amount primarily relates to the acquisition of Federal-Mogul in 2018 of $368 million , and changes in foreign currency exchange rates, primarily the euro, in 2017 and 2018.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE.

None.

ITEM 9A. CONTROLS AND PROCEDURES.

Evaluation of Disclosure Controls and Procedures

An evaluation was carried out under the supervision and with the participation of our management, including our co-Chief Executive Officers and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) and Rule 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act)) as of the end of the period covered by this report. Based on that evaluation, our co-Chief Executive Officers and Chief Financial Officer concluded that the Company's disclosure controls and procedures were effective as of December 31, 2018 to ensure that information required to be disclosed by our Company in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and such information is accumulated and communicated to management as appropriate to allow timely decisions regarding required disclosures.

Management's Report on Internal Control Over Financial Reporting

See Item 8, "Financial Statements and Supplementary Data" for management's report on internal control over financial reporting and the report of our independent registered public accounting firm thereon.

Remediation of Material Weakness

Management previously reported a material weakness in our internal control over financial reporting in our 2017 Form 10-K, filed on February 28, 2018, related to accounting for supplier payments in China. To address the material weakness in accounting for supplier payments, we undertook the following actions in prior 2018 quarters:

(i) We strengthened the China accounting staff by adding personnel who have significant experience in U.S. and international financial reporting;

(ii) We conducted training on the proper accounting for supplier payments in addition to providing training on the code of ethical conduct for China accounting and purchasing personnel;

(iii) We augmented oversight of the China accounting and purchasing functions with qualified personnel in the U.S. and Europe.

During the fourth quarter of 2018, we designed and implemented new processes associated with supplier agreements and payments that include development of policies and procedures, enhancements to supporting documentation, and adding additional levels of review and approval of the transactions recorded. Our testing of our internal control over financial reporting validated that controls and procedures over our accounting for supplier payments operated consistently on a monthly basis during the quarter. Therefore, we determined that the previously reported material weakness related to our accounting for supplier payment process has been remediated as of December 31, 2018.

Changes in Internal Control Over Financial Reporting

On October 1, 2018, Tenneco Inc. completed the acquisition of Federal-Mogul LLC. The acquisition of the Federal-Mogul business and the fourth quarter remediation activities described above are changes in our internal control over financial reporting during the quarter ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

During the quarter ended December 31, 2018 , there were no other changes in Tenneco's internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) that have materially affected, or are reasonably likely to materially affect Tenneco's internal control over financial reporting.

ITEM 9B. OTHER INFORMATION.

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE.

The sections entitled "Election of Directors" and "Corporate Governance" in our definitive Proxy Statement for the Annual Meeting of Stockholders to be held May 15, 2019 are incorporated herein by reference. In addition, Item 4.1 of this Annual Report on Form 10-K, which appears at the end of Part I, is incorporated herein by reference.

A copy of our Code of Ethical Conduct for Financial Managers, which applies to our Chief Executive Officer, Chief Financial Officer, Controller and other key financial managers, is filed as Exhibit 14 to this Form 10-K. We have posted a copy of the Code of Ethical Conduct for Financial Managers on our Internet website at *www.tenneco.com* . We will make a copy of this code available to any person, without charge, upon written request to Tenneco Inc., 500 North Field Drive, Lake Forest, Illinois 60045, Attn: General Counsel. We intend to satisfy the disclosure requirement under Item 5.05 of Form 8-K and applicable NYSE rules regarding amendments to or waivers of our Code of Ethical Conduct by posting this information on our Internet website at *www.tenneco.com* .

ITEM 11. EXECUTIVE COMPENSATION.

The sections entitled "Executive Compensation" and "Compensation/Nominating/Governance Committee Report on Executive Compensation" in our definitive Proxy Statement for the Annual Meeting of Stockholders to be held on May 15, 2019 are incorporated herein by reference.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS.

The section entitled "Ownership of Common Stock" in our definitive Proxy Statement for the Annual Meeting of Stockholders to be held on May 15, 2019 is incorporated herein by reference.

Securities Authorized for Issuance under Equity Compensation Plans

The following table shows, as of December 31, 2018 , information regarding outstanding awards available under our compensation plans (including individual compensation arrangements) under which our equity securities may be delivered:

Plan category	(a) Number of securities to be issued upon exercise of outstanding options, warrants and rights (1)	(b) Weighted-average exercise price of outstanding options, warrants and rights	(c) Number of securities available for future issuance (excluding shares in column (a)) (1)
Equity compensation plans approved by security holders:			
Stock Ownership Plan (2)	1,261	$ 19.08	—
2006 Long-Term Incentive Plan (as amended) (3)	1,187,537	$ 48.62	4,034,413

(1) Reflects the number of shares of the Company's common stock. Does not include 219,868 shares that may be issued in settlement of common stock equivalent units that were (i) credited to outside directors as payment for their retainer and other fees or (ii) credited to any of our executive officers who have elected to defer a portion of their compensation. In general, these units are settled in cash. At the option of the Company, however, the units may be settled in shares of the Company's common stock.

(2) This plan terminated as to new awards upon adoption of our 2006 Long-term Incentive Plan (except awards pursuant to commitments outstanding on that date).

(3) Does not include 178,550 shares subject to outstanding restricted stock (vest over time) as of December 31, 2018 that were issued at a weighted average grant date fair value of $55.46. Under this plan, as of December 31, 2018 , a maximum of 2,707,660 shares remained available for delivery under full value awards (i.e., bonus stock, stock equivalent units, performance units, restricted stock and restricted stock units).

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE.

The subsections entitled "The Board of Directors and its Committees" and "Transactions with Related Persons" under the section entitled "*Corporate Governance*" *in our definitive Proxy Statement for the Annual Meeting of Stockholders to be held on May 15, 2019 are* incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES.

The sections entitled "Ratify Appointment of Independent Public Accountants — Audit, Audit-Related, Tax and All Other Fees" and "Ratify Appointment of Independent Public Accountants — Pre-Approval Policy" in our definitive Proxy Statement for the Annual Meeting of Stockholders to be held on May 15, 2019 are incorporated herein by reference.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES.

CONSOLIDATED FINANCIAL STATEMENTS INCLUDED IN ITEM 8

See "Index to Financial Statements of Tenneco Inc. and Consolidated Subsidiaries" set forth in Item 8, "Financial Statements and Supplementary Data" for a list of financial statements filed as part of this Report.

INDEX TO SCHEDULE INCLUDED IN ITEM 8

	Page
Schedule of Tenneco Inc. and Consolidated Subsidiaries — Schedule II — Valuation and qualifying accounts — three years ended December 31, 2018	160

SCHEDULES OMITTED AS NOT REQUIRED OR INAPPLICABLE

Schedule I — Condensed financial information of registrant
Schedule III — Real estate and accumulated depreciation
Schedule IV — Mortgage loans on real estate
Schedule V — Supplemental information concerning property — casualty insurance operations

EXHIBITS

The following exhibits are filed with this Annual Report on Form 10-K for the fiscal year ended December 31, 2018 , or incorporated herein by reference (exhibits designated by an asterisk are filed with the report; all other exhibits are incorporated by reference):

INDEX TO EXHIBITS

Exhibit Number		Description
2.1	—	Membership Interest Purchase Agreement, dated as of April 10, 2018 by and among the Company, Federal-Mogul LLC, American Entertainment Properties Corp. and Icahn Enterprises L.P. (incorporated herein by reference to Exhibit 2.1 of the registrant's Current Report on Form 8-K filed April 10, 2018. File No. 1-12387).
3.1	—	Amended and Restated Certificate of Incorporation of Tenneco Inc. (incorporated herein by reference to Exhibit 3.1 of the registrant's Current Report on Form 8-K dated October 1 2018, File No. 1-12387).
3.2	—	By-laws of the registrant, as amended and restated effective October 1, 2018 (incorporated herein by reference to Exhibit 3.2 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.1	—	Specimen stock certificate for Tenneco Inc. common stock (incorporated herein by reference to Exhibit 4.3 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2006, File No. 1-12387).
4.2	—	Shareholders Agreement, dated as of October 1, 2018 by and among the Company, American Entertainment Properties Corp., Icahn Enterprises Holdings L.P. and Icahn Enterprises L.P. (incorporated herein by reference to Exhibit 4.1 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.3(a)	—	Credit Agreement, dated as of October 1, 2018, among Tenneco Inc., Tenneco Automotive Operating Company Inc., JPMorgan Chase Bank, N.A., as Administrative Agent, and the other lenders party thereto (incorporated herein by reference to Exhibit 10.01 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.3(b)	—	Guarantee Agreement, dated as of October 1, 2018, among Tenneco Inc., the Guarantors party thereto and JPMorgan Chase Bank, N.A., as Administrative Agent (incorporated herein by reference to Exhibit 10.02 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.3(c)	—	Collateral Agreement, dated as of October 1, 2018, among Tenneco Inc., various subsidiaries to Tenneco, Inc. party thereto and Wilmington Trust, National Association, as Collateral Trustee (incorporated herein by reference to Exhibit 10.03 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.4	—	Indenture, dated December 5, 2014, among the registrant, various subsidiaries of the registrant and U.S, Bank National Association, as trustee (incorporated herein by reference to Exhibit 4.1 of the registrant's Current Report on Form 8-K filed December 5, 2014, File No. 1-12387).
4.5	—	First Supplemental Indenture, dated December 5, 2014, among the registrant, various subsidiaries of the registrant and U.S. Bank National Association, as trustee (incorporated herein by reference to Exhibit 4.2 of the registrant's Current Report on Form 8-K filed December 5, 2014, File No. 1-12387).
4.6	—	Second Supplemental Indenture, dated as of June 13, 2016, among Tenneco Inc., the guarantors named therein and U.S. Bank National Association, as trustee (incorporated by reference to Exhibit 4.1 to the registrant's Current Report on Form 8-K dated June 13, 2016, File No. 1-12387).
4.7	—	Indenture, dated as of March 30, 2017, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, Wilmington Trust, National Association, as Trustee, The Bank of New York Mellon, London Branch, as Paying Agent, and The Bank of New York Mellon SA/NV, Luxembourg Branch (formerly. The Bank of New York Mellon (Luxembourg) S.A.), as Registrar (including the form of 4.875% Senior Secured Notes due 2022 and the form of Floating Rate Senior Secured Notes due 2024) (incorporated herein by reference to Exhibit 4.01 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.8	—	First Supplemental Indenture, dated as of April 4, 2018, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, Wilmington Trust, National Association, as Trustee, and Bank of America, N.A. and Citibank, N.A. as Co-Collateral Trustees (incorporated herein by reference to Exhibit 4.02 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).

Exhibit Number		Description
4.9	—	Second Supplemental Indenture, dated as of July 30, 2018, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, and Wilmington Trust, National Association, as Trustee (incorporated herein by reference to Exhibit 4.03 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.10	—	Third Supplemental Indenture, dated as of September 18, 2018, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, and Wilmington Trust, National Association, as Trustee (incorporated herein by reference to Exhibit 4.04 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.11	—	Fourth Supplemental Indenture, dated as of October 1, 2018, among Tenneco Inc. (as successor by merger to Federal-Mogul LLC) and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, and Wilmington Trust, National Association, as Trustee (incorporated herein by reference to Exhibit 4.05 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.12	—	Collateral Agreement, dated as of March 30, 2017, among Federal-Mogul LLC, as Company and Issuer, and certain of its subsidiaries in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.06 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.13	—	Assumption Agreement, dated as of July 30, 2018, made by Federal-Mogul Products Company LLC and Federal-Mogul Ignition LLC in favor of Bank of America, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.07 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.14	—	Assumption Agreement, dated as of September 18, 2018, made by Federal-Mogul New Products, Inc. and Federal-Mogul Products US LLC in favor of Bank of America, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.08 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.15	—	Assumption Agreement, dated as of October 1, 2018, made by Tenneco Inc., Tenneco Automotive Operating Company Inc., Tenneco International Holding Corp., Tenneco Global Holdings Inc., TMC Texas Inc., The Pullman Company and Clevite Industries Inc. in favor of Wilmington Trust, National Association, as Collateral Trustee (incorporated herein by reference to Exhibit 4.09 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.16	—	Amended and Restated Collateral Trust Agreement, dated as of April 15, 2014, among Federal-Mogul Holdings Corporation, certain of its subsidiaries and Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.10 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.17	—	Assumption Agreement, dated as of July 29, 2014, made by FM Motorparts TSC, Inc. (as predecessor to F-M Motorparts TSC LLC) in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.11 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.18	—	Assumption Agreement, dated as of July 23, 2015, made by F-M TSC Real Estate Holdings LLC in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.12 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.19	—	Assumption Agreement, dated as of July 28, 2015, made by Federal-Mogul Valve Train International LLC in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.13 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.20	—	Assumption Agreement, dated as of August 12, 2015, made by Federal-Mogul Sevierville, Inc. (as predecessor to Federal-Mogul Sevierville, LLC) in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.14 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.21	—	Assumption Agreement, dated as of July 14, 2016, made by Beck Arnley Holdings LLC and Federal-Mogul Filtration LLC in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.15 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).

4.22 — Assumption Agreement, dated as of March 30, 2017, made by Federal-Mogul Financing Corporation in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.16 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).

4.23 — Collateral Trust Joinder, dated as of March 30, 2017, by Wilmington Trust, National Associate, as Trustee, and acknowledged by Citibank, N.A, as Collateral Trustee (incorporated herein by reference to Exhibit 4.17 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).

4.24 — Collateral Trust Joinder, dated as of June 29, 2017 by The Bank of New York Mellon, London Branch, as Trustee, and acknowledged by Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.18 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).

Exhibit Number		Description
4.25	—	Assumption Agreement, dated as of July 30, 2018 made by Federal-Mogul Products Company LLC and Federal-Mogul Ignition LLC in favor of Bank of America, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.19 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.26	—	Assumption Agreement, dated as of September 18, 2018 made by Federal-Mogul New Products, Inc. and Federal-Mogul Products US LLC in favor of Bank of America, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.20 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.27	—	Assumption Agreement to Collateral Trust Agreement, dated as of October 1, 2018, made by Tenneco Inc., Tenneco Automotive Operating Company Inc., Tenneco International Holding Corp., Tenneco Global Holdings Inc., TMC Texas Inc., The Pullman Company and Clevite Industries Inc. in favor of Wilmington Trust, National Association, as Collateral Trustee (incorporated herein by reference to Exhibit 4.21 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.28	—	Pari Passu Intercreditor Agreement, dated as of March 30, 2017, among Credit Suisse AG, Cayman Islands Branch, as Tranche C Term Administrative Agent for the applicable PP&E Credit Agreement Secured Parties, Citibank, N.A., as Collateral Trustee, and Wilmington Trust, National Association, as the Initial Other Authorized Representative (incorporated herein by reference to Exhibit 4.22 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.29	—	Indenture, dated as of June 29, 2017, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, The Bank of New York Mellon, London Branch, as Trustee and Paying Agent, and The Bank of New York Mellon SA/NV, Luxembourg Branch (formerly, The Bank of New York Mellon (Luxembourg S.A.), as Registrar (incorporated herein by reference to Exhibit 4.23 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.30	—	First Supplemental Indenture, dated as of April 4, 2018, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, The Bank of New York Mellon, London Branch, as Trustee, and Bank of America, N.A. and Citibank, N.A., as Co-Collateral Trustees (incorporated herein by reference to Exhibit 4.24 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.31	—	Second Supplemental Indenture, dated as of July 30, 2018, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto and The Bank of New York Mellon, London Branch, as Trustee (incorporated herein by reference to Exhibit 4.25 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.32	—	Third Supplemental Indenture, dated as of September 18, 2018, among Federal-Mogul LLC and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto and The Bank of New York Mellon, London Branch, as Trustee (incorporated herein by reference to Exhibit 4.26 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.33	—	Fourth Supplemental Indenture, dated as of October 1, 2018, among Tenneco Inc. (as successor by merger to Federal-Mogul LLC) and Federal-Mogul Financing Corporation, as Issuers, the Guarantors party thereto, and The Bank of New York Mellon, London Branch, as Trustee (incorporated herein by reference to Exhibit 4.27 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.34	—	Collateral Agreement, dated as of June 29, 2017, among Federal-Mogul LLC, as Company and Issuer, and certain of its subsidiaries in favor of Citibank, N.A., as Collateral Trustee (incorporated herein by reference to Exhibit 4.28 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.35	—	Assumption Agreement, dated as of July 30, 2018, made by Federal-Mogul Products Company LLC and Federal-Mogul Ignition LLC in favor of Bank of America, N.A. as Collateral Trustee (incorporated herein by reference to Exhibit 4.29 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.36	—	Assumption Agreement, dated as of September 18, 2018, made by Federal-Mogul New Products, Inc. and Federal-Mogul Products US LLC in favor of Bank of America, N.A. as Collateral Trustee (incorporated herein by reference to Exhibit 4.30 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).

4.37 — Assumption Agreement, dated as of October 1, 2018, made by Tenneco Inc., Tenneco Automotive Operating Company Inc., Tenneco International Holding Corp., Tenneco Global Holdings Inc., TMC Texas Inc., The Pullman Company and Clevite Industries Inc. in favor of Wilmington Trust, National Association, as Collateral Trustee (incorporated herein by reference to Exhibit 4.31 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).

Exhibit Number		Description
4.38	—	Joinder No. 1 to Pari Passu Intercreditor Agreement, dated as of June 29, 2017, among The Bank of New York Mellon, London Branch, as Trustee, Citibank, N.A., as Collateral Trustee, Credit Suisse, AG, Cayman Islands Branch, as Tranche C Term Administrative Agent and an Authorized Representative, and Wilmington Trust National Association, as Initial Other Authorized Representative (incorporated herein by reference to Exhibit 4.32 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.39	—	Collateral Trustee Resignation and Appointment Agreement, dated as of February 23, 2018, among Bank of America, N.A., as Co-Collateral Trustee, successor Collateral Trustee and ABL Agent, Citibank. N.A., as Co-Collateral Trustee and resigning Collateral Trustee, Credit Suisse AG, Cayman Islands Branch, as PP&E First Lien Agent, Wilmington Trust, National Association, as PP&E First Lien Agent, The Bank of New Mellon, London Branch, as PP&E First Lien Agent, Federal-Mogul LLC and the other Loan Parties party thereto (incorporated herein by reference to Exhibit 4.33 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.40	—	Collateral Trustee Resignation and Appointment, Joinder, Assumption and Designation Agreement, dated as of October 1, 2018, among Wilmington Trust, National Association, as Co-Collateral Trustee, successor Collateral Trustee and PP&E First Lien Agent, Bank of America, N.A., as Co-Collateral Trustee and Retiring Collateral Trustee, the Bank of New York Mellon, London Branch, as PP&E First Lien Agent, JPMorgan Chase Bank, N.A., as Authorized Agent, Tenneco Inc. and the other Loan Parties party thereto (incorporated herein by reference to Exhibit 4.34 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.41	—	Third Supplemental Indenture, dated October 1, 2018, among Tenneco Inc., as issuer, the Guarantors party thereto and U.S. Bank National Association, as trustee (the "Trustee") (incorporated herein by reference to Exhibit 4.35 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.42	—	Fourth Supplemental Indenture, dated October 1, 2018, among Tenneco Inc., as issuer, the Guarantors party thereto and the Trustee (incorporated herein by reference to Exhibit 4.36 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.43	—	Joinder No. 2 to Pari Passu Intercreditor Agreement, dated as of October 1, 2018, among JPMorgan Chase Bank, N.A., as Additional Senior Class Debt Representative, Wilmington Trust, National Association, as Collateral Trustee, Wilmington Trust, National Association, as Initial Other Authorized Representative, The Bank of New York Mellon, London Branch, as an Authorized Representative (incorporated herein by reference to Exhibit 4.37 of the registrant's Current Report on Form 8-K dated October 1, 2018, File No. 1-12387).
4.44	—	The registrant is a party to other agreements for unregistered long-term debt securities, which do not exceed 10% of the registrant's total assets. The registrant agrees to furnish a copy of such agreements to the Commission upon request.
9	—	None.
+10.1	—	Stock Ownership Plan (incorporated herein by reference to Exhibit 10.14 of the registrant's Registration Statement on Form S-4, Reg.
+10.2	—	Supplemental Executive Retirement Plan (incorporated herein by reference to Exhibit 10.13 of the registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2000, File No. 1-12387).
+10.3	—	Form of Indemnity Agreement entered into between the registrant and Paul Stecko (incorporated herein by reference to Exhibit 10.29 of the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2000, File No. 1-12387).
+10.4	—	Amendment No. 1 to the Supplemental Executive Retirement Plan (incorporated herein by reference to Exhibit 10.40 of the registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2005, File No. 1-12387).
+10.5	—	Supplemental Retirement Plan (incorporated herein by reference to Exhibit 10.43 of the registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2005, File No. 1-12387).
+10.6	—	Form of First Amendment to the Tenneco Inc. Supplemental Retirement Plan (incorporated herein by reference to Exhibit 10.57 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2006, File No. 1-12387).
+10.7	—	Tenneco Inc. Change in Control Severance Benefit Plan for Key Executives, as Amended and Restated effective December 12, 2007 (incorporated herein by reference to Exhibit 10.61 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2008, File No. 1-12387).

Exhibit Number		Description
+10.8	—	Code Section 409A Amendment to Supplemental Retirement Plan (incorporated herein by reference to Exhibit 10.71 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2008, File No. 1-12387).
+10.9	—	Tenneco Inc. 2006 Long-Term Incentive Plan (as amended and restated effective March 11, 2009) (incorporated herein by reference to Appendix A of the registrant's proxy statement on Schedule 14A, filed with the Securities and Exchange Commission on March 31, 2009, File No. 1-12387).
+10.10	—	First Amendment to Tenneco Inc. Change in Control Severance Benefit Plan for Key Executives, as Amended and Restated effective December 12, 2007 (incorporated herein by reference to Exhibit 10.3 of the registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2011, File No. 1-12387).
+10.11	—	Form of Non-Qualified Stock Option Agreement for Employees under Tenneco Inc. 2006 Long-Term Incentive Plan (incorporated herein by reference to Exhibit 10.3 of the registrant's Current Report on Form 8-K dated January 18, 2012. File No. 1-12387).
+10.12	—	Letter Agreement between Tenneco Inc. and Gregg M. Sherrill (incorporated herein by reference to Exhibit 99.2 of the registrant's Current Report on Form 8-K dated as of January 5, 2007. File No. 1-12387).
+10.13	—	Letter Agreement between Tenneco Inc. and Gregg M. Sherrill, dated as of January 15, 2007 (incorporated herein by reference to Exhibit 99.1 of the registrant's Current Report on Form 8-K dated as of January 15, 2007, File No. 1-12387).
+10.14	—	Code Section 409A Amendment to Letter Agreement between the registrant and Gregg M. Sherrill (incorporated herein by reference to Exhibit 10.74 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2008, File No. 1-12387).
+10.15	—	Amended and Restated Tenneco Inc. 2006 Long-Term Incentive Plan (effective March 18, 2013) (incorporated by reference to Appendix A of the Company's Proxy Statement on Schedule 14A, filed with the Securities Exchange Commission on April 3, 2013).
+10.16	—	Form of Restricted Stock Unit Award Agreement under the Tenneco Inc. 2006 Long-Term Incentive Plan (awards after May 21, 2013 and before February 2017) (incorporated herein by reference to Exhibit 10.3 of the registrant's Current Report on Form 8-K filed May 21, 2013, File No. 1-12387).
+10.17	—	Form of Stock Option Award Agreement under the Tenneco Inc. 2006 Long-Term Incentive Plan (awards after May 21, 2013 and before February 2017) (incorporated herein by reference to Exhibit 10.4 of the registrant's Current Report on Form 8-K filed May 21, 2013, File No. 1-12387).
+10.18	—	Form of Long-Term Performance Unit Award Agreement under the Tenneco Inc. 2006 Long-Term Incentive Plan (grants after January 14, 2014 and before February 2017) (incorporated herein by reference to Exhibit 99.2 of the registrant's Current Report on Form 8-K filed January 15, 2014, File No. 1-12387).
+10.19	—	Offer Letter to Brian J. Kesseler dated January 6, 2015 (incorporated herein by reference to Exhibit 10.67 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2014, File No. 1-12387).
+10.20	—	Second Amendment to Tenneco Inc. Change in Control Severance Benefit Plan for Key Executives (incorporated by reference to Exhibit 10.1 of registrant's Current Report on form 8-K dated April 28, 2015, File No. 1.12387).
+10.21	—	Form of Restricted Stock Award for Brian J. Kesseler (January 2015 replacement grant) under Tenneco Inc. 2006 Long-Term Incentive Plan (incorporated herein by reference to Exhibit 10.71 of the registrant's Annual Report on Form 10-K for the year ended December 31,2014, File No. 1-12387).
+10.22	—	Tenneco Inc. Deferred Compensation Plan (as Amended and Restated Effective as of August 1, 2013) (incorporated by reference to Exhibit 10.6 of Tenneco Inc.'s Quarterly Report on Form 10-Q for the quarter ended June 30, 2013, File No. 1-12387).
+10.23	—	Amendment No. 1 to Tenneco Inc. 2006 Long-Term Incentive Plan, effective October 10, 2016 (incorporated herein by reference to Exhibit 10.2 to the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2016, File No. 1-12387).
+10.24	—	Notice to Employees of Agreement Amendments and New Options for Withholding, effective October 10, 2016 (incorporated herein by reference to Exhibit 10.5 to the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2016, File No. 1-12387).
+10.25	—	Form of Restricted Stock Award Agreement for Employees under Tenneco Inc. 2006 Long-Term Incentive Plan (for awards commencing February 2017) (incorporated herein by reference to Exhibit 10.78 to the registrant's Annual Report on Form 10-K for the year ended December 31, 2016, File No. 1-12387).
+10.26	—	Form of Long-Term Performance Unit Award Agreement for Employees under Tenneco Inc. 2006 Long-Term Incentive Plan (for awards commencing February 2017) (incorporated herein by reference to Exhibit 10.79 to the registrant's Annual Report on Form 10-K for the year ended December 31, 2016, File No. 1-12387).

Exhibit Number		Description
+10.27	—	Tenneco Inc. Annual Incentive Plan (incorporated herein by reference to Exhibit 10.1 of the registrant's Current Report on Form 8-K filed February 9, 2018. File No. 1-12387).
+10.28	—	Form of Restricted Stock Unit Award Agreement under the Tenneco Inc. 2006 Long-Term Incentive Plan (grants after 2017) (incorporated herein by reference to Exhibit 10.2 of the registrant's Current Report on Form 8-K filed February 9, 2018. File No. 1-12387).
+10.29	—	Form of Performance Share Unit Award Agreement under the Tenneco Inc. 2006 Long-Term Incentive Plan (grants after 2017) (incorporated herein by reference to Exhibit 10.3 of the registrant's Current Report on Form 8-K filed February 9, 2018. File No. 1-12387).
+10.30	—	Offer Letter to Jason M. Hollar dated April 18, 2017 (incorporated herein by reference to Exhibit 10.43 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-12387).
+10.31	—	Offer Letter to Gregg A. Bolt dated December 6, 2012 (incorporated herein by reference to Exhibit 10.44 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-12387).
+10.32	—	Amendment dated June 12, 2013 to Offer Letter to Gregg A Bolt (incorporated herein by reference to Exhibit 10.45 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-12387).
+10.33	—	Offer Letter to Patrick Guo dated March 26, 2007 (incorporated herein by reference to Exhibit 10.46 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-12387).
+10.34	—	Amendment dated February 29, 2012 to Offer Letter to Patrick Guo (incorporated herein by reference to Exhibit 10.47 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-12387).
+10.35	—	Tenneco Inc. Incentive Deferral Plan (incorporated herein by reference to Exhibit 10.48 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-12387).
+10.36	—	Tenneco Inc. Excess Benefit Plan (incorporated herein by reference to Exhibit 10.49 of the registrant's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-12387).
+10.37	—	First Amendment to Tenneco Inc. Excess Benefit Plan, dated October 9, 2018 (incorporated herein by reference to Exhibit 10.5 of the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, File No. 1-12387).
+10.38	—	Amended and Restated Tenneco Inc. 2006 Long-Term Incentive Plan adopted September 12, 2018 (incorporated by reference to Annex D of the registrant's definitive Proxy Statement dated August 2, 2018, File No. 1-12387).
+10.39	—	Addendum, dated July 20, 2018, to Offer Letter to Brian J. Kesseler dated January 6, 2015 (incorporated herein by reference to Exhibit 10.2 of the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, File No. 1-12387).
+10.40	—	Offer Letter to Roger Wood dated July 20, 2018 (incorporated herein by reference to Exhibit 10.3 of the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, File No. 1-12387).
+10.41	—	Tenneco Automotive Operating Company Inc. Severance Benefit Plan and Summary Plan Description, effective as of July 20, 2018 (incorporated herein by reference to Exhibit 10.4 of the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, File No. 1-12387).
+10.42	—	Form of Restricted Stock Unit Agreement under Tenneco Inc. 2006 Long-Term Incentive Plan (Retention Awards) (incorporated herein by reference to Exhibit 10.6 of the registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2018, File No. 1-12387).
*+10.43	—	Tenneco Inc. 2006 Long-Term Incentive Plan Special Restricted Stock Unit and Cash Incentive Award Agreement for Brandon Smith
*+10.44	—	Tenneco Inc. 2006 Long-Term Incentive Plan Special Restricted Stock Unit and Cash Incentive Award Agreement for Jason Hollar
*+10.45	—	Federal-Mogul LLC 2017 Long-Term Incentive Plan Motorparts Segment (for the period January 1, 2017 - December 31, 2019)
*+10.46	—	Federal-Mogul LLC 2017 Long Term Incentive Plan Powertrain Segment (for the period January 1, 2017 - December 31, 2019).
*+10.47	—	Federal-Mogul LLC 2017 Long-Term Incentive Plan Motorparts Segment LTIP Award Agreement (for the period January 1, 2017 - December 31, 2019) effective January 1, 2017
*+10.48	—	Federal-Mogul LLC 2017 Long Term Incentive Plan Powertrain Segment LTIP Award Agreement (for the period January 1, 2017 - December 31, 2019) effective January 1, 2017
*+10.49	—	Federal-Mogul LLC 2018 Long-Term Incentive Plan Motorparts Segment (for the period January 1, 2018 - December 31, 2020)

*+10.50	—	Federal-Mogul LLC 2018 Long-Term Incentive Plan Powertrain (for the period January 1, 2018 - December 31, 2020)
*+10.51	—	Federal-Mogul LLC 2018 Long Term Incentive Plan Motorparts Segment LTIP Award Agreement (for the period January 1, 2018 - December 31, 2020) effective January 1, 2018
*+10.52	—	Federal-Mogul LLC 2018 Long Term Incentive Plan Powertrain Segment LTIP Award Agreement (for the period January 1, 2018 - December 31, 2020) effective January 1, 2018
*+10.53	—	Form of Performance Share Unit Award Agreement under the Tenneco Inc. 2006 Long-Term Incentive Plan (grants after 2018)
11	—	None.
13	—	None.
14	—	Tenneco Inc. Code of Ethical Conduct for Financial Managers (incorporated herein by reference from Exhibit 99.3 to the registrant's Annual Report on Form 10-K for the year ended December 31, 2002, File No. 1-12387).
16	—	None.
18	—	None.

Exhibit Number		Description
*21	—	List of Subsidiaries of Tenneco Inc.
22	—	None.
*23.1	—	Consent of PricewaterhouseCoopers LLP.
*24	—	Powers of Attorney.
*31.1	—	Certification of Brian J. Kesseler under Section 302 of the Sarbanes-Oxley Act of 2002.
*31.2	—	Certification of Roger J. Wood under Section 302 of the Sarbanes-Oxley Act of 2002.
*31.3	—	Certification of Jason M. Hollar under Section 302 of the Sarbanes-Oxley Act of 2002.
*32.1	—	Certification of Brian J. Kesseler, Roger J. Wood and Jason M. Hollar under Section 906 of the Sarbanes-Oxley Act of 2002.
33	—	None.
34	—	None.
35	—	None.
99	—	None.
100	—	None.
101	—	None.
*101.INS	—	XBRL Instance Document.
*101.SCH	—	XBRL Taxonomy Extension Schema Document.
*101.CAL	—	XBRL Taxonomy Extension Calculation Linkbase Document.
*101.DEF	—	XBRL Taxonomy Extension Definition Linkbase Document.
*101.LAB	—	XBRL Taxonomy Extension Label Linkbase Document.
*101.PRE	—	XBRL Taxonomy Extension Presentation Linkbase Document.

* Filed herewith.

\+ Indicates a management contract or compensatory plan or arrangement.

ITEM 16. FORM 10-K SUMMARY.

Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

TENNECO INC.

By /S/ BRIAN J. KESSELER
Brian J. Kesseler
Co-Chief Executive Officer

By /S/ ROGER J WOOD
Roger J. Wood
Co-Chief Executive Officer

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Date: March 15, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934 this report has been signed by the following persons in the capacities indicated on March 15, 2019 .

Signature	Title
*	Chairman and Director
Gregg M. Sherrill	
/s/ BRIAN J. KESSELER	Co-Chief Executive Officer and Director (principal executive officer)
Brian J. Kesseler	
/s/ ROGER J. WOOD	Co-Chief Executive Officer and Director (principal executive officer)
Roger J. Wood	
/s/ JASON M. HOLLAR	Executive Vice President and Chief Financial Officer (principal financial officer)
Jason M. Hollar	
/s/ JOHN S. PATOUHAS	Vice President and Chief Accounting Officer (principal accounting officer)
John S. Patouhas	
*	Director
Keith Cozza	
*	Director
Thomas C. Freyman	
*	Director
Dennis J. Letham	
*	Director
James S. Metcalf	
*	Director
Roger B. Porter	
*	Director
David B. Price, Jr.	
*	Director
Paul T. Stecko	
*	Director
Jane L. Warner	
Denise Gray	Director

*BY: /s/ JASON M. HOLLAR
Jason M. Hollar
Attorney in fact

Exhibit 10.43

TENNECO INC. 2006 LONG-TERM INCENTIVE PLAN
SPECIAL RESTRICTED STOCK UNIT AND
CASH INCENTIVE AWARD AGREEMENT

Participant: Brandon Smith

Effective as of December 10, 2018 (the "Grant Date"), the Participant has been granted (a) a Full Value Award under the Tenneco Inc. 2006 Long-Term Incentive Plan (the "Plan") in the form of restricted stock units with respect to 23,020 shares of Common Stock ("Restricted Stock Units") and (b) a Cash Incentive Award under the Plan in an amount equal to $200,000 (the "Cash Incentive Award"). The Award is subject to the following terms and conditions (sometimes referred to as this "Award Agreement") and the terms and conditions of the Plan as the same has been and may be amended from time to time. Terms used in this Award Agreement are defined elsewhere in this Award Agreement; provided, however, that, capitalized terms used herein and not otherwise defined shall have the meaning set forth in the Plan. The term "Award" as referred to herein includes both the Full Value Award and the Cash Incentive Award.

1. Dividend Cash Amounts. The Full Value Award contains the right to receive cash credits to a hypothetical bookkeeping account (a "Dividend Cash Account") in respect of dividends paid with respect to shares of Common Stock in accordance with the following:

(a) If a dividend with respect to shares of Common Stock is payable in cash, then, as of the applicable dividend payment date, the Participant's Dividend Cash Account shall be credited with an amount (a "Dividend Cash Amount") equal to (i) the cash dividend payable with respect to a share of Common Stock, multiplied by (ii) the number of Restricted Stock Units outstanding on the applicable dividend record date.

(b) If a dividend with respect to shares of Common Stock is payable in shares of Common Stock, then, as of the applicable dividend payment date, the Participant's Dividend Cash Account shall be credited with a Dividend Cash Amount in an amount equal to (i) the number of shares of Common Stock distributed in the dividend with respect to a share of Common Stock, divided by (ii) the Fair Market Value of a share of Common Stock on the dividend payment date, multiplied by (iii) the number of Restricted Stock Units outstanding on the applicable dividend record date.

The Dividend Cash Amounts credited to the Participant's Dividend Cash Account shall be subject to the same vesting provisions as the Restricted Stock Units to which the Dividend Cash Amounts relate and shall be settled in accordance with Paragraph 3. No Dividend Cash Amounts with respect to a Restricted Stock Unit shall be credited under this Award Agreement for any period after the Vesting Date (as defined in Paragraph 2) applicable to such Restricted Stock Unit. Amounts credited to a Participant's Dividend Cash Account shall not be credited with any investment earnings.

2. Vesting and Forfeiture of Restricted Stock Units and Dividend Cash Amounts. All Restricted Stock Units and Dividend Cash Amounts credited to the Participant's Dividend Cash Account shall be unvested unless and until they become vested and nonforfeitable in accordance with this Paragraph 2. Subject to the terms and conditions of this Award Agreement and the Plan, one hundred percent (100%) of the Restricted Stock Units and associated Dividend Cash Amounts awarded hereunder shall vest on the third anniversary of the Grant Date (the "Vesting Date"), provided that the Participant is continuously employed by the Company or a Subsidiary through the applicable Vesting Date. Notwithstanding the foregoing:

(a) if the Participant's Termination Date occurs by reason of Total Disability (as defined below) or death, any unvested Restricted Stock Units that are outstanding on the Termination Date (and any associated Dividend Cash Amounts) shall immediately vest on the Termination Date and the Termination Date shall be the "Vesting Date" for purposes of this Award Agreement; and

(b) upon the occurrence of a Change in Control, unless otherwise specifically prohibited under applicable laws, or by the rules and regulations of any applicable governmental agencies or national securities exchange, all unvested Restricted Stock Units that are outstanding on the Change in Control (and associated Dividend Cash Amounts) shall immediately vest on the Change in Control and the Change in Control shall be the "Vesting Date" for purposes of this Award Agreement.

All Restricted Stock Units and associated Dividend Cash Amounts that are not vested upon the Participant's Termination Date shall immediately expire and shall be forfeited and the Participant shall have no further rights with respect to such Restricted Stock Units or Dividend Cash Amounts. In addition, the Full Value Award is subject to forfeiture if the Participant fails to accept the Full Value Award within the first twelve (12) months following the Grant Date in accordance with procedures established by the Company. In the event of forfeiture for any reason, the balance in the Participant's Dividend Cash Account shall be reduced by the amount of any Dividend Cash Amounts that are forfeited. For purposes of this Award Agreement, the term "Total Disability" means an event that results in the Participant being (A) unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than twelve (12) months, or (B) by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than twelve (12) months, receiving income replacement benefits for a period of not less than three (3) months under an accident and health plan covering employees of the Company or its Subsidiaries.

3. Settlement and Payment of Full Value Award . Subject to the terms and conditions of this Award Agreement, Restricted Stock Units and associated Dividend Cash Amounts that have become vested in accordance with Paragraph 2 shall be settled as of the applicable Vesting Date. The date on which settlement occurs is referred to as the "Settlement Date." Unless otherwise determined by the Committee in accordance with the terms of the Plan or as otherwise provided herein, (a) settlement of the vested Restricted Stock Units on the Settlement Date shall be made in the form of shares of Common Stock with one share of Common Stock being issued in settlement of each Restricted Stock Unit, plus an amount of cash equal to the Fair Market Value of any fractional Restricted Stock Unit being settled as of such Settlement Date and (b) settlement of the vested Dividend Cash Amounts on the Settlement Date shall be paid in a cash lump sum payment. Upon the settlement of any vested Restricted Stock Units, such Restricted Stock Units shall be cancelled and upon payment of any Dividend Cash Amounts the balance in the Participant's Dividend Cash Account shall be reduced by the amount paid to the Participant pursuant to subparagraph (b).

4. Vesting and Payment of Cash Incentive Award . The Cash Incentive Award shall be unvested, and the Participant shall have no right to payment of the Cash Incentive Award, unless and until it becomes vested and nonforfeitable in accordance with this Paragraph 4. Subject to the terms and conditions of this Award Agreement, one hundred percent (100%) of the Cash Incentive Award shall become vested on the date of the consummation of the separation of the Company's aftermarket and ride performance businesses and the Company's powertrain technology business, to be effected through a spin-off (the "Spin-off"), provided that the Participant's Termination Date has not occurred as of the effective date of the Spin-off. If the Spin-off does not occur or if the Participant's Termination Date occurs prior to

the Spin-off, the Participant shall have no right to payment of the Cash Incentive Award. If the Cash Incentive Award becomes vested pursuant to this Paragraph 4, it will be paid to the Participant within thirty (30) days of the Spin-off.

5. Withholding. All Awards and distributions under the Plan, including this Award and any distribution in respect of this Award, are subject to withholding of all applicable taxes, and the delivery of any cash or other benefits under the Plan or this Award is conditioned on satisfaction of the applicable tax withholding obligations. Such withholding obligations may be satisfied, at the Participant's election, (a) through cash payment by the Participant, (b) through the surrender of shares of Common Stock that the Participant already owns, or (c) through the surrender of shares of Common Stock to which the Participant is otherwise entitled under the Plan; provided, however, that any withholding obligations with respect to any Participant shall be satisfied by the method set forth in subparagraph (c) of this Paragraph 5 unless the Participant otherwise elects in accordance with this Paragraph 5; and provided further that any withholding with respect to payments of Dividend Cash Amounts and the Cash Incentive Award shall be satisfied by the method set forth in subparagraph (a) of this Paragraph 5. The amount withheld in the form of shares of Common Stock under this Paragraph 5 may not exceed the minimum statutory withholding obligation (based on the minimum statutory withholding rates for Federal and state purposes, including, without limitation, payroll taxes) unless otherwise elected by the Participant, in no event shall the Participant be permitted to elect less than the minimum statutory withholding obligation, and in no event shall the Participant be permitted to elect to have an amount withheld in the form of shares of Common Stock pursuant to this Paragraph 5 that exceeds the maximum individual tax rate for the employee in applicable jurisdictions.

6. Transferability. This Award is not transferable except as designated by the Participant by will or by the laws of descent and distribution or pursuant to a qualified domestic relations order.

7. Heirs and Successors. If any benefits deliverable to the Participant under this Award Agreement have not been delivered at the time of the Participant's death, such benefits shall be delivered to the Participant's Designated Beneficiary, in accordance with the provisions of this Award Agreement. The "Designated Beneficiary" shall be the beneficiary or beneficiaries designated by the Participant in a writing filed with the Company in such form and at such time as the Company shall require and in accordance with such rules and procedures established by the Company. If a deceased Participant fails to designate a beneficiary, or if the Designated Beneficiary does not survive the Participant, any rights that would have been exercisable by the Participant and any benefits distributable to the Participant shall be distributed to the legal representative of the estate of the Participant.

8. Administration. The authority to administer and interpret this Award and this Award Agreement shall be vested in the Committee, and the Committee shall have all powers with respect to this Award and this Award Agreement as it has with respect to the Plan. Any interpretation of this Award or this Award Agreement by the Committee and any decision made by it with respect to the Award or this Award Agreement is final and binding on all persons.

9. Addendum to Award Agreement. Notwithstanding any provision of this Award Agreement, if the Participant resides and/or works outside the United States of America (the "United States", "U.S." or "U.S.A."), this Award shall be subject to the special terms and conditions set forth in the addendum to this Award Agreement (the "Addendum") for the Participant's country. Further, if the Participant transfers residence and/or employment to another country reflected in the Addendum, the special terms and conditions for such country will apply to the Participant to the extent the Company determines, in its sole discretion, that the application of such special terms and conditions is necessary or advisable for legal or administrative reasons (or the Company may establish alternative terms and conditions as may be necessary or advisable to accommodate the Participant's transfer). The Addendum shall constitute part of this Award Agreement.

10. Adjustment of Award. The number of Restricted Stock Units awarded pursuant to this Award may be adjusted by the Committee in accordance with the Plan to reflect certain corporate

transactions which affect the number, type or value of the Restricted Stock Units. Without limiting the generality of the foregoing, any Restricted Stock Units that are outstanding on the date of the Spin-off, shall be adjusted in connection with the Spin-off in accordance with the adjustment principles applicable to restricted stock units generally in connection with the Spin-off as described in the operative documents relating to the Spin-off provided that fifty percent (50%) of the outstanding Restricted Stock Units will be adjusted and converted into restricted stock units with respect to stock of the spun-off company and fifty percent (50%) of the outstanding Restricted Stock Units will be adjusted and will remain as restricted stock units with respect to stock of the Company.

11. Notices. Any notice required or permitted under this Award Agreement shall be deemed given when delivered personally, or when deposited in a United States Post Office, postage prepaid, addressed, as appropriate, to the Committee or the Company at the Company's principal offices, to the Participant at the Participant's address as last known by the Company or, in any case, such other address as one party may designate in writing to the other.

12. Governing Law. The validity, construction and effect of this Award Agreement shall be determined in accordance with the laws of the State of Illinois and applicable federal law.

13. Amendments. The Board may, at any time, amend or terminate the Plan, and the Committee may amend this Award Agreement, provided that, except as provided in the Plan, no amendment or termination may, in the absence of written consent to the change by the Participant (or, if the Participant is not then living, the affected beneficiary), adversely affect the rights of the Participant or his or her beneficiary under this Award Agreement prior to the date such amendment or termination is adopted by the Board or the Committee, as the case may be.

14. Award Not Contract of Employment. The Award does not constitute a contract of employment or continued service, and the grant of the Award shall not give the Participant the right to be retained in the employ or service of the Company or any Subsidiary, nor any right or claim to any benefit under the Plan or this Award Agreement, unless such right or claim has specifically accrued under the terms of the Plan and this Award Agreement.

15. Unfunded Obligation. The Dividend Cash Account shall not be funded, no trust, escrow or other provisions shall be established to secure payments and distributions due from the Dividend Cash Account and the Dividend Cash Account shall be regarded as unfunded for purposes of the Employee Retirement Income Security Act of 1974, as amended, and the Code. The Participant shall be treated as a general, unsecured creditor of the Company with respect to amounts credited to the Dividend Cash Account, and shall have no rights to any specific assets of the Company. Any amounts credited to the Dividend Cash Account will remain general assets of the Company and shall be payable solely from the general assets of the Company.

16. Severability. If a provision of this Award Agreement is held invalid by a court of competent jurisdiction, the remaining provisions shall nonetheless be enforceable according to their terms. Further, if any provision is held to be overbroad as written, that provision shall be amended to narrow its application to the extent necessary to make the provision enforceable according to applicable law and enforced as amended.

17. Plan Governs. The Award evidenced by this Award Agreement is granted pursuant to the Plan, and this Award and this Award Agreement are in all respects governed by the Plan and subject to all of the terms and provisions thereof, whether such terms and provisions are incorporated in this Award Agreement by reference or are expressly cited.

18. Counterparts. This Award Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original and all of which together shall constitute one and the same instrument.

19. Special Section 409A Rules. It is intended that any amounts payable under this Award Agreement shall either be exempt from or comply with section 409A of the Code. The provisions of this Award shall be construed and interpreted in accordance with section 409A of the Code. Notwithstanding

any other provision of this Award Agreement to the contrary, if any payment or benefit hereunder is subject to section 409A of the Code, and if such payment or benefit is to be paid or provided on account of the Participant's termination of employment (or other separation from service):

(a) and if the Participant is a specified employee (within the meaning of section 409A(a)(2)(B) of the Code) and if any such payment or benefit is required to be made or provided prior to the first day of the seventh month following the Participant's separation from service or termination of employment, such payment or benefit shall be delayed until the first day of the seventh month following the Participant's termination of employment or separation from service; and

(b) the determination as to whether the Participant has had a termination of employment (or separation from service) shall be made in accordance with the provisions of section 409A of the Code and the guidance issued thereunder without application of any alternative levels of reductions of bona fide services permitted thereunder.

ACCEPTED:

PARTICIPANT:

TENNECO INC.:

_____

Electronic Signature

_____

Acceptance Date

Exhibit 10.45

FEDERAL-MOGUL LLC
2017 LONG-TERM INCENTIVE PLAN
MOTORPARTS SEGMENT
For the Period January 1, 2017 – December 31, 2019

I. PURPOSE AND STRUCTURE

The Company's (as defined below) 2017 Long-Term Incentive Plan (this or the " Plan "), established for the 2017 Fiscal Year (as defined below) and the two subsequent Fiscal Years thereafter, is designed to drive a culture focused on long-term company performance. The Plan is intended to deliver "pay-for-performance" through a long-term incentive payment, which is based on overall Company financial performance during the Performance Period to encourage and stimulate superior performance by eligible Participants, and to assist in retaining key employees. In addition, this Plan is intended to be in effect during the Performance Period, subject to the right of the Compensation Committee to amend, modify or terminate this Plan as provided below. All capitalized terms used in the Plan have the meaning assigned to such terms in Section II below unless such terms are otherwise defined in the Plan.

II. DEFINITIONS

Definitions for specific terms used within this Plan are identified below.

A. "Affiliate" means each of the following: (i) any Subsidiary; (ii) any Parent; (iii) any corporation, trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company or one of its Affiliates; (iv) any trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company; and (v) any other entity in which the Company or any of its Affiliates has a material equity interest and which is designated as an "Affiliate" by resolution of the Compensation Committee.

B. "Beneficial Owner " has the meaning assigned to such term in Rule 13d-3 and Rule 13d-5 under the Securities Exchange Act of 1934, as amended, except that in calculating the beneficial ownership of any particular "person" (as that term is used in Section 13(d)(3) of the Securities Exchange Act of 1934, as amended), such "person" will be deemed to have beneficial ownership of all securities that such "person" has the right to acquire by conversion or exercise of other securities, whether such right is currently exercisable or is exercisable only after the passage of time.

C. "Board" means the Board of Directors of the Company.

D. "Bonus Award" is the cash payment that may be earned by Participants in respect of the Performance Period, subject to the eligibility requirements set forth in Section III, achievement by the Company of Performance Metrics set forth in Section V with respect to the Performance Period, and subject to adjustments as provided in this Plan.

E. "Cause" means with respect to a Participant: (i) there has been misconduct or a gross dereliction of duty resulting in either a violation of law or Company policy or procedures, that, in either case, causes significant financial or reputational harm to the Company (or any of its Affiliates), and that such Participant committed the misconduct or gross dereliction of duty, or failed in his or her responsibility to manage or monitor the applicable conduct or risk; (ii) a conduct of such Participant involves an immoral or illegal act which is reasonably likely to impair the reputation of the Company (or any of its Affiliates); (iii) such Participant violated any securities or employment laws or regulations; (iv) such Participant materially breached the Confidentiality and Intellectual Property Assignment Agreement or any non-compete and/or non-solicitation clauses in such Participant's employment letter; or (v) such Participant embezzled and/or misappropriated any property of the Company (or any of its Affiliates) or committed any act involving fraud with respect to the Company (or any of its Affiliates).

F. " Change in Control " means (i) the consummation of any transaction (including, without limitation, any sale of stock, merger, consolidation or spinoff), the result of which is that any Person, other than Carl Icahn or the Related Parties, becomes that Beneficial Owner, directly or indirectly, of more than 50% of the voting power of the voting securities of the Company (or, if applicable, its parent corporation or entity) or (ii) the acquisition by any Person, other than Carl Icahn or the Related Parties, of all or substantially all of the assets of Company; provided, however, that to the extent the definition of Change in Control is applicable to an Bonus Award that constitutes

deferred compensation for purposes of Code Section 409A, the transaction or acquisition shall only constitute a Change in Control for purposes of such Bonus Award to the extent the transaction or acquisition would constitute a change in control under either (i) or (ii) and would also constitute a change in control event as defined in 26 C.F.R. 1.409A-3(i)(5)(i).

G. "Code" means the Internal Revenue Code of 1986, as amended. Any reference to any section of the Code will also be a reference to any successor provision and any Treasury Regulation promulgated there under.

H. "Company" means Federal-Mogul LLC and its subsidiaries and its successors and assigns (with respect to the Motorparts division).

I. "Compensation Committee" means the Compensation Committee of the Board.

J. " Disparagement " means making comments or statements to the press, the Company's or its Affiliates' employees, consultants or any individual or entity with whom the Company or its Affiliates has a business relationship or any other Person or entity which could reasonably be expected to adversely affect in any manner: (i) the conduct of the business of the Company or its Affiliates (including, without limitation, any products or business plans or prospects); or (ii) the business reputation of the Company or its Affiliates, or any of their products, or their past or present officers, directors or employees.

K. "Fiscal Year" means the Company's Fiscal Year beginning January 1 and ending December 31.

L. "Good Standing" has the meaning assigned to it in Section III.

M. "Parent" means any parent corporation of the Company within the meaning of Section 424(e) of the Code.

N. "Participant(s)" refer(s) to the employees listed selected and approved by the Compensation Committee, as long as any such person is eligible to participate in the Plan pursuant to Section III and any other person approved by the Compensation Committee in its sole and absolute discretion.

O. " Performance Metrics " are the Performance Metrics of the Company established by the Compensation Committee with respect to the Performance Period.

P. "Performance Period" means three years in duration, beginning on the first day of the 2017 Fiscal Year and ending on December 31, 2019.

Q. "Person" means any natural person, corporation, limited liability company, or other legal entity.

R. "Recoupment" is a compensation recovery method, provided under the Plan to recover all (or a portion) of a prior Bonus Award based on a correction or restatement of the Company's financial statements or other factors affecting Performance Metrics.

S. "Related Parties" shall mean (i) Carl Icahn, any spouse and any child, stepchild, sibling or descendant of Carl Icahn; (ii) any estate of Carl Icahn or of any Person referred to in clause (i); (iii) any Person who receives a bequest from or beneficial interest in any estate under clause (ii) to the extent of such interest; (iv) any executor, personal administrator or trustee who holds such beneficial interest in the Company for the benefit of, or as fiduciary for, any Person under clauses (i), (ii) or (iii) to the extent of such interest; (v) any Person directly or indirectly owned or controlled by Carl Icahn or any other Person or Persons identified in clauses (i), (ii) (iii) or (iv); and (vi) any not-for-profit entity not subject to taxation pursuant to Section 501(c)(3) of the Internal Revenue Code or any successor provision to which Carl Icahn or any Person identified in clauses (i), (ii) or (iii) above contributes his beneficial interest in the Company or to which such beneficial interest passes pursuant to such Person's will.

T. "Subsidiary" means any subsidiary corporation of the Company within the meaning of Section 424(f) of the Code.

U. "Term" means the period beginning on the date this Plan is adopted by the Compensation Committee, and ending on the date this Plan is terminated by the Compensation Committee. The Compensation Committee shall have the sole and absolute discretion to amend, modify or terminate this Plan at any time.

III. ELIGIBILIT

Y

A Participant may be eligible to participate in the performance cycle if he or she is promoted or hired into an eligible, full-time (defined as 40 hours per week) position before October 1, 2017 and remains employed on such basis through the end of the Performance Period. Eligibility for mid-cycle participation will be based on the proposal of the Chief Executive Officer, subject to review and approval of the Compensation Committee. The following additional conditions shall apply: (i) the Participant must have returned to the Company executed copies of the Integrity Policy Certification Agreement and Confidentiality Agreement, and acknowledged his or her understanding and acceptance of the Company's policies, consistent with the Company's practices and procedures; (ii) the Participant must be employed by the Company on the scheduled date of payment; and (iii) the Participant is subject to all other terms, conditions, restrictions and/or requirements set forth in this Section III. Contingency workers, including temporaries, contractors, consultants and outsourced work teams are not eligible for participation in the Plan.

- **Good Standing.** Participants must be actively employed and in good standing (and otherwise in compliance with the Company's policies and procedures) on the actual bonus pay date in order to receive a payout. Participants placed on a performance improvement plan or in corrective action status as a result of poor performance during the Performance Period, but who return to "Good Standing" status prior to the bonus payment date, may be eligible for a prorated incentive payout, as determined by the Compensation Committee in its sole and absolute discretion. As a condition of the receipt of any Bonus Award, the Participant will be required to certify (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Company's Confidentiality Policy or the non-compete and non-solicitation clauses in his or her employment letter, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Leave of Absence.** Subject to all applicable law, the Compensation Committee may, in its sole and absolute discretion, adjust any Bonus Award, on a pro-rata basis, for any leave of absence taken by a Participant during the Performance Period.

- **Voluntary Separation.** If a Participant voluntarily separates from the Company after the end of the Performance Period, but prior to the applicable Bonus Award payout date, then such Participant's Bonus Award will be deemed forfeited with respect to the Performance Period.

- ***Involuntary Separation.*** *Participants terminated for Cause prior to the payout date will irrevocably forfeit any* Bonus Award under the Plan. The determination of "Cause" will be made by the Compensation Committee in its sole and absolute discretion. Any other Participant whose employment is involuntarily terminated prior to the Bonus Award payout date will be deemed ineligible for payment of a Bonus Award.

- **Forfeiture of Bonus Award.** If a Participant's termination of employment occurs prior to the date a Bonus Award that has been awarded to such Participant is actually paid out, then the Participant will not be entitled to any bonus payment with respect to such Bonus Award. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. As a condition of the receipt of any Bonus Award, a Participant may be required to certify in writing (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Integrity Policy Certification Agreement and Confidentiality Agreement, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Clawback of Bonus Award.** To the extent not prohibited by applicable law, if a Participant is an officer of the Company, or, if applicable, has otherwise been designated by the Board as an "officer" for purposes of Section 16 of the Securities Exchange Act of 1934, as amended, the Compensation Committee shall seek reimbursement of any payment made to such Participant in respect of the Bonus Award in the event of a restatement of the Company's (or any of its subsidiaries') financial results (occurring due to material noncompliance with any financial reporting requirements under applicable securities laws) that reduced a previously granted payment made to such Participant in respect of the Bonus Award. In that event, the Compensation Committee may, in its sole and absolute discretion, seek to recover the amount of any such payment made to the Participant that exceeded the amount that would have been paid based on the restated financial results. To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to a Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that any such amounts are exempt from, or set off in a manner intended to comply with the requirements of, Section 409A of the Code .

IV. TARGET BONUS AWARD

Participants covered by this Plan will be notified of eligibility in writing by the Company. Each Participant's respective target Bonus Award will be separately communicated in writing to each Participant by the Senior Vice President of Human Resources.

V. PERFORMANCE METRICS

The Performance Metrics established for the Plan are based on the Company's financial and operational targets for the Performance Period. The Company must achieve the Performance Metrics established by the Compensation Committee for the Performance Period in order for any payout to occur under the Plan.

The Board or the Compensation Committee may, in its sole and absolute discretion, at any time prior to the final determination of Bonus Awards, increase, decrease or otherwise adjust performance measures, targets, and payout ranges used hereunder as a result of extraordinary or non-recurring events, changes in applicable accounting rules or principles, changes in the Company's methods of accounting, changes in applicable law, changes due to any consolidation, acquisition or reorganization affecting the Company and its subsidiaries or such other material change in the Company's business. The Board or the Compensation Committee, as applicable, will implement such change(s) in its sole and absolute discretion.

VI. COMPUTATION AND DISBURSEMENT OF FUNDS

A. COMPUTATION

The calculation of the Company's financial and operational targets will be based upon the Company's audited financials, subject to review and approval by the Compensation Committee in its sole and absolute discretion and determination by the Compensation Committee in its sole and absolute discretion as to whether or not the Performance Metrics were achieved.

Notwithstanding anything to the contrary in this Plan, if the Compensation Committee determines, in its sole and absolute discretion, that calculations underlying the Performance Metrics, including but not limited to, mistakes in the Company's audited financial statements for the 2017 Fiscal Year or any Fiscal Year were incorrect, then the Compensation Committee may (i) adjust Bonus Awards (upward or downward); and/or (ii) initiate a Recoupment.

B. DISBURSEMENT OF FUNDS

As soon as practicable after the close of the Performance Period, the Company's Chief Financial Officer will calculate the Company's actual performance relative to the Performance Metrics with respect to the Performance Period. Subject to the terms and conditions set forth herein, if (i) the Company achieves the Performance Metrics; and (ii) Participant is an employee in Good Standing on the applicable payout date and no event or condition shall have occurred that would have given the Company the right to terminate the Participant for Cause on or prior to such date (the conditions set forth in (i) and (ii), the "Bonus Conditions"); then Participant will have earned and be entitled to be paid the Bonus Award. The proposed Bonus Award payouts and a list of eligible Participants will be presented to the Compensation Committee no later than ninety (90) days after the end of the Performance Period, and once approved, unless otherwise set forth in an Award agreement, the Bonus Awards will be paid to all eligible and approved Participants within 30 days of such approval but not later than June 30 th of the calendar year immediately succeeding the end of the Performance Period, in each case provided that the Bonus Conditions are met. Payments of the Bonus Awards shall be one-time payments and will be reduced by amounts required to be withheld for taxes and other applicable withholdings at the time such payments are made.

C. TAXES

Income, employment, and any other applicable taxes and withholdings will be withheld from any Bonus Award payments required under the Plan to the extent determined by the Company in accordance with applicable law. In addition, in the sole and absolute discretion of the Company, any applicable employment taxes that are a liability of a Participant may be deducted from Bonus Awards and transmitted to the appropriate tax authority. A Participant who receives payment hereunder also will be issued a Form W-2, Form 1099 or other report as is required by law, and such report also will be filed with taxing authorities as is required by law.

VII. ADMINISTRATION

This Plan will be administered by the Compensation Committee.

In the event of a claim or dispute brought forth by a Participant, the decision of the Compensation Committee as to the facts in the case and the meaning and intent of any provision of the Plan, or its application, will be final, binding, and

conclusive. Notwithstanding anything herein to the contrary, the Compensation Committee shall retain sole and absolute discretion over all matters relating to this Plan.

VIII. NO EMPLOYMENT CONTRACT; FUTURE PLANS

Participation in this Plan will not confer upon any Participant any right to continue in the employ of the Company nor interfere in any way with the right of the Company to terminate any Participant's employment at any time. The Company is under no obligation to continue the Plan in future Fiscal Years.

IX. GENERAL PROVISIONS

A Participant's rights under the Plan will not be assignable, either voluntarily or involuntarily by way of encumbrance, pledge, attachment, level or charge of any nature (except as may be required by state or federal law).

Nothing in the Plan will require the Company to segregate or set aside any funds or other property for the purpose of paying any portion of a Bonus Award. No Participant, beneficiary or other person will have any right, title or interest in any amount awarded under the Plan prior to the payment of such Bonus Award to him or her or the close of any Performance Period, or in any property of the Company or its subsidiaries. A Participant's rights to a Bonus Award under this Plan are no greater than those of unsecured general creditors of the Company.

Notwithstanding anything herein to the contrary, whether or not any Bonus Award is authorized, earned or paid under the Plan shall be determined by the Compensation Committee in its sole and absolute discretion, and no such Bonus Award shall be earned, nor shall any right to any such Bonus Award exist or accrue, unless, among other factors, such Bonus Award has been authorized by the Compensation Committee in its sole and absolute discretion, and actually paid to Participants. In addition, whether or not any Bonus Award is authorized, earned or paid pursuant to the Plan is without regard to whether any of the individual performance metrics, Company financial performance targets and/or goals, or any other benchmarks, targets, personal goals or Company criteria set forth in the Plan are met, not met, exceeded or not exceeded.

This Plan is governed by the laws of the State of New York and as such will be construed under and in accordance with the laws of the State of New York without regard to conflicts of law.

X. COMPLIANCE WITH CODE SECTION 409(A)

This Plan and Bonus Awards paid hereunder are intended to be exempt from Code Section 409A and shall be construed, interpreted, and administered accordingly. In no event whatsoever shall the Company or its affiliates be liable for any additional tax, interest or penalty that may be imposed on any Participant pursuant to Code Section 409A or any damages for failing to comply with Code Section 409A.

Exhibit 10.46

FEDERAL-MOGUL LLC
2017 LONG-TERM INCENTIVE PLAN
POWERTRAIN SEGMENT
For the Period January 1, 2017 – December 31, 2019

I. PURPOSE AND STRUCTURE

The Company's (as defined below) 2017 Long-Term Incentive Plan (this or the "Plan"), established for the 2017 Fiscal Year (as defined below) and the two subsequent Fiscal Years thereafter, is designed to drive a culture focused on long-term company performance. The Plan is intended to deliver "pay-for-performance" through a long-term incentive payment, which is based on overall Company financial performance during the Performance Period to encourage and stimulate superior performance by eligible Participants, and to assist in retaining key employees. In addition, this Plan is intended to be in effect during the Performance Period, subject to the right of the Compensation Committee to amend, modify or terminate this Plan as provided below. All capitalized terms used in the Plan have the meaning assigned to such terms in Section II below unless such terms are otherwise defined in the Plan.

II. DEFINITIONS

Definitions for specific terms used within this Plan are identified below.

A. "Affiliate" means each of the following: (i) any Subsidiary; (ii) any Parent; (iii) any corporation, trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company or one of its Affiliates; (iv) any trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company; and (v) any other entity in which the Company or any of its Affiliates has a material equity interest and which is designated as an "Affiliate" by resolution of the Compensation Committee.

B. "Beneficial Owner " has the meaning assigned to such term in Rule 13d-3 and Rule 13d-5 under the Securities Exchange Act of 1934, as amended, except that in calculating the beneficial ownership of any particular "person" (as that term is used in Section 13(d)(3) of the Securities Exchange Act of 1934, as amended), such "person" will be deemed to have beneficial ownership of all securities that such "person" has the right to acquire by conversion or exercise of other securities, whether such right is currently exercisable or is exercisable only after the passage of time.

C. "Board" means the Board of Directors of the Company.

D. "Bonus Award" is the cash payment that may be earned by Participants in respect of the Performance Period, subject to the eligibility requirements set forth in Section III, achievement by the Company of Performance Metrics set forth in Section V with respect to the Performance Period, and subject to adjustments as provided in this Plan.

E. "Cause" means with respect to a Participant: (i) there has been misconduct or a gross dereliction of duty resulting in either a violation of law or Company policy or procedures, that, in either case, causes significant financial or reputational harm to the Company (or any of its Affiliates), and that such Participant committed the misconduct or gross dereliction of duty, or failed in his or her responsibility to manage or monitor the applicable conduct or risk; (ii) a conduct of such Participant involves an immoral or illegal act which is reasonably likely to impair the reputation of the Company (or any of its Affiliates); (iii) such Participant violated any securities or employment laws or regulations; (iv) such Participant materially breached the Confidentiality and Intellectual Property Assignment Agreement or any non-compete and/or non-solicitation clauses in such Participant's employment letter; or (v) such Participant embezzled and/or misappropriated any property of the Company (or any of its Affiliates) or committed any act involving fraud with respect to the Company (or any of its Affiliates).

F. " Change in Control " means (i) the consummation of any transaction (including, without limitation, any sale of stock, merger, consolidation or spinoff), the result of which is that any Person, other than Carl Icahn or the Related Parties, becomes that Beneficial Owner, directly or indirectly, of more than 50% of the voting power of the voting securities of the Company (or, if applicable, its parent corporation or entity) or (ii) the acquisition by any Person, other than Carl Icahn or the Related Parties, of all or substantially all of the assets of Company; provided, however, that to the extent the definition of Change in Control is applicable to an Bonus Award that constitutes

deferred compensation for purposes of Code Section 409A, the transaction or acquisition shall only constitute a Change in Control for purposes of such Bonus Award to the extent the transaction or acquisition would constitute a change in control under either (i) or (ii) and would also constitute a change in control event as defined in 26 C.F.R. 1.409A-3(i)(5)(i).

G. "Code" means the Internal Revenue Code of 1986, as amended. Any reference to any section of the Code will also be a reference to any successor provision and any Treasury Regulation promulgated thereunder.

H. "Company" means Federal-Mogul LLC and its subsidiaries and its successors and assigns (with respect to the Powertrain division).

I. "Compensation Committee" means the Compensation Committee of the Board.

J. " Disparagement " means making comments or statements to the press, the Company's or its Affiliates' employees, consultants or any individual or entity with whom the Company or its Affiliates has a business relationship or any other Person or entity which could reasonably be expected to adversely affect in any manner: (i) the conduct of the business of the Company or its Affiliates (including, without limitation, any products or business plans or prospects); or (ii) the business reputation of the Company or its Affiliates, or any of their products, or their past or present officers, directors or employees.

K. "Fiscal Year" means the Company's Fiscal Year beginning January 1 and ending December 31.

L. "Good Standing" has the meaning assigned to it in Section III.

M. "Parent" means any parent corporation of the Company within the meaning of Section 424(e) of the Code.

N. "Participant(s)" refer(s) to the employees listed selected and approved by the Compensation Committee, as long as any such person is eligible to participate in the Plan pursuant to Section III and any other person approved by the Compensation Committee in its sole and absolute discretion.

O. " Performance Metrics " are the Performance Metrics of the Company established by the Compensation Committee with respect to the Performance Period.

P. "Performance Period" means three years in duration, beginning on the first day of the 2017 Fiscal Year and ending on December 31, 2019.

Q. "Person" means any natural person, corporation, limited liability company, or other legal entity.

R. "Recoupment" is a compensation recovery method, provided under the Plan to recover all (or a portion) of a prior Bonus Award based on a correction or restatement of the Company's financial statements or other factors affecting Performance Metrics.

S. "Related Parties" shall mean (i) Carl Icahn, any spouse and any child, stepchild, sibling or descendant of Carl Icahn; (ii) any estate of Carl Icahn or of any Person referred to in clause (i); (iii) any Person who receives a bequest from or beneficial interest in any estate under clause (ii) to the extent of such interest; (iv) any executor, personal administrator or trustee who holds such beneficial interest in the Company for the benefit of, or as fiduciary for any Person under clauses (i), (ii) or (iii) to the extent of such interest; (v) any Person directly or indirectly owned or controlled by Carl Icahn or any other Person or Persons identified in clauses (i), (ii) (iii) or (iv); and (vi) any not-for-profit entity not subject to taxation pursuant to Section 501(c)(3) of the Internal Revenue Code or any successor provision to which Carl Icahn or any Person identified in clauses (i), (ii) or (iii) above contributes his beneficial interest in the Company or to which such beneficial interest passes pursuant to such Person's will.

T. "Subsidiary" means any subsidiary corporation of the Company within the meaning of Section 424(f) of the Code.

U. "Term" means the period beginning on the date this Plan is adopted by the Compensation Committee, and ending on the date this Plan is terminated by the Compensation Committee. The Compensation Committee shall have the sole and absolute discretion to amend, modify or terminate this Plan at any time.

III. ELIGIBILIT

Y

A Participant may be eligible to participate in the performance cycle if he or she is promoted or hired into an eligible, full-time (defined as 40 hours per week) position before October 1, 2017 and remains employed on such basis through the end of the Performance Period. Eligibility for mid-cycle participation will be based on the proposal of the Chief Executive Officer, subject to review and approval of the Compensation Committee. The following additional conditions shall apply: (i) the Participant must have returned to the Company executed copies of the Integrity Policy Certification Agreement and Confidentiality Agreement, and acknowledged his or her understanding and acceptance of the Company's policies, consistent with the Company's practices and procedures; (ii) the Participant must be employed by the Company on the scheduled date of payment; and (iii) the Participant is subject to all other terms, conditions, restrictions and/or requirements set forth in this Section III. Contingency workers, including temporaries, contractors, consultants and outsourced work teams are not eligible for participation in the Plan.

- **Good Standing.** Participants must be actively employed and in good standing (and otherwise in compliance with the Company's policies and procedures) on the actual bonus pay date in order to receive a payout. Participants placed on a performance improvement plan or in corrective action status as a result of poor performance during the Performance Period, but who return to "Good Standing" status prior to the bonus payment date, may be eligible for a prorated incentive payout, as determined by the Compensation Committee in its sole and absolute discretion. As a condition of the receipt of any Bonus Award, the Participant will be required to certify (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Company's Confidentiality Policy or the non-compete and non-solicitation clauses in his or her employment letter, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Leave of Absence.** Subject to all applicable law, the Compensation Committee may, in its sole and absolute discretion, adjust any Bonus Award, on a pro-rata basis, for any leave of absence taken by a Participant during the Performance Period.

- **Voluntary Separation.** If a Participant voluntarily separates from the Company after the end of the Performance Period, but prior to the applicable Bonus Award payout date, then such Participant's Bonus Award will be deemed forfeited with respect to the Performance Period.

- **Involuntary Separation.** Participants terminated for Cause prior to the payout date will irrevocably forfeit any Bonus Award under the Plan. The determination of "Cause" will be made by the Compensation Committee in its sole and absolute discretion. Any other Participant whose employment is involuntarily terminated prior to the Bonus Award payout date will be deemed ineligible for payment of a Bonus Award.

- **Forfeiture of Bonus Award.** If a Participant's termination of employment occurs prior to the date a Bonus Award that has been awarded to such Participant is actually paid out, then the Participant will not be entitled to any bonus payment with respect to such Bonus Award. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. As a condition of the receipt of any Bonus Award, a Participant may be required to certify in writing (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Integrity Policy Certification Agreement and Confidentiality Agreement, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Clawback of Bonus Award.** To the extent not prohibited by applicable law, if a Participant is an officer of the Company, or, if applicable, has otherwise been designated by the Board as an "officer" for purposes of Section 16 of the Securities Exchange Act of 1934, as amended, the Compensation Committee shall seek reimbursement of any payment made to such Participant in respect of the Bonus Award in the event of a restatement of the Company's (or any of its subsidiaries') financial results (occurring due to material noncompliance with any financial reporting requirements under applicable securities laws) that reduced a previously granted payment made to such Participant in respect of the Bonus Award. In that event, the Compensation Committee may, in its sole and absolute discretion, seek to recover the amount of any such payment made to the Participant that exceeded the amount that would have been paid based on the restated financial results. To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to a Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that any such amounts are exempt from, or set off in a manner intended to comply with the requirements of, Section 409A of the Code.

IV. BONUS AWARD

Participants covered by this Plan will be notified of eligibility in writing by the Company. Each Participant's respective Bonus Award, shall be valued based on the Participant's "award percentage" multiplied by the "Bonus Pool" (as established by the Compensation Committee), which "award percentage" will be separately communicated in writing to each Participant by the Senior Vice President of Human Resources.

V. PERFORMANCE METRICS

The Performance Metrics established for the Plan are based on the Company's financial performance during the Performance Period.

The Board or the Compensation Committee may, in its sole and absolute discretion, at any time prior to the final determination of Bonus Awards, increase, decrease or otherwise adjust performance measures, targets, and payout ranges used hereunder as a result of extraordinary or non-recurring events, changes in applicable accounting rules or principles, changes in the Company's methods of accounting, changes in applicable law, changes due to any consolidation, acquisition or reorganization affecting the Company and its subsidiaries or such other material change in the Company's business. The Board or the Compensation Committee, as applicable, will implement such change(s) in its sole and absolute discretion.

VI. COMPUTATION AND DISBURSEMENT OF FUNDS

A. COMPUTATION

The calculation of the Company's financial and operational targets will be based upon the Company's audited financials, subject to review and approval by the Compensation Committee in its sole and absolute discretion and determination by the Compensation Committee in its sole and absolute discretion as to whether or not the Performance Metrics were achieved.

Notwithstanding anything to the contrary in this Plan, if the Compensation Committee determines, in its sole and absolute discretion, that calculations underlying the Performance Metrics, including but not limited to, mistakes in the Company's audited financial statements for the 2017 Fiscal Year or any Fiscal Year were incorrect, then the Compensation Committee may (i) adjust Bonus Awards (upward or downward); and/or (ii) initiate a Recoupment.

B. DISBURSEMENT OF FUNDS

As soon as practicable after the close of the Performance Period, the Company's Chief Financial Officer will calculate the Company's actual performance relative to the Performance Metrics with respect to the Performance Period. Subject to the terms and conditions set forth herein, if (i) the Company achieves the Performance Metrics; and (ii) Participant is an employee in Good Standing on the applicable payout date and no event or condition shall have occurred that would have given the Company the right to terminate the Participant for Cause on or prior to such date (the conditions set forth in (i) and (ii), the "Bonus Conditions"); then Participant will have earned and be entitled to be paid the Bonus Award. The proposed Bonus Award payouts and a list of eligible Participants will be presented to the Compensation Committee no later than ninety (90) days after the end of the Performance Period, and once approved, unless otherwise set forth in an Award agreement, the Bonus Awards will be paid to all eligible and approved Participants within 30 days of such approval but not later than June 30 th of the calendar year immediately succeeding the end of the Performance Period, in each case provided that the Bonus Conditions are met. Payments of the Bonus Awards shall be one-time payments and will be reduced by amounts required to be withheld for taxes and other applicable withholdings at the time such payments are made.

C. TAXES

Income, employment, and any other applicable taxes and withholdings will be withheld from any Bonus Award payments required under the Plan to the extent determined by the Company in accordance with applicable law. In addition, in the sole and absolute discretion of the Company, any applicable employment taxes that are a liability of a Participant may be deducted from Bonus Awards and transmitted to the appropriate tax authority. A Participant who receives payment hereunder also will be issued a Form W-2, Form 1099 or other report as is required by law, and such report also will be filed with taxing authorities as is required by law.

VII. ADMINISTRATION

This Plan will be administered by the Compensation Committee.

In the event of a claim or dispute brought forth by a Participant, the decision of the Compensation Committee as to the facts in the case and the meaning and intent of any provision of the Plan, or its application, will be final, binding, and

conclusive. Notwithstanding anything herein to the contrary, the Compensation Committee shall retain sole and absolute discretion over all matters relating to this Plan.

VIII. NO EMPLOYMENT CONTRACT; FUTURE PLANS

Participation in this Plan will not confer upon any Participant any right to continue in the employ of the Company nor interfere in any way with the right of the Company to terminate any Participant's employment at any time. The Company is under no obligation to continue the Plan in future Fiscal Years.

IX. GENERAL PROVISIONS

A Participant's rights under the Plan will not be assignable, either voluntarily or involuntarily by way of encumbrance, pledge, attachment, level or charge of any nature (except as may be required by state or federal law).

Nothing in the Plan will require the Company to segregate or set aside any funds or other property for the purpose of paying any portion of a Bonus Award. No Participant, beneficiary or other person will have any right, title or interest in any amount awarded under the Plan prior to the payment of such Bonus Award to him or her or the close of any Performance Period, or in any property of the Company or its subsidiaries. A Participant's rights to a Bonus Award under this Plan are no greater than those of unsecured general creditors of the Company.

Notwithstanding anything herein to the contrary, whether or not any Bonus Award is authorized, earned or paid under the Plan shall be determined by the Compensation Committee in its sole and absolute discretion, and no such Bonus Award shall be earned, nor shall any right to any such Bonus Award exist or accrue, unless, among other factors, such Bonus Award has been authorized by the Compensation Committee in its sole and absolute discretion, and actually paid to Participants. In addition, whether or not any Bonus Award is authorized, earned or paid pursuant to the Plan is without regard to whether any of the individual performance metrics, Company financial performance targets and/or goals, or any other benchmarks, targets, personal goals or Company criteria set forth in the Plan are met, not met, exceeded or not exceeded.

This Plan is governed by the laws of the State of New York and as such will be construed under and in accordance with the laws of the State of New York without regard to conflicts of law.

X. COMPLIANCE WITH CODE SECTION 409(A)

This Plan and Bonus Awards paid hereunder are intended to be exempt from Code Section 409A and shall be construed, interpreted, and administered accordingly. In no event whatsoever shall the Company or its affiliates be liable for any additional tax, interest or penalty that may be imposed on any Participant pursuant to Code Section 409A or any damages for failing to comply with Code Section 409A.

Exhibit 10.47

FEDERAL-MOGUL LLC
2017 LONG-TERM INCENTIVE PLAN
MOTORPARTS SEGMENT
LTIP AWARD AGREEMENT
For the Period January 1, 2017 – December 31, 2019

THIS LTIP AWARD AGREEMENT (the "Agreement") is made by and between Federal-Mogul LLC (Motorparts segment), a Delaware corporation (the "Company"), and [Name], an officer or employee of the Company or a subsidiary of the Company (the "Participant") effective as of January 1, 2017.

In consideration of the mutual covenants herein contained and other good and valuable consideration, receipt of which is hereby acknowledged, the Company and the Participant hereby agree as follows:

1. GRANT. The Company hereby grants to the Participant identified above a "Bonus Award" (sometimes referred to herein as the "Award") (calculated in the manner set forth herein and the Plan) subject to the terms and conditions set forth herein and the Plan (defined below) (the "Terms"). No Bonus Award will be paid or payable hereunder unless the Participant earns the Bonus Award pursuant to Sections 6 and/or 7 hereof and Section V of the Federal-Mogul LLC (Motorparts segment) 2017 Long-Term Performance Plan effective as of January 1, 2017 (the "Plan"). This Bonus Award is granted pursuant to and is subject to the terms and conditions of the Plan. A copy of the Plan is attached as an exhibit hereto and the terms and conditions thereof are incorporated herein by this reference and are expressly made part of this Agreement. All terms used herein and defined in the Plan shall, unless otherwise defined herein, have the same meaning set forth in the Plan. The Bonus Award granted hereby is non-transferable except as otherwise permitted under the Plan.

2. PERFORMANCE PERIOD. The Performance Period for this Award shall be the three-year period commencing on January 1, 2017 and ending on December 31, 2019.

3. VESTING. The Performance-based portion of the Award shall be earned in accordance with Sections 6 and/or 7 hereof, subject to the Participant's continuous employment throughout the Performance Period. The Service-based portion of the Award shall fully vest at the end of the three-year Performance Period, subject to the Participant's continued employment with the Company through the applicable payment date.

4. PERFORMANCE MEASURE. The performance measure for the Performance Period shall have two elements: the cumulative Operational EBITDA for the Performance Period; and ROWA (as defined below) for the Performance Period. "Operational EBITDA" is defined as disclosed in the Company's public filings or audited financial statements in a manner consistent with past practices.

Notwithstanding anything herein to the contrary, for purposes of calculating Operational EBITDA and ROWA, the Compensation Committee may, in its sole and absolute discretion, adjust the calculation of Operational EBITDA and ROWA, or their respective targets, based on approved capital expansion plans, acquisitions, changes in foreign currency exchange rates and other changes in Company business for events or actions during the course of the Performance Period that vary from business plan assumptions or that are unusual, infrequent and/or non-recurring (including but not limited to goodwill impairments or legacy costs). For purposes of clarification, the Operational EBITDA performance target set forth in Section 6 is based on the Company's current business plan.

"ROWA" shall be expressed as a percentage and will be equal to the fiscal year earnings before interest, taxes and intangible amortization, divided by monthly average "Working Assets." "Working Assets" is equal to accounts receivable plus inventory, less accounts payable, plus PP&E (plant, property and equipment),

capitalized software, plus investment in non-consolidated joint ventures. The ROWA calculation will assume factoring levels remain consistent with 2017 budget levels.

5 . SERVICE UNIT MEASURE. The service unit measure for the Performance Period shall be based upon the Participant remaining 'in good standing' for the entire Performance Period and will be further qualified pursuant to Sections 7, 8, 9, 10 and 11 below.

6. PERFORMANCE GOAL.

2017 Operational EBITDA: $[Redacted]
2018 Operational EBITDA: $[Redacted]
2019 Operational EBITDA: $[Redacted]
Cumulative Operational EBITDA of $[Redacted]

RETURN ON WORKING ASSETS:

2017: [Redacted]% Target
2018: [Redacted]% Target
2019: [Redacted]% Target

7. PERFORMANCE AWARD.

a. Participant's target Award hereunder shall be a combination of a performance-based award and a service-based award. For the 2017-2019 Performance Period, the total target award for both elements shall be a total target of _____ allocated as follows:

i. Participant's performance-based portion of the Award will equate to 75% of the total Award (see Section 7(a)). The final performance-based portion will be determined based on the achievement of the two performance metrics described above in Section 4 of this Agreement following the end of the Performance Period, subject to the Participant's continued employment with the Company through the applicable payment date. Actual award payout will be equal to the target Award multiplied by the percent of the Award achieved and earned as determined by the Compensation Committee in accordance with Appendix A .

ii. Participant's service-based portion of the Award will equate to 25% of the total Award (see Section 7(a)). The service-based portion will be payable at the end of the three-year Performance Period, subject to the Participant's continued employment with the Company through the applicable payment date.

8. TIMING AND FORM OF PAYOUT. As soon as practicable after the close of the Performance Period, the Chief Financial Officer shall calculate the financial performance and the proposed payout under the Plan based on the achievement of the financial Performance Measure. The proposed payout shall be presented to the Compensation Committee for its review and approval. Once approved, payment of the Award shall be made within 30 days after such approval but not later than June 30 th of the calendar year following the end of the Performance Period. All Award payments shall be reduced by amounts required to be withheld for taxes at the time payments are made.

9. DEATH OR SEPARATION FROM SERVICE DUE TO (i) TERMINATION BY THE COMPANY WITHOUT CAUSE, OR (ii) TERMINATION BY THE COMPANY DUE TO PARTICIPANT'S DISABILITY. In the event of the Participant's death, or separation from service due to (i) termination by the Company for any reason other than Cause, or (ii) termination by the Company due to the Participant's

Disability, each, a "Qualifying Event", in each case on or after January 1, 2019 and prior to the end of the Performance Period, the Compensation Committee may, in its sole and absolute discretion, take action to cause the Participant (or in the case of the Participant's death, the Participant's beneficiary) to be entitled to receive an Award payout equal to the Bonus Award (calculated in accordance with Sections 6 and/or 7 hereof) as if he or she had remained employed until the last day of the Performance Period, multiplied by a fraction, the numerator of which shall be the number of full calendar months during the period of January 1, 2017 through the date the Participant's employment terminated due to a Qualifying Event and the denominator of which shall be thirty-six (36), the total number of months in the Performance Period. The payment of any such amount shall be made according to same terms set forth in Section 8 above. As used herein, "Disability" shall have the meaning given to such term in Section 409A(a)(2)(C) of the Code.

10. SEPARATION FROM SERVICE FOR ANY REASON. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. Except as may be provided in Section 9 or Section 11, the Participant must be an employee of the Company and/or an Affiliate continuously from the date of this Award until the Bonus Award is paid. Consequently, if the Participant's employment with the Company is voluntarily or involuntarily terminated prior to the Bonus Award payment date, he or she will be ineligible for payment of the Bonus Award, except as otherwise may be provided by the Compensation Committee or pursuant to Section 9, in which case any such Bonus Award to the Participant shall be paid at the time Bonus Awards are paid to active employees pursuant to Section 8 above or pursuant to Section 11.

11. PAYMENT UPON A CHANGE IN CONTROL. Notwithstanding anything to the contrary in this Agreement, upon the occurrence of a Change in Control during the Performance Period, the Compensation Committee may, but shall have no obligation to, take such action to provide for the payment of a pro-rated Bonus Award to the Participant with respect to such Performance Period or require the Company or its successor to assume or continue to be bound by this Agreement, in each case, under such terms and conditions as may be established by the Compensation Committee in its sole and absolute discretion.

12. NO LIMITATION ON RIGHTS OF THE COMPANY. The grant of this Award shall not in any way affect the right or power of the Company to make adjustments, reclassification, or changes in its capital or business structure, or to merge, consolidate, dissolve, liquidate, sell or transfer all or any part of its business or assets.

13. CANCELLATION, RESCISSION, AND CLAWBACK OF AWARDS. In the event of a restatement of the Company's consolidated financial statements that would reduce the amount of any previously awarded Bonus Award, the related outstanding Awards will be cancelled or reduced accordingly. For Bonus Awards that have been paid, the Participant shall be obligated and required to pay over to the Company an amount equal to any gain realized as a result of the exercise, distribution or settlement (whether at the time of exercise, distribution or settlement or thereafter) of such Bonus Awards. The Compensation Committee's determinations hereunder shall be conclusive, binding, and final on all parties.

In connection with any action contemplated by this Section 13 or the Plan, the terms of repayment by the applicable Participant shall be determined in the Compensation Committee's sole and absolute discretion, which may include, among other terms, the repayment being required to be made (i) in one or more installments or payroll deductions or deducted from future bonus payments or (ii) immediately in a lump sum in the event that such Participant incurs a termination of employment.

To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to the Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that an such amounts are exempt from, or set off in a manner intended to comply with the requirements of, Section 409A of the Code.

14. NOTICE. Any notice or other communication required or permitted hereunder shall be in writing and shall be delivered by electronic mail or personally, or sent by certified, registered or express mail, postage prepaid. Any such notice shall be deemed given when so delivered (if sent by electronic mail or personal delivery) or, if mailed, three days after the date of deposit in the United States mail, in the case of the Company to the Chief Financial Officer and, in the case of the Participant, to his or her address on file with the Company or, in each case, to such other address as may be designated in a notice given in accordance with this Section 14. Electronic mail notices to Participant shall be sent to his or her e-mail address on file with the Company, and electronic mail notices to the Company shall be sent to the Company's Human Resources Department.

15. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the laws of the State of New York without giving effect to the conflicts of laws principles thereof.

16. PARTICIPANT ACKNOWLEDGMENT. The Participant hereby acknowledges receipt of a copy of the Plan, has read and understands the Plan, and agrees to be bound by all terms and provisions contained therein.

17. DEFINITIONS. Capitalized terms used herein and not otherwise defined shall have the meanings ascribed to such terms in the Plan.

18. UNFUNDED STATUS. The Bonus Award constitutes an unfunded and unsecured promise of the Company to deliver (or cause to be delivered) to the Participant, subject to the terms and conditions of this Agreement and the Plan, payment in respect of the Award as provided herein. By accepting this Bonus Award, the Participant understands that this grant does not confer any legal or equitable right (other than those constituting the Bonus Award) against the Company or any of its affiliates, directly or indirectly, or give rise to any cause of action at law or in equity against the Company or any of its affiliates. The rights of the Participant (or any person claiming through the Participant) under this Agreement shall be solely those of an unsecured general creditor of the Company.

19. NO RIGHT TO CONTINUED EMPLOYMENT. Nothing in this Agreement shall be interpreted or construed to confer upon the Participant any right with respect to continuance of employment by the Company or one of its subsidiaries, nor shall this Agreement interfere in any way with the right of the Company or one of its subsidiaries to terminate the Participant's employment therewith at any time. In addition, the Bonus Award is provided solely as an incentive and shall not constitute part of the Participant's employment compensation package. The Bonus Award shall not be considered part of normal or expected compensation for purposes of calculating any severance, resignation, redundancy, end of service payments, long-service awards, pension, or retirement benefits or similar payments.

20. TAX WITHHOLDING. The Participant shall be liable for any and all federal, state, provincial, local or foreign taxes, pension plan contributions, employment insurance premiums, social insurance contributions, amounts payable to a governmental and/or regulatory body in the Participant's country and other levies of any kind required by applicable laws to be deducted or withheld with respect to the Bonus Award (collectively, the "Withholding Taxes"). The Company and its subsidiaries shall have the right to deduct and withhold all required Withholding Taxes from any payment or other consideration deliverable hereunder to the Participant.

21. PLAN DOCUMENT CONTROLS. The rights herein granted are in all respects subject to the provisions set forth in the Plan to the same extent and with the same effect as if set forth fully herein. In the event that the terms of this Agreement conflict with the terms of the Plan document, the Plan document shall control.

22. COMPLIANCE WITH SECTION 409A. The intent of the parties is that payments and benefits under this Agreement be exempt from, or comply with, Code Section 409A and the regulations and

guidance promulgated thereunder (collectively "Code Section 409A") and, accordingly, to the maximum extent permitted, this Agreement shall be interpreted in accordance with such intent. In no event whatsoever shall the Company be liable for any additional tax, interest or penalty that may be imposed on the Participant by Code Section 409A (or analogous state laws) or any damages for failing to comply with Code Section 409A (or analogous state laws).

If the Participant is a "specified employee" (as such term is defined for purposes of Code Section 409A) at the time of his or her termination of employment, no amount that is subject to Code Section 409A and that becomes payable by reason of such termination of employment shall be paid to the Participant before the earlier of (i) the date immediately following the expiration of the six-month period measured from the date of the Participant's termination of employment, and (ii) the date of the Participant's death. A termination of employment shall be deemed to occur only if it is a "separation from service" as defined in the Plan, and references in this Agreement to "termination," "termination of employment," or like terms shall mean a separation from service.

23. DATA PROTECTION. By executing this Agreement, the Participant consents to the holding and processing of personal information provided by the Participant to the Company, any affiliate of the Company, trustee or third party service provider, for all purposes relating to the performance of this Agreement. These include, but are not limited to: (i) administering and maintaining Participant records; (ii) providing information to the Company, its affiliates, trustees of any employee benefit trust, registrars, brokers or third party administrators; (iii) providing information to future purchasers or merger partners of the Company or any of its affiliates, or the business in which the Participant works; and (iv) to the extent not prohibited by applicable law, transferring information about the Participant to any country or territory that may not provide the same protection for the information as the Participant's home country.

24. CONFIDENTIALITY. By executing this Agreement, the Participant agrees and acknowledges that at all times, and notwithstanding any payment or forfeiture of this Award, he or she will hold in strict confidence and will not disclose the terms of this Bonus Award and/or the Plan to any third party, except to Participant's spouse or significant other, legal counsel, financial or tax advisor, or as otherwise required by law. In the event Participant discloses such information to one or more of the foregoing individuals, such individual(s) shall also be bound by the confidentiality obligations set forth herein.

IN WITNESS WHEREOF , the Company has caused this Agreement to be duly executed by its duly authorized officer and said Participant has hereunto signed this Agreement on his or her own behalf, as of the day and year first above written.

FEDERAL-MOGUL LLC
(MOTORPARTS SEGMENT)

By: _____
Title:_____

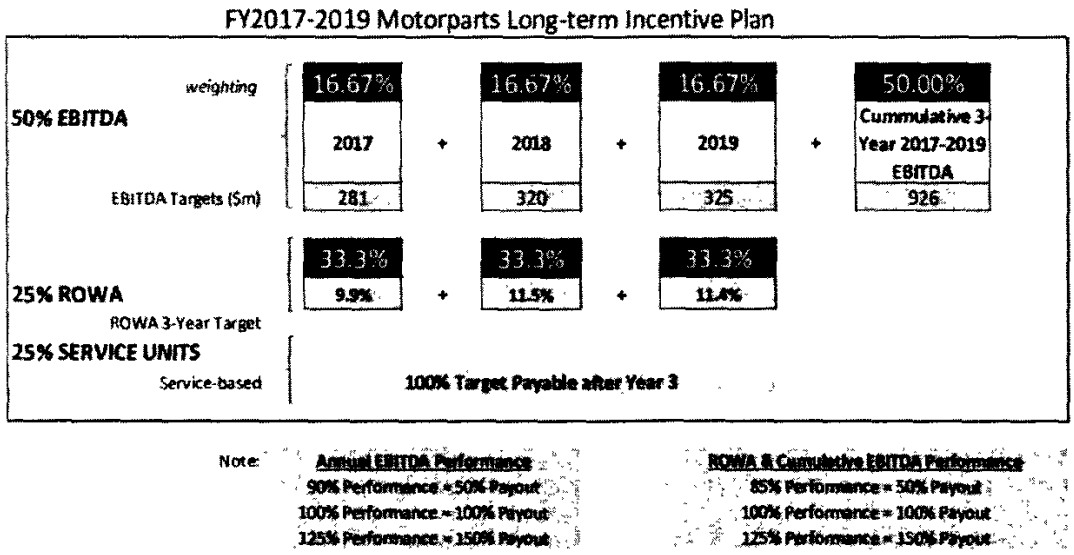
PARTICIPANT

_____
Participant Signature

Date

APPENDIX A

Payout Ranges for Performance-Portion of Bonus Awards



Annual EBITDA Performance Payout % of Peformance Goal Achieved	
% Achieved of Performance Goal	% Performance-based Long term Incentive Award Earned
<90%	0%
90%	50%
91%	55%
92%	60%
93%	65%
94%	70%
95%	75%
96%	80%
97%	85%
98%	90%
99%	95%
100%	100%
105%	110%
110%	120%
115%	130%
120%	140%
125% or more	150%

ROWA & 3-Year Cumulative EBITDA Performance Payout % of Peformance Goal Achieved	
% Achieved of Performance Goal	% Performance-based Long-term Incentive Award Earned
<85%	0%
85%	50%
86%	53%
87%	57%
88%	60%
89%	63%
90%	67%
91%	70%
92%	73%
93%	77%
94%	80%
95%	83%
96%	87%
97%	90%
98%	93%
99%	97%
100%	100%
105%	110%
110%	120%
115%	130%
120%	140%
125% or more	150%

Exhibit 10.48

FEDERAL-MOGUL LLC
2017 LONG-TERM INCENTIVE PLAN
POWERTRAIN SEGMENT
LTIP AWARD AGREEMENT
For the Period January 1, 2017 – December 31, 2019

THIS LTIP AWARD AGREEMENT (the "Agreement") is made by and between Federal-Mogul LLC (Powertrain segment), a Delaware corporation (the "Company"), and [Name], an officer or employee of the Company or a subsidiary of the Company (the "Participant") effective as of January 1, 2017.

In consideration of the mutual covenants herein contained and other good and valuable consideration, receipt of which is hereby acknowledged, the Company and the Participant hereby agree as follows:

1. GRANT. The Company hereby grants to the Participant identified above a "Bonus Award" (sometimes referred to herein as the "Award") (calculated in the manner set forth herein and the Plan) subject to the terms and conditions set forth herein and the Plan (defined below) (the "Terms"). No Bonus Award will be paid or payable hereunder unless the Participant earns the Bonus Award pursuant to Sections 3, 4 and/or 5 hereof and Section V of the Federal-Mogul LLC (Powertrain segment) 2017 Long-Term Performance Plan effective as of January 1, 2017 (the "Plan"). This Bonus Award is granted pursuant to and is subject to the terms and conditions of the Plan. A copy of the Plan is attached as an exhibit hereto and the terms and conditions thereof are incorporated herein by this reference and are expressly made part of this Agreement. All terms used herein and defined in the Plan shall, unless otherwise defined herein, have the same meaning set forth in the Plan. The Bonus Award granted hereby is non-transferable except as otherwise permitted under the Plan.

2. PERFORMANCE PERIOD. The Performance Period for this Award shall be the three-year period commencing on January 1, 2017 and ending on December 31, 2019.

3. AWARD VALUE. Participant's Award hereunder shall be valued based on the Participant's "award percentage" multiplied by the PT Bonus Pool. For purposes of this Agreement, the Participant's "award percentage" is equal to [_]%.

4. DEFINITIONS.

(a) "PT Bonus Pool" means 5.18% of Economic Profit generated by the Powertrain Segment during the Performance Period. The PT Bonus Pool cannot be less than $0 and may not exceed $[ ] with respect to the Performance Period.

(b) "Economic Profit" means, with respect to the Powertrain Segment of the Company, EBIT of the Powertrain Segment less the Capital Charge. Economic Profit shall be calculated quarterly during the Performance Period.

(c) "EBIT" means, for any fiscal quarter, the Powertrain Segment's consolidated net income determined in accordance with GAAP before the following:

i. interest income and expense,
ii. provision for income taxes (including tax sharing payments),
iii. legacy defined benefit expenses (including European pension expense),
iv. OPEB curtailment gains or losses,
v. expenses associated with factoring of receivables,
vi. gains and losses on the sale of a business,

vii. restructuring charge, to be capitalized and then amortized through EBIT over a 3 year period (i.e. over 12 quarters).
viii. Intercompany Dividends, Income/Expense, Fixed Asset transfers,
ix. Minority Interest, and
x. Goodwill Impairment.

EBIT shall be calculated quarterly during the Performance Period Notwithstanding anything to the contrary in the foregoing, for so long as the Company is not subject to Section 162(m) of the Internal Revenue Code, the Committee may, in its sole and absolute discretion, subject to the terms of the Plan, adjust the calculation of EBIT for events or actions during the course of the Performance Period that are unusual and/or non-recurring (including but not limited to goodwill impairments or legacy costs).

(d) "Capital Charge" means, for any fiscal quarter, Average Working Assets multiplied by the annual rate specified below. Capital Charge shall be calculated quarterly during the Performance Period.

i. Fiscal 2017: Ten percent (10.0%) (*i.e.* , 2.5% each fiscal quarter).

ii. Fiscal 2018: Ten percent (10.0%) (*i.e.* , 2.5% each fiscal quarter).

iii. Fiscal 2019: Ten percent (10.0%) (*i.e.* , 2.5% each fiscal quarter).

(e) "Average Working Assets" means, for any fiscal quarter, the average of (i) Working Assets as of the last day of such quarter and (ii) Working Assets as of the last day of the immediately preceding quarter. Average Working Assets shall be calculated quarterly during the Performance Period.

(f) "Powertrain Segment" means the Powertrain operating segment of the Company (or any successor operating segment).

(g) "Working Assets" means, for any fiscal quarter, the following items for the Powertrain Segment as of the last day of such quarter (in each case determined in accordance with GAAP):

i. accounts receivable; plus
ii. factored receivables that would not have otherwise been paid during the fiscal quarter; plus
iii. net inventory; plus
iv. property, plant and equipment net of depreciation (i.e. net book value); plus
v. goodwill and other intangible assets related to acquisitions or investments completed on or after September 30, 2013; plus
vi. net book value of capitalized restructuring (i.e. gross amount of restructuring capitalized net of accumulated amortized restructuring charged through EBIT); plus
vii. investments in non-consolidated subsidiaries (excluding $[ ] million consisting primarily of retained earnings established before January 1, 2014); less
viii. accounts payable; less
ix. accrued liabilities (other than accruals for short term taxes or short term interest).

Working Assets shall be calculated quarterly during the Performance Period. The Participant and the Company acknowledge and agree that Working Assets for the fiscal quarter of the Powertrain Segment ended December 31, 2016 was $[ ] billion. Notwithstanding anything to the contrary in the foregoing: (A) Working Assets shall

be determined without giving effect to any gains and losses on the sale of a business; and (B) the Committee may in its sole and absolute discretion, subject to the terms of the Plan, adjust the calculation of Working Assets for events or actions during the course of the Performance Period that are unusual, infrequent and/or non-recurring (including but not limited to goodwill impairments).

5. TIMING AND FORM OF PAYOUT. As soon as practicable after the close of the Performance Period, the Chief Financial Officer shall calculate the financial performance and the proposed payout under the Plan based on the achievement of the financial Performance Measure. The proposed payout shall be presented to the Compensation Committee for its review and approval. Once approved, payment of the Award shall be made within 30 days after such approval but not later than June 30 th of the calendar year following the end of the Performance Period. All Award payments shall be reduced by amounts required to be withheld for taxes at the time payments are made.

6. DEATH OR SEPARATION FROM SERVICE DUE TO (i) TERMINATION BY THE COMPANY WITHOUT CAUSE, OR (ii) TERMINATION BY THE COMPANY DUE TO PARTICIPANT'S DISABILITY. In the event of the Participant's death, or separation from service due to (i) termination by the Company for any reason other than Cause, or (ii) termination by the Company due to the Participant's Disability, each, a "Qualifying Event", in each case on or after January 1, 2019 and prior to the end of the Performance Period, the Compensation Committee may, in its sole and absolute discretion, take action to cause the Participant (or in the case of the Participant's death, the Participant's beneficiary) to be entitled to receive an Award payout equal to the Bonus Award (calculated in accordance with Sections 3, 4 and/or 5 hereof) as if he or she had remained employed until the last day of the Performance Period, multiplied by a fraction, the numerator of which shall be the number of full calendar months during the period of January 1, 2017 through the date the Participant's employment terminated due to a Qualifying Event and the denominator of which shall be thirty-six (36), the total number of months in the Performance Period. The payment of any such amount shall be made according to same terms set forth in Section 5 above. As used herein, "Disability" shall have the meaning given to such term in Section 409A(a)(2)(C) of the Code.

7. SEPARATION FROM SERVICE FOR ANY REASON. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. Except as may be provided in Section 6 or Section 8, the Participant must be an employee of the Company and/or an Affiliate continuously from the date of this Award until the Bonus Award is paid. Consequently, if the Participant's employment with the Company is voluntarily or involuntarily terminated prior to the Bonus Award payment date, he or she will be ineligible for payment of the Bonus Award, except as otherwise may be provided by the Compensation Committee or pursuant to Section 6, in which case any such Bonus Award to the Participant shall be paid at the time Bonus Awards are paid to active employees pursuant to Section 5 above or pursuant to Section 8.

8. PAYMENT UPON A CHANGE IN CONTROL. Notwithstanding anything to the contrary in this Agreement, upon the occurrence of a Change in Control during the Performance Period, the Compensation Committee may, but shall have no obligation to, take such action to provide for the payment of a pro-rated Bonus Award to the Participant with respect to such Performance Period or require the Company or its successor to assume or continue to be bound by this Agreement, in each case, under such terms and conditions as may be established by the Compensation Committee in its sole and absolute discretion.

9. NO LIMITATION ON RIGHTS OF THE COMPANY. The grant of this Award shall not in any way affect the right or power of the Company to make adjustments, reclassification, or changes in its capital or business structure, or to merge, consolidate, dissolve, liquidate, sell or transfer all or any part of its business or assets.

10. CANCELLATION, RESCISSION, AND CLAWBACK OF AWARDS. In the event of a restatement of the Company's consolidated financial statements that would reduce the amount of any

previously awarded Bonus Award, the related outstanding Awards will be cancelled or reduced accordingly. For Bonus Awards that have been paid, the Participant shall be obligated and required to pay over to the Company an amount equal to any gain realized as a result of the exercise, distribution or settlement (whether at the time of exercise, distribution or settlement or thereafter) of such Bonus Awards. The Compensation Committee's determinations hereunder shall be conclusive, binding, and final on all parties.

In connection with any action contemplated by this Section 10 or the Plan, the terms of repayment by the applicable Participant shall be determined in the Compensation Committee's sole and absolute discretion, which may include, among other terms, the repayment being required to be made (i) in one or more installments or payroll deductions or deducted from future bonus payments or (ii) immediately in a lump sum in the event that such Participant incurs a termination of employment.

To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to the Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that an such amounts are exempt from, or set off in a manner intended to comply with the requirements of, Section 409A of the Code.

11. NOTICE. Any notice or other communication required or permitted hereunder shall be in writing and shall be delivered by electronic mail or personally, or sent by certified, registered or express mail, postage prepaid. Any such notice shall be deemed given when so delivered (if sent by electronic mail or personal delivery) or, if mailed, three days after the date of deposit in the United States mail, in the case of the Company to the Chief Financial Officer and, in the case of the Participant, to his or her address on file with the Company or, in each case, to such other address as may be designated in a notice given in accordance with this Section 11. Electronic mail notices to Participant shall be sent to his or her e-mail address on file with the Company, and electronic mail notices to the Company shall be sent to the Company's Human Resources Department.

12. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the laws of the State of New York without giving effect to the conflicts of laws principles thereof.

13. PARTICIPANT ACKNOWLEDGMENT. The Participant hereby acknowledges receipt of a copy of the Plan, has read and understands the Plan, and agrees to be bound by all terms and provisions contained therein.

14. DEFINITIONS. Capitalized terms used herein and not otherwise defined shall have the meanings ascribed to such terms in the Plan.

15. UNFUNDED STATUS. The Bonus Award constitutes an unfunded and unsecured promise of the Company to deliver (or cause to be delivered) to the Participant, subject to the terms and conditions of this Agreement and the Plan, payment in respect of the Award as provided herein. By accepting this Bonus Award, the Participant understands that this grant does not confer any legal or equitable right (other than those constituting the Bonus Award) against the Company or any of its affiliates, directly or indirectly, or give rise to any cause of action at law or in equity against the Company or any of its affiliates. The rights of the Participant (or any person claiming through the Participant) under this Agreement shall be solely those of an unsecured general creditor of the Company.

16. NO RIGHT TO CONTINUED EMPLOYMENT. Nothing in this Agreement shall be interpreted or construed to confer upon the Participant any right with respect to continuance of employment by the Company or one of its subsidiaries, nor shall this Agreement interfere in any way with the right of the Company or one of its subsidiaries to terminate the Participant's employment therewith at any time. In addition, the Bonus Award is provided solely as an incentive and shall not constitute part of the Participant's employment compensation package. The Bonus Award shall not be considered part of normal or expected

compensation for purposes of calculating any severance, resignation, redundancy, end of service payments, long-service awards, pension, or retirement benefits or similar payments.

17. TAX WITHHOLDING. The Participant shall be liable for any and all federal, state, provincial, local or foreign taxes, pension plan contributions, employment insurance premiums, social insurance contributions, amounts payable to a governmental and/or regulatory body in the Participant's country and other levies of any kind required by applicable laws to be deducted or withheld with respect to the Bonus Award (collectively, the "Withholding Taxes"). The Company and its subsidiaries shall have the right to deduct and withhold all required Withholding Taxes from any payment or other consideration deliverable hereunder to the Participant.

18. PLAN DOCUMENT CONTROLS. The rights herein granted are in all respects subject to the provisions set forth in the Plan to the same extent and with the same effect as if set forth fully herein. In the event that the terms of this Agreement conflict with the terms of the Plan document, the Plan document shall control.

19. COMPLIANCE WITH SECTION 409A. The intent of the parties is that payments and benefits under this Agreement be exempt from, or comply with, Code Section 409A and the regulations and guidance promulgated thereunder (collectively "Code Section 409A") and, accordingly, to the maximum extent permitted, this Agreement shall be interpreted in accordance with such intent. In no event whatsoever shall the Company be liable for any additional tax, interest or penalty that may be imposed on the Participant by Code Section 409A (or analogous state laws) or any damages for failing to comply with Code Section 409A (or analogous state laws).

If the Participant is a "specified employee" (as such term is defined for purposes of Code Section 409A) at the time of his or her termination of employment, no amount that is subject to Code Section 409A and that becomes payable by reason of such termination of employment shall be paid to the Participant before the earlier of (i) the date immediately following the expiration of the six-month period measured from the date of the Participant's termination of employment, and (ii) the date of the Participant's death. A termination of employment shall be deemed to occur only if it is a "separation from service" as defined in the Plan, and references in this Agreement to "termination," "termination of employment," or like terms shall mean a separation from service.

20. DATA PROTECTION. By executing this Agreement, the Participant consents to the holding and processing of personal information provided by the Participant to the Company, any affiliate of the Company, trustee or third party service provider, for all purposes relating to the performance of this Agreement. These include, but are not limited to: (i) administering and maintaining Participant records; (ii) providing information to the Company, its affiliates, trustees of any employee benefit trust, registrars, brokers or third party administrators; (iii) providing information to future purchasers or merger partners of the Company or any of its affiliates, or the business in which the Participant works; and (iv) to the extent not prohibited by applicable law, transferring information about the Participant to any country or territory that may not provide the same protection for the information as the Participant's home country.

21. CONFIDENTIALITY. By executing this Agreement, the Participant agrees and acknowledges that at all times, and notwithstanding any payment or forfeiture of this Award, he or she will hold in strict confidence and will not disclose the terms of this Bonus Award and/or the Plan to any third party, except to Participant's spouse or significant other, legal counsel, financial or tax advisor, or as otherwise required by law. In the event Participant discloses such information to one or more of the foregoing individuals, such individual(s) shall also be bound by the confidentiality obligations set forth herein.

IN WITNESS WHEREOF , the Company has caused this Agreement to be duly executed by its duly authorized officer and said Participant has hereunto signed this Agreement on his or her own behalf, as of the day and year first above written.

FEDERAL-MOGUL LLC
(POWERTRAIN SEGMENT)

By: _____
Title:_____

PARTICIPANT

Participant Signature

_____
Date

Exhibit 10.49

FEDERAL-MOGUL LLC
2018 LONG-TERM INCENTIVE PLAN MOTORPARTS SEGMENT
For the Period January 1, 2018 – December 31, 2020

I. PURPOSE AND STRUCTURE

The Company's (as defined below) 2018 Long-Term Incentive Plan (this or the " Plan "), established for the 2018 Fiscal Year (as defined below) and the two subsequent Fiscal Years thereafter, is designed to drive a culture focused on long-term company performance. The Plan is intended to deliver "pay-for-performance" through a long-term incentive payment, which is based on overall Company financial performance during the Performance Period to encourage and stimulate superior performance by eligible Participants, and to assist in retaining key employees. In addition, this Plan is intended to be in effect during the Performance Period, subject to the right of the Compensation Committee to amend, modify or terminate this Plan as provided below. All capitalized terms used in the Plan have the meaning assigned to such terms in Section II below unless such terms are otherwise defined in the Plan.

II. DEFINITIONS

Definitions for specific terms used within this Plan are identified below.

A. "Affiliate" means each of the following: (i) any Subsidiary; (ii) any Parent; (iii) any corporation, trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company or one of its Affiliates; (iv) any trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company; and (v) any other entity in which the Company or any of its Affiliates has a material equity interest and which is designated as an "Affiliate" by resolution of the Compensation Committee.

B. "Beneficial Owner " has the meaning assigned to such term in Rule 13d-3 and Rule 13d-5 under the Securities Exchange Act of 1934, as amended, except that in calculating the beneficial ownership of any particular "person" (as that term is used in Section 13(d)(3) of the Securities Exchange Act of 1934, as amended), such "person" will be deemed to have beneficial ownership of all securities that such "person" has the right to acquire by conversion or exercise of other securities, whether such right is currently exercisable or is exercisable only after the passage of time.

C. "Board" means the Board of Directors of the Company.

D. "Bonus Award" is the cash payment that may be earned by Participants in respect of the Performance Period, subject to the eligibility requirements set forth in Section III, achievement by the Company of Performance Metrics set forth in Section V with respect to the Performance Period, and subject to adjustments as provided in this Plan.

E. "Cause" means with respect to a Participant, the occurrence of any of the following: (i) willful failure of the Participant to perform substantially his/her duties (other than any such failure resulting from incapacity due to disability); (ii) the Participant's commission of, or indictment for, a felony or any crime involving fraud or embezzlement or dishonesty or conviction of, or plea of guilty or *nolo contendere* to a crime or misdemeanor (other than a traffic violation) punishable by imprisonment under foreign, federal, state or local law; (iii) the Participant's engagement in an act of fraud or other act of willful dishonesty or misconduct, towards the Company or any of its Affiliates, or detrimental to the Company or any of its Affiliates, or in the performance of the Participant's duties; (iv) the Participant's negligence in the performance of employment duties that has a detrimental effect on the Company or any of its Affiliates; (v) the Participant's violation of a federal or state securities law or regulation; (vi) the Participant's use of a controlled substance without a prescription or the use of alcohol which, in each case, significantly impairs the Participant's ability to carry out his or her duties and responsibilities; (vii) material violation by the Participant of the policies and procedures of the Company or any of its Affiliates; (viii) the Participant's embezzlement and/or misappropriation of property of the Company or any of its Affiliates; (ix) conduct by the Participant involving any immoral acts which is reasonably likely to impair the reputation of the Company or any of its Affiliates; or (x) the Participant's material breach of the Company's Integrity Policy Certification Agreement and Confidentiality Agreement, Confidentiality and Intellectual Property Assignment Agreement, the non-compete and non-solicitation clauses in his or her employment letter (if applicable) or any restrictive covenants applicable to the

Participant.

F. " Change in Control " means (i) the consummation of any transaction (including, without limitation, any sale of stock, merger, consolidation or spinoff), the result of which is that any Person, other than Carl Icahn or the Related Parties, becomes that Beneficial Owner, directly or indirectly, of more than 50% of the voting power of the voting securities of the Company (or, if applicable, its parent corporation or entity) or (ii) the acquisition by any Person, other than Carl Icahn or the Related Parties, of all or substantially all of the assets of Company; provided, however, that to the extent the definition of Change in Control is applicable to a Bonus Award that constitutes deferred compensation for purposes of Code Section 409A, the transaction or acquisition shall only constitute a Change in Control for purposes of such Bonus Award to the extent the transaction or acquisition would constitute a change in control under either (i) or (ii) and would also constitute a change in control event as defined in 26 C.F.R. 1.409A-3(i)(5)(i).

G. "Code" means the Internal Revenue Code of 1986, as amended. Any reference to any section of the Code will also be a reference to any successor provision and any Treasury Regulation promulgated thereunder.

H. "Company" means Federal-Mogul LLC and its subsidiaries and its successors and assigns (with respect to the Motorparts division).

I. "Compensation Committee" means the Compensation Committee of the Board.

J. " Disparagement " means making comments or statements to the press, the Company's or its Affiliates' employees, consultants or any individual or entity with whom the Company or its Affiliates has a business relationship or any other Person or entity which could reasonably be expected to adversely affect in any manner: (i) the conduct of the business of the Company or its Affiliates (including, without limitation, any products or business plans or prospects); or (ii) the business reputation of the Company or its Affiliates, or any of their products, or their past or present officers, directors or employees.

K. "Fiscal Year" means the Company's Fiscal Year beginning January 1 and ending December 31.

L. "Good Standing" has the meaning assigned to it in Section III.

M. "Parent" means any parent corporation of the Company within the meaning of Section 424(e) of the Code.

N. "Participant(s)" refer(s) to the employees listed selected and approved by the Compensation Committee, as long as any such person is eligible to participate in the Plan pursuant to Section III and any other person approved by the Compensation Committee in its sole and absolute discretion.

O. " Performance Metrics " are the Performance Metrics of the Company established by the Compensation Committee with respect to the Performance Period.

P. "Performance Period" means three years in duration, beginning on the first day of the 2018 Fiscal Year and ending on December 31, 2020.

Q. "Person" means any natural person, corporation, limited liability company, or other legal entity.

R. "Recoupment" is a compensation recovery method, provided under the Plan to recover all (or a portion) of a prior Bonus Award based on a correction or restatement of the Company's financial statements or other factors affecting Performance Metrics.

S. "Related Parties" shall mean (i) Carl Icahn, any spouse and any child, stepchild, sibling or descendant of Carl Icahn (ii) any estate of Carl Icahn or of any Person referred to in clause (i); (iii) any Person who receives a bequest from or beneficial interest in any estate under clause (ii) to the extent of such interest; (iv) any executor, personal administrator or trustee who holds such beneficial interest in the Company for the benefit of, or as fiduciary for, any Person under clauses (i), (ii) or (iii) to the extent of such interest; (v) any Person directly or indirectly owned or controlled by Carl Icahn or any other Person or Persons identified in clauses (i), (ii) (iii) or (iv); and (vi) any not-for-profit entity not subject to taxation pursuant to Section 501(c)(3) of the Internal Revenue Code or any successor provision to which Carl Icahn or any Person identified in clauses (i), (ii) or (iii) above contributes his beneficial interest in the Company or to which such beneficial interest passes pursuant to such Person's will.

T. "Subsidiary" means any subsidiary corporation of the Company within the meaning of Section 424(f) of the Code.

U. "Term" means the period beginning on the date this Plan is adopted by the Compensation Committee, and ending on the date this Plan is terminated by the Compensation Committee. The Compensation Committee shall have the sole and absolute discretion to amend, modify or terminate this Plan at any time.

III. ELIGIBILITY

A Participant may be eligible to participate in the performance cycle if he or she is promoted or hired into an eligible, full-time (defined as 40 hours per week) position before October 1, 2018 and remains employed on such basis through the end of the Performance Period. Eligibility for mid-cycle participation will be based on the proposal of the Chief Executive Officer, subject to review and approval of the Compensation Committee. The following additional conditions shall apply: (i) the Participant must have returned to the Company executed copies of the Integrity Policy Certification Agreement and Confidentiality Agreement, and acknowledged his or her understanding and acceptance of the Company's policies, consistent with the Company's practices and procedures; (ii) the Participant must be employed by the Company on the scheduled date of payment; and (iii) the Participant is subject to all other terms, conditions, restrictions and/or requirements set forth in this Section III. Contingency workers, including temporaries, contractors, consultants and outsourced work teams are not eligible for participation in the Plan.

- **Good Standing.** Participants must be actively employed and in good standing (and otherwise in compliance with the Company's policies and procedures) on the actual bonus pay date in order to receive a payout. Participants placed on a performance improvement plan or in corrective action status as a result of poor performance during the Performance Period, but who return to "Good Standing" status prior to the bonus payment date, may be eligible for a prorated incentive payout, as determined by the Compensation Committee in its sole and absolute discretion. As a condition of the receipt of any Bonus Award, the Participant will be required to certify (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Company's Integrity Policy Certification Agreement and Confidentiality Agreement or the non-compete and non-solicitation clauses in his or her employment letter, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Leave of Absence.** Subject to all applicable law, the Compensation Committee may, in its sole and absolute discretion, adjust any Bonus Award, on a pro-rata basis, for any leave of absence taken by a Participant during the Performance Period.

- **Voluntary Separation.** If a Participant voluntarily separates from the Company after the end of the Performance Period, but prior to the applicable Bonus Award payout date, then such Participant's Bonus Award will be deemed forfeited with respect to the Performance Period.

- **Involuntary Separation.** Participants terminated for Cause prior to the payout date will irrevocably forfeit any Bonus Award under the Plan. The determination of "Cause" will be made by the Compensation Committee in its sole and absolute discretion. Any other Participant whose employment is involuntarily terminated prior to the Bonus Award payout date will be deemed ineligible for payment of a Bonus Award.

- **Forfeiture of Bonus Award.** If a Participant's termination of employment occurs prior to the date a Bonus Award that has been awarded to such Participant is actually paid out, then the Participant will not be entitled to any bonus payment with respect to such Bonus Award. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. As a condition of the receipt of any Bonus Award, a Participant may be required to certify in writing (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Company's Integrity Policy Certification Agreement and Confidentiality Agreement, Confidentiality and Intellectual Property Assignment Agreement, the non-compete and non-solicitation clauses in his or her employment letter (if applicable) or any restrictive covenants applicable to the Participant, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Clawback of Bonus Award.** In the event that a Participant is terminated for Cause, the Company will be entitled to recover from the Participant at any time, and the Participant will pay over to the Company upon request, an amount equal to any Bonus Award that has been paid out to the Participant. To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to a Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that any such amounts are exempt from, or set off in a manner intended to comply with the

requirements of, Section 409A of the Code.

IV. TARGET BONUS AWARD

Participants covered by this Plan will be notified of eligibility in writing by the Company. Each Participant's respective target Bonus Award will be separately communicated in writing to each Participant by the Senior Vice President of Human Resources.

V. PERFORMANCE METRICS

The Performance Metrics established for the Plan are based on the Company's financial and operational targets for the Performance Period. The Company must achieve the Performance Metrics established by the Compensation Committee for the Performance Period in order for any payout to occur under the Plan.

The Board or the Compensation Committee may, in its sole and absolute discretion, at any time prior to the final determination of Bonus Awards, increase, decrease or otherwise adjust performance measures, targets, and payout ranges used hereunder as a result of extraordinary or non-recurring events, changes in applicable accounting rules or principles, changes in the Company's methods of accounting, changes in applicable law, changes due to any consolidation, acquisition or reorganization affecting the Company and its subsidiaries or such other material change in the Company's business. The Board or the Compensation Committee, as applicable, will implement such change(s) in its sole and absolute discretion.

VI. COMPUTATION AND DISBURSEMENT OF FUNDS

A. COMPUTATION

The calculation of the Company's financial and operational targets will be based upon the Company's audited financials, subject to review and approval by the Compensation Committee in its sole and absolute discretion and determination by the Compensation Committee in its sole and absolute discretion as to whether or not the Performance Metrics were achieved.

Notwithstanding anything to the contrary in this Plan, if the Compensation Committee determines, in its sole and absolute discretion, that calculations underlying the Performance Metrics, including but not limited to, mistakes in the Company's audited financial statements for the 2018 Fiscal Year or any Fiscal Year were incorrect, then the Compensation Committee may (i) adjust Bonus Awards (upward or downward); and/or (ii) initiate a Recoupment.

B. DISBURSEMENT OF FUNDS

As soon as practicable after the close of the Performance Period, the Company's Chief Financial Officer will calculate the Company's actual performance relative to the Performance Metrics with respect to the Performance Period. Subject to the terms and conditions set forth herein, if (i) the Company achieves the Performance Metrics; and (ii) Participant is an employee in Good Standing on the applicable payout date and no event or condition shall have occurred that would have given the Company the right to terminate the Participant for Cause on or prior to such date (the conditions set forth in (i) and (ii), the " Bonus Conditions "); then Participant will have earned and be entitled to be paid the Bonus Award. The proposed Bonus Award payouts and a list of eligible Participants will be presented to the Compensation Committee no later than ninety (90) days after the end of the Performance Period, and once approved, unless otherwise set forth in an Award agreement, the Bonus Awards will be paid to all eligible and approved Participants within 30 days of such approval but not later than June 30th of the calendar year immediately succeeding the end of the Performance Period, in each case provided that the Bonus Conditions are met. Payments of the Bonus Awards shall be one-time payments and will be reduced by amounts required to be withheld for taxes and other applicable withholdings at the time such payments are made.

C. TAXES

Income, employment, and any other applicable taxes and withholdings will be withheld from any Bonus Award payments required under the Plan to the extent determined by the Company in accordance with applicable law. In addition, in the sole and absolute discretion of the Company, any applicable employment taxes that are a liability of a Participant may be deducted from Bonus Awards and transmitted to the appropriate tax authority. A

Participant who receives payment hereunder also will be issued a Form W-2, Form 1099 or other report as is required by law, and such report also will be filed with taxing authorities as is required by law.

VII. ADMINISTRATION

This Plan will be administered by the Compensation Committee.

In the event of a claim or dispute brought forth by a Participant, the decision of the Compensation Committee as to the facts in the case and the meaning and intent of any provision of the Plan, or its application, will be final, binding, and conclusive. Notwithstanding anything herein to the contrary, the Compensation Committee shall retain sole and absolute discretion over all matters relating to this Plan.

VIII. NO EMPLOYMENT CONTRACT; FUTURE PLANS

Participation in this Plan will not confer upon any Participant any right to continue in the employ of the Company nor interfere in any way with the right of the Company to terminate any Participant's employment at any time. The Company is under no obligation to continue the Plan in future Fiscal Years.

IX. GENERAL PROVISIONS

A Participant's rights under the Plan will not be assignable, either voluntarily or involuntarily by way of encumbrance, pledge, attachment, level or charge of any nature (except as may be required by state or federal law).

Nothing in the Plan will require the Company to segregate or set aside any funds or other property for the purpose of paying any portion of a Bonus Award. No Participant, beneficiary or other person will have any right, title or interest in any amount awarded under the Plan prior to the payment of such Bonus Award to him or her or the close of any Performance Period, or in any property of the Company or its subsidiaries. A Participant's rights to a Bonus Award under this Plan are no greater than those of unsecured general creditors of the Company.

Notwithstanding anything herein to the contrary, whether or not any Bonus Award is authorized, earned or paid under the Plan shall be determined by the Compensation Committee in its sole and absolute discretion, and no such Bonus Award shall be earned, nor shall any right to any such Bonus Award exist or accrue, unless, among other factors, such Bonus Award has been authorized by the Compensation Committee in its sole and absolute discretion, and actually paid to Participants. In addition, whether or not any Bonus Award is authorized, earned or paid pursuant to the Plan is without regard to whether any of the individual performance metrics, Company financial performance targets and/or goals, or any other benchmarks, targets, personal goals or Company criteria set forth in the Plan are met, not met, exceeded or not exceeded.

The Bonus Awards payable hereunder are provided solely as a payment pursuant to the circumstances described herein and shall not constitute part of a Participant's employment compensation package. The Bonus Awards hereunder are not part of normal or expected compensation for purposes of calculating any severance, resignation, termination pay, redundancy, end of service payments, long-service awards, bonus, incentive pay, pension, or retirement benefits or similar payments and do not create any acquired rights.

This Plan is governed by the laws of the State of New York and as such will be construed under and in accordance with the laws of the State of New York without regard to conflicts of law.

X. COMPLIANCE WITH CODE SECTION 409(A)

This Plan and Bonus Awards paid hereunder are intended to be exempt from Code Section 409A and shall be construed, interpreted, and administered accordingly. In no event whatsoever shall the Company or its affiliates be liable for any additional tax, interest or penalty that may be imposed on any Participant pursuant to Code Section 409A or any damages for failing to comply with Code Section 409A. This section shall not apply to any Participant who is not a U.S. taxpayer (by reason of being a U.S. citizen, U.S. resident or otherwise).

XI. PERSONAL INFORMATION

By participating in this Plan, each of the Participants hereunder shall consent to the holding and processing of personal information provided by such Participant to the Company, any affiliate of the Company, trustee or third-party service provider, for all purposes relating to the operation of this Plan and to the extent necessary for such operation. These include, but are not limited to: (i) administering and maintaining Participant records; (ii) providing information to the Company, its affiliates, trustees of any employee benefit trust, registrars, brokers or third-party

administrators of this Plan; (iii) providing information to future purchasers or merger partners of the Company or any of its affiliates, or the business in which a Participant works; and (iv) to the extent not prohibited by applicable law, transferring information about a Participant to any country or territory that may not provide the same protection for the information as the Participant's home country.

Exhibit 10.50

FEDERAL-MOGUL LLC
2018 LONG-TERM INCENTIVE PLAN POWERTRAIN SEGMENT
For the Period January 1, 2018 – December 31, 2020

I. PURPOSE AND STRUCTURE

The Company's (as defined below) 2018 Long-Term Incentive Plan (this or the "Plan"), established for the 2018 Fiscal Year (as defined below) and the two subsequent Fiscal Years thereafter, is designed to drive a culture focused on long-term company performance. The Plan is intended to deliver "pay-for-performance" through a long-term incentive payment, which is based on overall Company financial performance during the Performance Period to encourage and stimulate superior performance by eligible Participants, and to assist in retaining key employees. In addition, this Plan is intended to be in effect during the Performance Period, subject to the right of the Compensation Committee to amend, modify or terminate this Plan as provided below. All capitalized terms used in the Plan have the meaning assigned to such terms in Section II below unless such terms are otherwise defined in the Plan.

II. DEFINITIONS

Definitions for specific terms used within this Plan are identified below.

A. "Affiliate" means each of the following: (i) any Subsidiary; (ii) any Parent; (iii) any corporation, trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company or one of its Affiliates; (iv) any trade or business (including, without limitation, a partnership or limited liability company) which directly or indirectly controls fifty percent (50%) or more (whether by ownership of stock, assets or an equivalent ownership interest or voting interest) of the Company; and (v) any other entity in which the Company or any of its Affiliates has a material equity interest and which is designated as an "Affiliate" by resolution of the Compensation Committee.

B. "Beneficial Owner " has the meaning assigned to such term in Rule 13d-3 and Rule 13d-5 under the Securities Exchange Act of 1934, as amended, except that in calculating the beneficial ownership of any particular "person" (as that term is used in Section 13(d)(3) of the Securities Exchange Act of 1934, as amended), such "person" will be deemed to have beneficial ownership of all securities that such "person" has the right to acquire by conversion or exercise of other securities, whether such right is currently exercisable or is exercisable only after the passage of time.

C. "Board" means the Board of Directors of the Company.

D. "Bonus Award" is the cash payment that may be earned by Participants in respect of the Performance Period, subject to the eligibility requirements set forth in Section III, achievement by the Company of Performance Metrics set forth in Section V with respect to the Performance Period, and subject to adjustments as provided in this Plan.

E. "Cause" means with respect to a Participant, the occurrence of any of the following: (i) willful failure of the Participant to perform substantially his/her duties (other than any such failure resulting from incapacity due to disability); (ii) the Participant's commission of, or indictment for, a felony or any crime involving fraud or embezzlement or dishonesty or conviction of, or plea of guilty or *nolo contendere* to a crime or misdemeanor (other than a traffic violation) punishable by imprisonment under foreign, federal, state or local law; (iii) the Participant's engagement in an act of fraud or other act of willful dishonesty or misconduct, towards the Company or any of its Affiliates, or detrimental to the Company or any of its Affiliates, or in the performance of the Participant's duties; (iv) the Participant's negligence in the performance of employment duties that has a detrimental effect on the Company or any of its Affiliates; (v) the Participant's violation of a federal or state securities law or regulation; (vi) the Participant's use of a controlled substance without a prescription or the use of alcohol which, in each case, significantly impairs the Participant's ability to carry out his or her duties and responsibilities; (vii) material violation by the Participant of the policies and procedures of the Company or any of its Affiliates; (viii) the Participant's embezzlement and/or misappropriation of property of the Company or any of its Affiliates; (ix) conduct by the Participant involving any immoral acts which is reasonably likely to impair the reputation of the Company or any of its Affiliates; or (x) the Participant's material breach of the Company's Integrity Policy Certification Agreement and Confidentiality Agreement, Confidentiality and Intellectual Property Assignment Agreement, the non-compete and non-solicitation clauses in his or her employment letter (if applicable) or any restrictive covenants applicable to the Participant.

F. " Change in Control " means (i) the consummation of any transaction (including, without limitation, any sale of stock, merger, consolidation or spinoff), the result of which is that any Person, other than Carl Icahn or the Related Parties, becomes that Beneficial Owner, directly or indirectly, of more than 50% of the voting power of the voting securities of the Company (or, if applicable, its parent corporation or entity) or (ii) the acquisition by any Person, other than Carl Icahn or the Related Parties, of all or substantially all of the assets of Company; provided, however, that to the extent the definition of Change in Control is applicable to a Bonus Award that constitutes deferred compensation for purposes of Code Section 409A, the transaction or acquisition shall only constitute a Change in Control for purposes of such Bonus Award to the extent the transaction or acquisition would constitute a change in control under either (i) or (ii) and would also constitute a change in control event as defined in 26 C.F.R. 1.409A-3(i)(5)(i).

G. "Code" means the Internal Revenue Code of 1986, as amended. Any reference to any section of the Code will also be a reference to any successor provision and any Treasury Regulation promulgated thereunder.

H. "Company" means Federal-Mogul LLC and its subsidiaries and its successors and assigns (with respect to the Powertrain division).

I. "Compensation Committee" means the Compensation Committee of the Board.

J. " Disparagement " means making comments or statements to the press, the Company's or its Affiliates' employees, consultants or any individual or entity with whom the Company or its Affiliates has a business relationship or any other Person or entity which could reasonably be expected to adversely affect in any manner: (i) the conduct of the business of the Company or its Affiliates (including, without limitation, any products or business plans or prospects); or (ii) the

business reputation of the Company or its Affiliates, or any of their products, or their past or present officers, directors or employees.

K. "Fiscal Year" means the Company's Fiscal Year beginning January 1 and ending December 31.

L. "Good Standing" has the meaning assigned to it in Section III.

M. "Parent" means any parent corporation of the Company within the meaning of Section 424(e) of the Code.

N. "Participant(s)" refer(s) to the employees listed selected and approved by the Compensation Committee, as long as any such person is eligible to participate in the Plan pursuant to Section III and any other person approved by the Compensation Committee in its sole and absolute discretion.

O. " Performance Metrics " are the Performance Metrics of the Company established by the Compensation Committee with respect to the Performance Period.

P. "Performance Period" means three years in duration, beginning on the first day of the 2018 Fiscal Year and ending on December 31, 2020.

Q. "Person" means any natural person, corporation, limited liability company, or other legal entity.

R. "Recoupment" is a compensation recovery method, provided under the Plan to recover all (or a portion) of a prior Bonus Award based on a correction or restatement of the Company's financial statements or other factors affecting Performance Metrics.

S. "Related Parties" shall mean (i) Carl Icahn, any spouse and any child, stepchild, sibling or descendant of Carl Icahn; (ii) any estate of Carl Icahn or of any Person referred to in clause (i); (iii) any Person who receives a bequest from or beneficial interest in any estate under clause (ii) to the extent of such interest; (iv) any executor, personal administrator or trustee who holds such beneficial interest in the Company for the benefit of, or as fiduciary for, any Person under clauses (i), (ii) or (iii) to the extent of such interest; (v) any Person directly or indirectly owned or controlled by Carl Icahn or any other Person or Persons identified in clauses (i), (ii) (iii) or (iv); and (vi) any not-for-profit entity not subject to taxation pursuant to Section 501(c)(3) of the Internal Revenue Code or any successor provision to which Carl Icahn or any Person identified in clauses (i), (ii) or (iii) above contributes his beneficial interest in the Company or to which such beneficial interest passes pursuant to such Person's will.

T. "Subsidiary" means any subsidiary corporation of the Company within the meaning of Section 424(f) of the Code.

U. "Term" means the period beginning on the date this Plan is adopted by the Compensation Committee, and ending on the date this Plan is terminated by the Compensation Committee. The Compensation Committee shall have the sole and absolute discretion to amend, modify or terminate this Plan at any time.

III. ELIGIBILITY

A Participant may be eligible to participate in the performance cycle if he or she is promoted or hired into an eligible, full-time (defined as 40 hours per week) position before October 1, 2018 and

remains employed on such basis through the end of the Performance Period. Eligibility for mid-cycle participation will be based on the proposal of the Chief Executive Officer, subject to review and approval of the Compensation Committee. The following additional conditions shall apply: (i) the Participant must have returned to the Company executed copies of the Integrity Policy Certification Agreement and Confidentiality Agreement, and acknowledged his or her understanding and acceptance of the Company's policies, consistent with the Company's practices and procedures; (ii) the Participant must be employed by the Company on the scheduled date of payment; and (iii) the Participant is subject to all other terms, conditions, restrictions and/or requirements set forth in this Section III. Contingency workers, including temporaries, contractors, consultants and outsourced work teams are not eligible for participation in the Plan. Additional information regarding participation and eligibility is set forth in **Exhibit A** attached hereto.

- **Good Standing.** Participants must be actively employed and in good standing (and otherwise in compliance with the Company's policies and procedures) on the actual bonus pay date in order to receive a payout. Participants placed on a performance improvement plan or in corrective action status as a result of poor performance during the Performance Period, but who return to "Good Standing" status prior to the bonus payment date, may be eligible for a prorated incentive payout, as determined by the Compensation Committee in its sole and absolute discretion. As a condition of the receipt of any Bonus Award, the Participant will be required to certify (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Company's Integrity Policy Certification Agreement and Confidentiality Agreement or the non-compete and non-solicitation clauses in his or her employment letter, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Leave of Absence.** Subject to all applicable law, the Compensation Committee may, in its sole and absolute discretion, adjust any Bonus Award, on a pro-rata basis, for any leave of absence taken by a Participant during the Performance Period.

- **Voluntary Separation.** If a Participant voluntarily separates from the Company after the end of the Performance Period, but prior to the applicable Bonus Award payout date, then such Participant's Bonus Award will be deemed forfeited with respect to the Performance Period.

- **Involuntary Separation.** Participants terminated for Cause prior to the payout date will irrevocably forfeit any Bonus Award under the Plan. The determination of "Cause" will be made by the Compensation Committee in its sole and absolute discretion. Any other Participant whose employment is involuntarily terminated prior to the Bonus Award payout date will be deemed ineligible for payment of a Bonus Award.

- **Forfeiture of Bonus Award.** If a Participant's termination of employment occurs prior to the date a Bonus Award that has been awarded to such Participant is actually paid out, then the Participant will not be entitled to any bonus payment with respect to such Bonus Award. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. As a condition of the receipt of any Bonus Award, Participant may be required to certify in writing (or will be deemed to have certified) at the time of receipt in a manner acceptable to the Company that the Participant (i) is in compliance with the terms and conditions of the Plan, (ii) has not violated any terms of the Company's Integrity Policy Certification Agreement and Confidentiality Agreement, Confidentiality and Intellectual Property Assignment Agreement, the non-compete and non-solicitation clauses in his or her employment letter (if

applicable) or any restrictive covenants applicable to the Participant, and (iii) has not engaged in, and does not intend to engage in, any behavior that would result in a termination for Cause.

- **Clawback of Bonus Award.** In the event that a Participant is terminated for Cause, the Company will be entitled to recover from the Participant at any time, and the Participant will pay over to the Company upon request, an amount equal to any Bonus Award that has been paid out to the Participant. To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to a Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that any such amounts are exempt from, or set off in a manner intended to comply with the requirements of, Section 409A of the Code.

IV. BONUS AWARD

Participants covered by this Plan will be notified of eligibility in writing by the Company. Each Participant's respective Bonus Award shall be valued based on the Participant's "award percentage" multiplied by the "Bonus Pool" (as established by the Compensation Committee), which "award percentage" will be separately communicated in writing to each Participant by the Senior Vice President of Human Resources.

V. PERFORMANCE METRICS

The Performance Metrics established for the Plan are based on the Company's financial performance during the Performance Period.

The Board or the Compensation Committee may, in its sole and absolute discretion, at any time prior to the final determination of Bonus Awards, increase, decrease or otherwise adjust performance measures, targets, and payout ranges used hereunder as a result of extraordinary or non-recurring events, changes in applicable accounting rules or principles, changes in the Company's methods of accounting, changes in applicable law, changes due to any consolidation, acquisition or reorganization affecting the Company and its subsidiaries or such other material change in the Company's business. The Board or the Compensation Committee, as applicable, will implement such change(s) in its sole and absolute discretion.

VI. COMPUTATION AND DISBURSEMENT OF FUNDS

A. COMPUTATION

The calculation of the Company's financial and operational targets will be based upon the Company's audited financials, subject to review and approval by the Compensation Committee in its sole and absolute discretion and determination by the Compensation Committee in its sole and absolute discretion as to whether or not the Performance Metrics were achieved.

Notwithstanding anything to the contrary in this Plan, if the Compensation Committee determines, in its sole and absolute discretion, that calculations underlying the Performance Metrics, including but not limited to, mistakes in the Company's audited financial statements for the 2018 Fiscal Year or any Fiscal Year were incorrect, then the Compensation Committee may (i) adjust Bonus Awards (upward or downward); and/or (ii) initiate a Recoupment.

B. DISBURSEMENT OF FUNDS

As soon as practicable after the close of the Performance Period, the Company's Chief Financial Officer will calculate the Company's actual performance relative to the Performance Metrics

with respect to the Performance Period. Subject to the terms and conditions set forth herein, if (i) the Company achieves the Performance Metrics; and (ii) Participant is an employee in Good Standing on the applicable payout date and no event or condition shall have occurred that would have given the Company the right to terminate the Participant for Cause on or prior to such date (the conditions set forth in (i) and (ii), the "Bonus Conditions"); then Participant will have earned and be entitled to be paid the Bonus Award. The proposed Bonus Award payouts and a list of eligible Participants will be presented to the Compensation Committee no later than ninety (90) days after the end of the Performance Period, and once approved, unless otherwise set forth in an Award agreement, the Bonus Awards will be paid to all eligible and approved Participants within 30 days of such approval but not later than June 30th of the calendar year immediately succeeding the end of the Performance Period, in each case provided that the Bonus Conditions are met. Payments of the Bonus Awards shall be one-time payments and will be reduced by amounts required to be withheld for taxes and other applicable withholdings at the time such payments are made.

C. **TAXES**

Income, employment, and any other applicable taxes and withholdings will be withheld from any Bonus Award payments required under the Plan to the extent determined by the Company in accordance with applicable law. In addition, in the sole and absolute discretion of the Company, any applicable employment taxes that are a liability of a Participant may be deducted from Bonus Awards and transmitted to the appropriate tax authority. A Participant who receives payment hereunder also will be issued a Form W-2, Form 1099 or other report as is required by law, and such report also will be filed with taxing authorities as is required by law.

VII. ADMINISTRATION

This Plan will be administered by the Compensation Committee.

In the event of a claim or dispute brought forth by a Participant, the decision of the Compensation Committee as to the facts in the case and the meaning and intent of any provision of the Plan, or its application, will be final, binding, and conclusive. Notwithstanding anything herein to the contrary, the Compensation Committee shall retain sole and absolute discretion over all matters relating to this Plan.

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Participation in this Plan will not confer upon any Participant any right to continue in the employ of the Company nor interfere in any way with the right of the Company to terminate any Participant's employment at any time. The Company is under no obligation to continue the Plan in future Fiscal Years.

IX. GENERAL PROVISIONS

A Participant's rights under the Plan will not be assignable, either voluntarily or involuntarily by way of encumbrance, pledge, attachment, level or charge of any nature (except as may be required by state or federal law).

Nothing in the Plan will require the Company to segregate or set aside any funds or other property for the purpose of paying any portion of a Bonus Award. No Participant, beneficiary or other person will have any right, title or interest in any amount awarded under the Plan prior to the payment of such Bonus Award to him or her or the close of any Performance Period, or in any property of the

Company or its subsidiaries. A Participant's rights to a Bonus Award under this Plan are no greater than those of unsecured general creditors of the Company.

Notwithstanding anything herein to the contrary, whether or not any Bonus Award is authorized, earned or paid under the Plan shall be determined by the Compensation Committee in its sole and absolute discretion, and no such Bonus Award shall be earned, nor shall any right to any such Bonus Award exist or accrue, unless, among other factors, such Bonus Award has been authorized by the Compensation Committee in its sole and absolute discretion, and actually paid to Participants. In addition, whether or not any Bonus Award is authorized, earned or paid pursuant to the Plan is without regard to whether any of the individual performance metrics, Company financial performance targets and/or goals, or any other benchmarks, targets, personal goals or Company criteria set forth in the Plan are met, not met, exceeded or not exceeded.

The Bonus Awards payable hereunder are provided solely as a payment pursuant to the circumstances described herein and shall not constitute part of a Participant's employment compensation package. The Bonus Awards hereunder are not part of normal or expected compensation for purposes of calculating any severance, resignation, termination pay, redundancy, end of service payments, long-service awards, bonus, incentive pay, pension, or retirement benefits or similar payments and do not create any acquired rights.

This Plan is governed by the laws of the State of New York and as such will be construed under and in accordance with the laws of the State of New York without regard to conflicts of law.

X. COMPLIANCE WITH CODE SECTION 409(A)

This Plan and Bonus Awards paid hereunder are intended to be exempt from Code Section 409A and shall be construed, interpreted, and administered accordingly. In no event whatsoever shall the Company or its affiliates be liable for any additional tax, interest or penalty that may be imposed on any Participant pursuant to Code Section 409A or any damages for failing to comply with Code Section 409A. This section shall not apply to any Participant who is not a U.S. taxpayer (by reason of being a U.S. citizen, U.S. resident or otherwise).

XI. PERSONAL INFORMATION

By participating in this Plan, each of the Participants hereunder shall consent to the holding and processing of personal information provided by such Participant to the Company, any affiliate of the Company, trustee or third-party service provider, for all purposes relating to the operation of this Plan and to the extent necessary for such operation. These include, but are not limited to: (i) administering and maintaining Participant records; (ii) providing information to the Company, its affiliates, trustees of any employee benefit trust, registrars, brokers or third-party administrators of this Plan; (iii) providing information to future purchasers or merger partners of the Company or any of its affiliates, or the business in which a Participant works; and (iv) to the extent not prohibited by applicable law, transferring information about a Participant to any country or territory that may not provide the same protection for the information as the Participant's home country.

Exhibit 10.51

FEDERAL-MOGUL LLC
2018 LONG-TERM INCENTIVE PLAN MOTORPARTS SEGMENT
LTIP AWARD AGREEMENT
For the Period January 1, 2018 – December 31, 2020

THIS LTIP AWARD AGREEMENT (the "Agreement") is made by and between Federal-Mogul LLC (Motorparts segment), a Delaware corporation (the "Company"), and [•], an officer or employee of the Company or a subsidiary of the Company (the "Participant") effective as of January 1, 2018.

In consideration of the mutual covenants herein contained and other good and valuable consideration, receipt of which is hereby acknowledged, the Company and the Participant hereby agree as follows:

1. GRANT. The Company hereby grants to the Participant identified above a "Bonus Award" (sometimes referred to herein as the "Award") (calculated in the manner set forth herein and the Plan) subject to the terms and conditions set forth herein and the Plan (defined below) (the "Terms"). No Bonus Award will be paid or payable hereunder unless the Participant earns the Bonus Award pursuant to Sections 6 and/or 7 hereof and Section V of the Federal-Mogul LLC (Motorparts segment) 2018 Long-Term Performance Plan dated as of January 1, 2018 (the "Plan"). This Bonus Award is granted pursuant to and is subject to the terms and conditions of the Plan. A copy of the Plan is attached as an exhibit hereto and the terms and conditions thereof are incorporated herein by this reference and are expressly made part of this Agreement. All terms used herein and defined in the Plan shall, unless otherwise defined herein, have the same meaning set forth in the Plan. The Bonus Award granted hereby is non-transferable except as otherwise permitted under the Plan.

2. PERFORMANCE PERIOD. The Performance Period for this Award shall be the three- year period commencing on January 1, 2018 and ending on December 31, 2020.

3. VESTING. The Performance-based portions of the Award shall be earned in accordance with Sections 6 and/or 7 hereof, subject to the Participant's continuous employment throughout the Performance Period.

4. PERFORMANCE MEASURE. The performance measure for the Performance Period shall have three elements: Operational EBITDA (as defined below) for the Performance Period; ROWA (as defined below) for the Performance Period and Net Sales for the Performance Period (as defined below). All three of the elements will have a stand-alone 2018 measure and a three-year cumulative 2018 to 2020 measure. The payout of the stand-alone 2018 measure and three-year cumulative 2018 to 2020 measure are independent.

"Operational EBITDA [1] " is defined as disclosed in the Company's public filings or audited financial statements in a manner consistent with past practices. For 2018, EBITDA will be adjusted for foreign currency exchange rates versus the Budget exchange rates. For the cumulative EBITDA (2018-2020), adjustments for foreign currency exchange rates will not apply

[1] Operational EBITDA equals "CF EBITDA" in the company's Onestream corporate reporting system.

Net Sales [2] are defined as third party sales as disclosed in the Company's public filings or audited financial statements in a manner consistent with past practices. Net Sales will be adjusted for sales from acquisitions and/or divestitures and do not include Motorparts sales to Federal-Mogul Powertrain. For 2018, Net Sales will be adjusted for foreign currency exchange rates versus the Budget exchange rates. For the cumulative Net Sales (2018-2020), adjustments for foreign currency exchange rates will not apply.

[2] Net Sales equals value identified in account "6000" in the company's Onestream corporate reporting system.

"ROWA" shall be expressed as a percentage and will be equal to Operational Earnings before interest, taxes and intangible amortization, divided by monthly average "Working Assets." "Working Assets" is equal to accounts receivable plus inventory, less accounts payable, plus PP&E (plant, property and equipment), capitalized software, plus investment in non-consolidated joint ventures. The ROWA calculation will assume factoring levels remain consistent with 2018 budget levels.

Notwithstanding anything herein to the contrary, for purposes of calculating Operational EBITDA, ROWA and Net Sales, the Compensation Committee may, in its sole and absolute discretion, adjust the calculation of Operational EBITDA, ROWA and Net Sales, or their respective targets, based on approved capital expansion plans, acquisitions, changes in foreign

currency exchange rates and other changes in Company business for events or actions during the course of the Performance Period that vary from business plan assumptions or that are unusual, infrequent and/or non-recurring (including but not limited to goodwill impairments or legacy costs). For purposes of clarification, the Operational EBITDA performance target set forth in Section 6 is based on the Company's current business plan.

Performance Metrics: Two Elements (see Appendix A):

Element One: Stand-alone 2018 period with specific KPI's:

- **50% Operational EBITDA**
- **25% ROWA**
- **25% Net Sales**

Element Two: Three-year (2018-2020) cumulative performance period

- **50% Operational EBITDA**
- **25% ROWA**
- **25% Net Sales**

5. TIMING AND FORM OF PAYOUT. As soon as practicable after the close of the Performance Period, the Chief Financial Officer shall calculate the financial performance and the proposed payout under the Plan based on the achievement of the financial Performance Measure. The proposed payout shall be presented to the Compensation Committee for its review and approval. Once approved, payment of the Award shall be made within 30 days after such approval but not later than June 30th of the calendar year following the end of the Performance Period. All Award payments shall be reduced by amounts required to be withheld for taxes at the time payments are made.

6. DEATH OR SEPARATION FROM SERVICE DUE TO (i) TERMINATION BY THE COMPANY WITHOUT CAUSE, OR (ii) TERMINATION BY THE COMPANY DUE TO PARTICIPANT'S DISABILITY. In the event of the Participant's death, or separation from service due to (i) termination by the Company for any reason other than Cause, or (ii) termination by the Company due to the Participant's Disability, each, a "Qualifying Event", in each case on or after January 1, 2020 and prior to the end of the Performance Period, the Compensation Committee may, in its sole and absolute discretion, take action to cause the Participant (or in the case of the Participant's death, the Participant's beneficiary) to be entitled to receive an Award payout equal to the Bonus Award (calculated in accordance with Sections 6 and/or 7 hereof) as if he or she had remained employed until the last day of the Performance Period, multiplied by a fraction, the numerator of which shall be the number of full calendar months during the period of January 1, 2018 through the date the Participant's employment terminated due to a Qualifying Event and the denominator of which shall be thirty-six (36), the total number of months in the Performance Period. The payment of any such amount shall be made according to same terms set forth in Section 8 above. As used herein, "Disability" shall have the meaning given to such term in Section 409A(a)(2)(C) of the Code.

7. SEPARATION FROM SERVICE FOR ANY REASON. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. Except as may be provided in Section 9 or Section 11, the Participant must be an employee of the Company and/or an Affiliate continuously from the date of this Award until the Bonus Award is paid. Consequently, if the Participant's employment with the Company is voluntarily or involuntarily terminated prior to the Bonus Award payment date, he or she will be ineligible for payment of the Bonus Award, except as otherwise may be provided by the Compensation Committee or pursuant to Section 9, in which case any such Bonus Award to the Participant shall be paid at the time Bonus Awards are paid to active employees pursuant to Section 8 above or pursuant to Section 11.

8. PAYMENT UPON A CHANGE IN CONTROL. Notwithstanding anything to the contrary in this Agreement, upon the occurrence of a Change in Control during the Performance Period, the Compensation Committee may, but shall have no obligation to, take such action to provide for the payment of a pro-rated Bonus Award to the Participant with respect to such Performance Period or require the Company or its successor to assume or continue to be bound by this Agreement, in each case, under such terms and conditions as may be established by the Compensation Committee in its sole and absolute discretion.

9. NO LIMITATION ON RIGHTS OF THE COMPANY. The grant of this Award shall not in any way affect the right or power of the Company to make adjustments, reclassification, or changes in its capital or business structure, or to merge, consolidate, dissolve, liquidate, sell or transfer all or any part of its business or assets.

10. CANCELLATION, RESCISSION, AND CLAWBACK OF AWARDS. In the event of a restatement of the Company's consolidated financial statements that would reduce the amount of any previously awarded Bonus Award, the related outstanding Awards will be cancelled or reduced accordingly. For Bonus Awards that have been paid, the Participant shall be obligated and required to pay over to the Company an amount equal to any gain realized as a result of the exercise, distribution or settlement (whether at the time of exercise, distribution or settlement or thereafter) of such Bonus Awards.

Additionally, the Compensation Committee may at any time, in its sole and absolute discretion, cancel, declare forfeited, rescind, or require the return of any outstanding Award (or a portion thereof) upon the Compensation Committee determining, at any time (whether before or after the grant date of the Award), that the Participant has engaged in misconduct (including by omission) or that an event or condition has occurred, which, in each case, would have given the Company the right to terminate the Participant's employment for Cause. In addition, at any time following the payment of an Award, the Compensation Committee may, in its sole and absolute discretion, rescind any such payment and require the repayment of an Award (or a portion thereof) upon the Compensation Committee determining, at any time (whether before or after the payment of the Award), that the Participant has engaged in misconduct (including by omission) or that an event or condition has occurred, which, in each case, would have given the Company the right to terminate the Participant's employment for Cause.

The Compensation Committee's determination that the Participant has engaged in misconduct (including by omission), or that an event or condition has occurred, which, in each case, would have given the Company the right to terminate the Participant's employment for Cause, and its decision to require rescission of an Award's payment, shall be conclusive, binding, and final on all parties. The Compensation Committee's determination that the Participant has violated the terms of the Plan or the Award and the Compensation Committee's decision to cancel, declare forfeited, or rescind an Award or to require rescission of an Award's payment shall be conclusive, binding, and final on all parties.

In connection with any cancellation, forfeiture or rescission contemplated by this Section 13 or the Plan, the terms of repayment by the applicable Participant shall be determined in the Compensation Committee's sole and absolute discretion, which may include, among other terms, the repayment being required to be made (i) in one or more installments or payroll deductions or deducted from future bonus payments or (ii) immediately in a lump sum in the event that such Participant incurs a termination of employment.

To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to the Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that such amounts are exempt from, or set off in a manner intended to comply with the requirements of, Section 409A of the Code.

11. NOTICE. Any notice or other communication required or permitted hereunder shall be in writing and shall be delivered by electronic mail or personally, or sent by certified, registered or express mail, postage prepaid. Any such notice shall be deemed given when so delivered (if sent by electronic mail or personal delivery) or, if mailed, three days after the date of deposit in the United States mail, in the case of the Company to the Chief Financial Officer and, in the case of the Participant, to his or her address on file with the Company or, in each case, to such other address as may be designated in a notice given in accordance with this Section 14. Electronic mail notices to Participant shall be sent to his or her e-mail address on file with the Company, and electronic mail notices to the Company shall be sent to the Company's Human Resources Department.

12. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the laws of the State of New York without giving effect to the conflicts of laws principles thereof.

13. PARTICIPANT ACKNOWLEDGMENT. The Participant hereby acknowledges receipt of a copy of the Plan, has read and understands the Plan, and agrees to be bound by all terms and provisions contained therein.

14. DEFINITIONS. Capitalized terms used herein and not otherwise defined shall have the meanings ascribed to such terms in the Plan.

15. UNFUNDED STATUS. The Bonus Award constitutes an unfunded and unsecured promise of the Company to deliver (or cause to be delivered) to the Participant, subject to the terms and conditions of this Agreement and the Plan, payment in respect of the Award as provided herein. By accepting this Bonus Award, the Participant understands that this grant does not confer any legal or equitable right (other than those constituting the Bonus Award) against the Company or any of its affiliates, directly or indirectly, or give rise to any cause of action at law or in equity against the Company or any of its affiliates. The rights of the Participant (or any person claiming through the Participant) under this Agreement shall be solely those of an unsecured general creditor of the Company.

16. NO RIGHT TO CONTINUED EMPLOYMENT. Nothing in this Agreement shall be interpreted or construed to confer upon the Participant any right with respect to continuance of employment by the Company or one of its subsidiaries, nor shall this Agreement interfere in any way with the right of the Company or one of its subsidiaries to terminate the Participant's employment therewith at any time. In addition, the Bonus Award is provided solely as an incentive and shall not constitute part of the Participant's employment compensation package. The Bonus Award shall not be considered part of normal or expected compensation for purposes of calculating any severance, resignation, redundancy, end of service payments, long-service awards, pension, or retirement benefits or similar payments and does not create any acquired rights.

17. TAX WITHHOLDING. The Participant shall be liable for any and all federal, state, provincial, local or foreign taxes, pension plan contributions, employment insurance premiums, social insurance contributions, amounts payable to a governmental and/or regulatory body in the Participant's country and other levies of any kind required by applicable laws to be deducted or withheld with respect to the Bonus Award (collectively, the "Withholding Taxes"). The Company and its subsidiaries shall have the right to deduct and withhold all required Withholding Taxes from any payment or other consideration deliverable hereunder to the Participant.

18. PLAN DOCUMENT CONTROLS. The rights herein granted are in all respects subject to the provisions set forth in the Plan to the same extent and with the same effect as if set forth fully herein. In the event that the terms of this Agreement conflict with the terms of the Plan document, the Plan document shall control.

19. COMPLIANCE WITH SECTION 409A. The intent of the parties is that payments and benefits under this Agreement be exempt from, or comply with, Code Section 409A and the regulations and guidance promulgated thereunder (collectively "Code Section 409A") and, accordingly, to the maximum extent permitted, this Agreement shall be interpreted in accordance with such intent. In no event whatsoever shall the Company be liable for any additional tax, interest or penalty that may be imposed on the Participant by Code Section 409A (or analogous state laws) or any damages for failing to comply with Code Section 409A (or analogous state laws).

If the Participant is a "specified employee" (as such term is defined for purposes of Code Section 409A) at the time of his or her termination of employment, no amount that is subject to Code Section 409A and that becomes payable by reason of such termination of employment shall be paid to the Participant before the earlier of (i) the date immediately following the expiration of the six-month period measured from the date of the Participant's termination of employment, and (ii) the date of the Participant's death. A termination of employment shall be deemed to occur only if it is a "separation from service" as defined in the Plan, and references in this Agreement to "termination," "termination of employment," or like terms shall mean a separation from service. This Section 22 shall not apply if the Participant is not a U.S. taxpayer (by reason of being a U.S. citizen, U.S. resident or otherwise).

20. DATA PROTECTION. By executing this Agreement, the Participant consents to the holding and processing of personal information provided by the Participant to the Company, any affiliate of the Company, trustee or third party service provider, for all purposes relating to the performance of this Agreement. These include, but are not limited to: (i) administering and maintaining Participant records; (ii) providing information to the Company, its affiliates, trustees of any employee benefit trust, registrars, brokers or third party administrators; (iii) providing information to future purchasers or merger partners of the Company or any of its affiliates, or the business in which the Participant works; and (iv) to the extent not prohibited by applicable law, transferring information about the Participant to any country or territory that may not provide the same protection for the information as the Participant's home country.

21. CONFIDENTIALITY. By executing this Agreement, the Participant agrees and acknowledges that at all times, and notwithstanding any payment or forfeiture of this Award, he or she will hold in strict confidence and will not disclose the terms of this Bonus Award and/or the Plan to any third party, except to Participant's spouse or significant other, legal counsel, financial or tax advisor, or as otherwise required by law. In the event Participant discloses such information to one or more of the foregoing individuals, such individual(s) shall also be bound by the confidentiality obligations set forth herein.

IN WITNESS WHEREOF , the Company has caused this Agreement to be duly executed by its duly authorized officer and said Participant has hereunto signed this Agreement on his or her own behalf, as of the day and year first above written.

FEDERAL-MOGUL LLC (MOTORPARTS SEGMENT)

By: _____

Title: __

Exhibit 10.52

FEDERAL-MOGUL LLC
2018 LONG-TERM INCENTIVE PLAN POWERTRAIN SEGMENT
LTIP AWARD AGREEMENT
For the Period January 1, 2018 – December 31, 2020

THIS LTIP AWARD AGREEMENT (the "Agreement") is made by and between Federal-Mogul LLC (Powertrain segment), a Delaware corporation (the "Company"), and [•], an officer or employee of the Company or a subsidiary of the Company (the "Participant") effective as of January 1, 2018.

In consideration of the mutual covenants herein contained and other good and valuable consideration, receipt of which is hereby acknowledged, the Company and the Participant hereby agree as follows:

GRANT. The Company hereby grants to the Participant identified above a "Bonus Award" (sometimes referred to herein as the "Award") (calculated in the manner set forth herein and the Plan) subject to the terms and conditions set forth herein and the Plan (defined below) (the "Terms"). No Bonus Award will be paid or payable hereunder unless the Participant earns the Bonus Award pursuant to Sections 3, 4 and/or 5 hereof and Section V of the Federal-Mogul LLC (Powertrain segment) 2018 Long-Term Performance Plan dated as of January 1, 2018, (the "Plan"). This Bonus Award is granted pursuant to and is subject to the terms and conditions of the Plan. A copy of the Plan is attached as an exhibit hereto and the terms and conditions thereof are incorporated herein by this reference and are expressly made part of this Agreement. All terms used herein and defined in the Plan shall, unless otherwise defined herein, have the same meaning set forth in the Plan. The Bonus Award granted hereby is non-transferable except as otherwise permitted under the Plan.

1. PERFORMANCE PERIOD. The Performance Period for this Award shall be the three- year period commencing on January 1, 2018 and ending on December 31, 2020.

2. AWARD VALUE. Participant's Award hereunder shall be valued based on the Participant's "award percentage" multiplied by the PT Bonus Pool. For purposes of this Agreement, the Participant's "award percentage" is equal to [_]%.

3. DEFINITIONS.

(a) "PT Bonus Pool" means 5% of Economic Profit generated by the Powertrain Segment during the Performance Period. The PT Bonus Pool cannot be less than $0 and may not exceed $[ ] with respect to the Performance Period.

(b) "Economic Profit" means, with respect to the Powertrain Segment of the Company, EBIT of the Powertrain Segment less the Capital Charge. Economic Profit shall be calculated quarterly during the Performance Period.

(c) "EBIT" means, for any fiscal quarter, the Powertrain Segment's consolidated net income determined in accordance with GAAP before the following:

i. interest income and expense,
ii. provision for income taxes (including tax sharing payments),
iii. legacy defined benefit expenses (including European pension expense),
iv. OPEB curtailment gains or losses,
v. expenses associated with factoring of receivables,

vi. gains and losses on the sale of a business,
vii. restructuring charge, to be capitalized and then amortized through EBIT over a 3 year period (i.e. over 12 quarters).
viii. Intercompany Dividends, Income/Expense, Fixed Asset transfers,
ix. Minority Interest, and
x. Goodwill Impairment.

EBIT shall be calculated quarterly during the Performance Period Notwithstanding anything to the contrary in the foregoing, the Committee may, in its sole and absolute discretion, subject to the terms of the Plan, adjust the calculation of EBIT for events or actions during the course of the Performance Period that are unusual and/or non-recurring (including but not limited to goodwill impairments or legacy costs).

(d) "Capital Charge" means, for any fiscal quarter, Average Working Assets multiplied by the annual rate specified below. Capital Charge shall be calculated quarterly during the Performance Period.

i. Fiscal 2018: Ten percent (10.0%) (*i.e.* , 2.5% each fiscal quarter).

ii. Fiscal 2019: Ten percent (10.0%) (*i.e.* , 2.5% each fiscal quarter).

iii. Fiscal 2020: Ten percent (10.0%) (*i.e.* , 2.5% each fiscal quarter).

(e) "Average Working Assets" means, for any fiscal quarter, the average of (i) Working Assets as of the last day of such quarter and (ii) Working Assets as of the last day of the immediately preceding quarter. Average Working Assets shall be calculated quarterly during the Performance Period.

(f) "Powertrain Segment" means the Powertrain operating segment of the Company (or any successor operating segment).

(g) "Working Assets" means, for any fiscal quarter, the following items for the Powertrain Segment as of the last day of such quarter (in each case determined in accordance with GAAP):

i. accounts receivable; plus
ii. factored receivables that would not have otherwise been paid during the fiscal quarter; plus
iii. net inventory; plus
iv. property, plant and equipment net of depreciation (i.e. net book value); plus
v. goodwill and other intangible assets related to acquisitions or investments completed on or after September 30, 2013; plus
vi. net book value of capitalized restructuring (i.e. gross amount of restructuring capitalized net of accumulated amortized restructuring charged through EBIT); plus
vii. investments in non-consolidated subsidiaries (excluding $[ ] million consisting primarily of retained earnings established before January 1, 2014); less
viii. accounts payable; less
ix. accrued liabilities (other than accruals for short term taxes or short term interest).

Working Assets shall be calculated quarterly during the Performance Period. The Participant and the Company acknowledge and agree that Working Assets for the

fiscal quarter of the Powertrain Segment ended December 31, 2017 was $[ ] billion. Notwithstanding anything to the contrary in the foregoing: (A) Working Assets shall be determined without giving effect to any gains and losses on the sale of a business; and (B) the Committee may in its sole and absolute discretion, subject to the terms of the Plan, adjust the calculation of Working Assets for events or actions during the course of the Performance Period that are unusual, infrequent and/or non-recurring (including but not limited to goodwill impairments).

4. TIMING AND FORM OF PAYOUT. As soon as practicable after the close of the Performance Period, the Chief Financial Officer shall calculate the financial performance and the proposed payout under the Plan based on the achievement of the financial Performance Measure. The proposed payout shall be presented to the Compensation Committee for its review and approval. Once approved, payment of the Award shall be made within 30 days after such approval but not later than June 30th of the calendar year following the end of the Performance Period. All Award payments shall be reduced by amounts required to be withheld for taxes at the time payments are made.

5. DEATH OR SEPARATION FROM SERVICE DUE TO (i) TERMINATION BY THE COMPANY WITHOUT CAUSE, OR (ii) TERMINATION BY THE COMPANY DUE TO PARTICIPANT'S DISABILITY. In the event of the Participant's death, or separation from service due to
(i) termination by the Company for any reason other than Cause, or (ii) termination by the Company due to the Participant's Disability, each, a "Qualifying Event", in each case on or after January 1, 2020 and prior to the end of the Performance Period, the Compensation Committee may, in its sole and absolute discretion, take action to cause the Participant (or in the case of the Participant's death, the Participant's beneficiary) to be entitled to receive an Award payout equal to the Bonus

Award (calculated in accordance with Sections 3, 4 and/or 5 hereof) as if he or she had remained employed until the last day of the Performance Period, multiplied by a fraction, the numerator of which shall be the number of full calendar months during the period of January 1, 2018 through the date the Participant's employment terminated due to a Qualifying Event and the denominator of which shall be thirty-six (36), the total number of months in the Performance Period. The payment of any such amount shall be made according to same terms set forth in Section 5 above. As used herein, "Disability" shall have the meaning given to such term in Section 409A(a)(2)(C) of the Code.

6. SEPARATION FROM SERVICE FOR ANY REASON. Bonus Awards are not considered earned until they are approved by the Compensation Committee and are actually paid by the Company. Except as may be provided in Section 6 or Section 8, the Participant must be an employee of the Company and/or an Affiliate continuously from the date of this Award until the Bonus Award is paid. Consequently, if the Participant's employment with the Company is voluntarily or involuntarily terminated prior to the Bonus Award payment date, he or she will be ineligible for payment of the Bonus Award, except as otherwise may be provided by the Compensation Committee or pursuant to Section 6, in which case any such Bonus Award to the Participant shall be paid at the time Bonus Awards are paid to active employees pursuant to Section 5 above or pursuant to Section 8.

7. PAYMENT UPON A CHANGE IN CONTROL. Notwithstanding anything to the contrary in this Agreement, upon the occurrence of a Change in Control during the Performance Period, the Compensation Committee may, but shall have no obligation to, take such action to provide for the payment of a pro-rated Bonus Award to the Participant with respect to such Performance Period or require the Company or its successor to assume or continue to be bound by this Agreement, in each case, under such terms and conditions as may be established by the Compensation Committee in its sole and absolute discretion.

8. NO LIMITATION ON RIGHTS OF THE COMPANY. The grant of this Award shall not in any way affect the right or power of the Company to make adjustments, reclassification, or changes in its capital or business structure, or to merge, consolidate, dissolve, liquidate, sell or transfer all or any part of its business or assets.

9. CANCELLATION, RESCISSION, AND CLAWBACK OF AWARDS. In the event of a restatement of the Company's consolidated financial statements that would reduce the amount of any previously awarded Bonus Award, the related outstanding Awards will be cancelled or reduced accordingly. For Bonus Awards that have been paid, the Participant shall be obligated and required to pay over to the Company an amount equal to any gain realized as a result of the exercise, distribution or settlement (whether at the time of exercise, distribution or settlement or thereafter) of such Bonus Awards.

Additionally, the Compensation Committee may at any time, in its sole and absolute discretion, cancel, declare forfeited, rescind, or require the return of any outstanding Award (or a portion thereof) upon the Compensation Committee determining, at any time (whether before or after the grant date of the Award), that the Participant has engaged in misconduct (including by omission) or that an event or condition has occurred, which, in each case, would have given the Company the right to terminate the Participant's employment for Cause. In addition, at any time following the payment of an Award, the Compensation Committee may, in its sole and absolute discretion, rescind any such payment and require the repayment of an Award (or a portion thereof) upon the Compensation Committee determining, at any time (whether before or after the payment of the Award), that the Participant has engaged in misconduct (including by omission) or that an event or condition has occurred, which, in each case, would have given the Company the right to terminate the Participant's employment for Cause.

The Compensation Committee's determination that the Participant has engaged in misconduct (including by omission), or that an event or condition has occurred, which, in each case, would have given the Company the right to terminate the Participant's employment for Cause, and its decision to require rescission of an Award's payment, shall be conclusive, binding, and final on all parties. The Compensation Committee's determination that the Participant has violated the terms of the Plan or the Award and the Compensation Committee's decision to cancel, declare forfeited, or rescind an Award or to require rescission of an Award's payment shall be conclusive, binding, and final on all parties.

In connection with any cancellation, forfeiture or rescission contemplated by this Section 10 or the Plan, the terms of repayment by the applicable Participant shall be determined in the Compensation Committee's sole and absolute discretion, which may include, among other terms, the repayment being required to be made (i) in one or more installments or payroll deductions or deducted from future bonus payments or (ii) immediately in a lump sum in the event that such Participant incurs a termination of employment.

To the extent not prohibited under applicable law, the Company, in its sole and absolute discretion, will have the right to set off (or cause to be set off) any amounts otherwise due to the Participant from the Company in satisfaction of any repayment obligation of such Participant hereunder, provided that an such amounts are exempt from, or set off in a manner intended to comply with the requirements of, Section 409A of the Code.

10. NOTICE. Any notice or other communication required or permitted hereunder shall be in writing and shall be delivered by electronic mail or personally, or sent by certified, registered or express mail, postage prepaid. Any such notice shall be deemed given when so delivered (if sent by electronic mail or personal delivery) or, if mailed, three days after the date of deposit in the United States mail, in the case of the Company to the Chief Financial Officer and, in the case of the Participant, to his or her address on file with the Company or, in each case, to such other address as may be designated in a notice given in accordance with this Section 11. Electronic mail notices to Participant shall be sent to his or her e-mail address on file with the Company, and electronic mail notices to the Company shall be sent to the Company's Human Resources Department.

11. GOVERNING LAW. This Agreement shall be governed by and construed in accordance with the laws of the State of New York without giving effect to the conflicts of laws principles thereof.

12. PARTICIPANT ACKNOWLEDGMENT. The Participant hereby acknowledges receipt of a copy of the Plan, has read and understands the Plan, and agrees to be bound by all terms and provisions contained therein.

13. DEFINITIONS. Capitalized terms used herein and not otherwise defined shall have the meanings ascribed to such terms in the Plan.

14. UNFUNDED STATUS. The Bonus Award constitutes an unfunded and unsecured promise of the Company to deliver (or cause to be delivered) to the Participant, subject to the terms and conditions of this Agreement and the Plan, payment in respect of the Award as provided herein. By accepting this Bonus Award, the Participant understands that this grant does not confer any legal or equitable right (other than those constituting the Bonus Award) against the Company or any of its affiliates, directly or indirectly, or give rise to any cause of action at law or in equity against the Company or any of its affiliates. The rights of the Participant (or any person claiming through the Participant) under this Agreement shall be solely those of an unsecured general creditor of the Company.

15. NO RIGHT TO CONTINUED EMPLOYMENT. Nothing in this Agreement shall be interpreted or construed to confer upon the Participant any right with respect to continuance of employment by the Company or one of its subsidiaries, nor shall this Agreement interfere in any way with the right of the Company or one of its subsidiaries to terminate the Participant's employment therewith at any time. In addition, the Bonus Award is provided solely as an incentive and shall not constitute part of the Participant's employment compensation package. The Bonus Award shall not be considered part of normal or expected compensation for purposes of calculating any severance, resignation, redundancy, end of service payments, long-service awards, pension, or retirement benefits or similar payments and does not create any acquired rights.

16. TAX WITHHOLDING. The Participant shall be liable for any and all federal, state, provincial, local or foreign taxes, pension plan contributions, employment insurance premiums, social insurance contributions, amounts payable to a governmental and/or regulatory body in the Participant's country and other levies of any kind required by applicable laws to be deducted or withheld with respect to the Bonus Award (collectively, the "Withholding Taxes"). The Company and its subsidiaries shall have the right to deduct and withhold all required Withholding Taxes from any payment or other consideration deliverable hereunder to the Participant.

17. PLAN DOCUMENT CONTROLS. The rights herein granted are in all respects subject to the provisions set forth in the Plan to the same extent and with the same effect as if set forth fully herein. In the event that the terms of this Agreement conflict with the terms of the Plan document, the Plan document shall control.

18. COMPLIANCE WITH SECTION 409A. The intent of the parties is that payments and benefits under this Agreement be exempt from, or comply with, Code Section 409A and the regulations and guidance promulgated thereunder (collectively "Code Section 409A") and, accordingly, to the maximum extent permitted, this Agreement shall be interpreted in accordance with such intent. In no event whatsoever shall the Company be liable for any additional tax, interest or penalty that may be imposed on the Participant by Code Section 409A (or analogous state laws) or any damages for failing to comply with Code Section 409A (or analogous state laws).

If the Participant is a "specified employee" (as such term is defined for purposes of Code Section 409A) at the time of his or her termination of employment, no amount that is subject to Code Section 409A and that becomes payable by reason of such termination of employment shall be paid to the Participant before the earlier of (i) the date immediately following the expiration of the six-month period measured from the date of the Participant's termination of employment, and (ii) the date of the Participant's death. A termination of employment shall be deemed to occur only if it is a "separation from service" as defined in the Plan, and references in this Agreement to "termination," "termination of employment," or like terms shall mean a separation from service. This Section 19 shall not apply if the Participant is not a U.S. taxpayer (by reason of being a U.S. citizen, U.S. resident or otherwise).

19. DATA PROTECTION. By executing this Agreement, the Participant consents to the holding and processing of personal information provided by the Participant to the Company, any affiliate of the Company, trustee or third party service provider, for all purposes relating to the performance of this Agreement. These include, but are not limited to: (i) administering and maintaining Participant records; (ii) providing information to the Company, its affiliates, trustees of any employee benefit trust, registrars, brokers or third party administrators; (iii) providing information to future purchasers or merger partners of the Company or any of its affiliates, or the business in which the Participant works; and (iv) to the extent not prohibited by applicable law, transferring information about the Participant to any country or territory that may not provide the same protection for the information as the Participant's home country.

20. CONFIDENTIALITY. By executing this Agreement, the Participant agrees and acknowledges that at all times, and notwithstanding any payment or forfeiture of this Award, he or she will hold in strict confidence and will not disclose the terms of this Bonus Award and/or the Plan to any third party, except to Participant's spouse or significant other, legal counsel, financial or tax advisor, or as otherwise required by law. In the event Participant discloses such information to one or more of the foregoing individuals, such individual(s) shall also be bound by the confidentiality obligations set forth herein.

IN WITNESS WHEREOF , the Company has caused this Agreement to be duly executed by its duly authorized officer and said Participant has hereunto signed this Agreement on his or her own behalf, as of the day and year first above written.

FEDERAL-MOGUL LLC (POWERTRAIN SEGMENT)

By: __

Title: __

PARTICIPANT

Participant Signature

Date

Exhibit 10.53

TENNECO INC.
PERFORMANCE SHARE UNIT AWARD AGREEMENT
(_____-_____Performance Period)

_____
Participant

Effective as of **[Grant Date]** (the "Grant Date"), the Participant has been granted a Full Value Award (the "Award") under the Tenneco Inc. 2006 Long-Term Incentive Plan (the "Plan") in the form of performance share units ("PSUs") with respect to the number of shares of Common Stock ("Target PSUs") set forth herein. The Award is subject to the following terms and conditions (sometimes referred to as this "Award Agreement") and the terms and conditions of the Plan as the same has been and may be amended from time to time. Terms used in this Award Agreement are defined elsewhere in this Award Agreement; provided, however, that, capitalized terms used herein and not otherwise defined shall have the meaning set forth in the Plan.

1. General Terms of the Award . The following terms and conditions apply to the Award:

Performance Period: January 1, 201X_to December 31, 202X__

Target PSUs: _____

Earning of Award: 50% based on Relative TSR Performance
50% based on Cumulative Free Cash Flow (FCF) Performance

Appendix A of this Award Agreement, which is incorporated herein and forms a part of this Award Agreement, sets forth the manner in which the "Relative TSR Performance" and "Cumulative FCF Performance" are calculated for purposes of this Award Agreement for the Performance Period. Relative TSR Performance and Cumulative FCF Performance are sometimes referred to herein individually as a "Performance Target" and collectively as the "Performance Targets".

2. Determination of Amount of Award . The number of Target PSUs that shall become vested pursuant to this Award shall be based on satisfaction of Performance Targets as determined in accordance with the following:

(a) *TSR Target PSUs* . For purposes hereof, the Participant's "TSR Target PSUs" are equal to 50% of his or her total Target PSUs. The maximum number of TSR Target PSUs (expressed as a percentage, the "TSR Vesting Percentage") to which the Participant may become entitled under the Award (subject to the terms and conditions of the Plan) is based on the Relative TSR Percentile Ranking (calculated as described in Appendix A) for the Performance Period based on the following chart:

(b)

Relative TSR Percentile Ranking	**TSR Vesting Percentage**
≥ 75 th	200% (maximum)
50 th	100% (target)
25 th	50% (threshold)
<25 th	0%

(c) *FCF Target PSUs* . For purposes hereof, the Participant's "FCF Target PSUs" are equal to 50% of his or her total Target PSUs. The maximum number of FCF Target PSUs (expressed as a percentage, the "FCF Vesting Percentage") to which the Participant may become entitled under the Award (subject to the terms and conditions of this Award Agreement) is based on the Cumulative FCF (calculated as described in Appendix A) achieved for the Performance Period against the Cumulative FCF Target established by the Committee for the Performance Period based on the following chart:

Cumulative FCF Target	**FCF Vesting Percentage**
	200% (maximum)
	100% (target)

	50% (threshold)
	0%

(d) *Determination of Performance Targets and Number of Vested Target PSUs.* As soon as practicable following the end of the Performance Period, the Committee shall determine whether and the extent to which the Performance Targets have been satisfied and the number of the Participant's Target PSUs to which the Participant shall be entitled under the Award, subject to the terms and conditions of Paragraph 3 and the other terms and conditions of this Award Agreement.

(e) *Interpolation.* Interpolation shall be used to determine the TSR Vesting Percentage and FCF Vesting Percentage, as applicable, in the event the Relative TSR Percentile Ranking and/or Cumulative FCF Target, as applicable, does not fall directly on one of the ranks or targets, as applicable, listed in the above charts.

3. Form and Timing of Settlement of Award .

(a) *Unvested Award* . Except as otherwise specifically provided herein, the Participant shall have no right with respect to any payments or other amounts in respect of this Award until the Award is actually settled on the Settlement Date (as defined below) and if the Participant's Termination Date occurs before the Settlement Date, the Participant shall forfeit this Award and shall have no rights with respect thereto.

(b) *Settlement Generally.* Except as otherwise provided in this Paragraph 3, the settlement of this Award shall be made following the end of the Performance Period as of a date determined by the Committee and no later than two and one-half months after the end of the Performance Period (such date, the "Settlement Date"). Unless otherwise determined by the Committee in accordance with the terms of the Plan, settlement shall be made in the form of shares of Common Stock with one share of Common Stock being issued in settlement of each vested Target PSU, plus an amount of cash equal to the Fair Market Value of any fractional vested Target PSUs being settled as of such Settlement Date. Upon the settlement of the Award, the Award shall be cancelled.

(c) *Termination for Death, Total Disability or Retirement.* Notwithstanding the provisions of Paragraphs 3(a) and (b), if the Participant's Termination Date occurs on or before the end of the Performance Period:

(i) as a result of the Participant's death or Total Disability (as defined below), the Participant (or, in the event of his or her death, his or her beneficiary) shall be entitled to settlement of that number of Target PSUs equal to the product of (A) 100% of the Target PSUs subject to this Award for the Performance Period, multiplied by (B) the Termination Multiplier (as defined below), which Target PSUs shall be settled within 60 days after the Participant's Termination Date (and such date shall be the "Settlement Date" for purposes of this Award Agreement), or

(ii) as a result of Retirement (as defined below), the Participant shall be entitled to settlement of that number of Target PSUs equal to the product of (A) the number of Target PSUs to which the Participant would otherwise have been entitled pursuant to Paragraph 2 for the Performance Period had the Participant's Termination Date not occurred prior to the end of the Performance Period, multiplied by (B) the Termination Multiplier, which Target PSUs shall be settled on the Settlement Date.

If the Participant's Termination Date occurs after the end of the Performance Period and prior to the Settlement Date for the Performance Period as a result of the Participant's death, Total Disability or Retirement, the Participant (or, in the event of his or her death, his or her beneficiary) shall be entitled to settlement on the Settlement Date of that number of Target PSUs to which the Participant would have been entitled for the Performance Period had his or her Termination Date not occurred prior to the Settlement Date.

(d) *Change in Control.* In the event of a Change in Control, the terms of Article 6 of the Plan shall control.

(e) *Certain Definitions.* For purposes of this Award Agreement, the term (i) "Total Disability" means an event that results in the Participant being (A) unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than twelve (12) months, or (B) by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than twelve (12) months, receiving income replacement

benefits for a period of not less than three (3) months under an accident and health plan covering employees of the Company or its Subsidiaries, (ii) "Retirement" means the Participant's termination of employment with the Company and its Subsidiaries, other than termination by the Company and its Subsidiaries for cause, which shall include the failure to meet the obligations required by the individual's position (as determined in the reasonable discretion of the Committee), after the date on which the Participant attains (A) age 65 or (B) age 55 and has completed at least 10 years of service with the Company and its Subsidiaries, and (iii)"Termination Multiplier" means a fraction, the numerator of which is the number of full months of the Participant's employment during the Performance Period prior to his or her Termination Date and the denominator of which is the number of full months in the Performance Period.

(f) *Effect of Contrary Terms in Employment Agreement.* In the event that the Company (or any of its Subsidiaries) is a party to a written employment agreement with the Participant, and if the employment agreement is inconsistent with the provisions of this Paragraph 3, the terms of the employment agreement will take precedence over the foregoing provisions, as applicable.

4. Payment of Fair Market Value in Certain Cases . If the Participant is entitled to receive payment for the fair market value of this Award pursuant to Article 6 of the Plan (relating to Change in Control), that fair market value shall be equal to the amount the Participant would have received hereunder as if (a) his or her service had continued through the end of the Performance Period and (b) he or she had earned 100% of his or her Target PSUs.

5. Withholding . All Awards and distributions under the Plan, including this Award and any distribution in respect of this Award, are subject to withholding of all applicable taxes, and the delivery of any cash or other benefits under the Plan or this Award is conditioned on satisfaction of the applicable tax withholding obligations. Such withholding obligations may be satisfied, at the Participant's election, (a) through cash payment by the Participant, (b) through the surrender of shares of Common Stock that the Participant already owns, or (c) through the surrender of shares of Common Stock to which the Participant is otherwise entitled under the Plan; provided, however, that any withholding obligations with respect to any Participant shall be satisfied by the method set forth in subparagraph (c) of this Paragraph 5 unless the Participant otherwise elects in accordance with this Paragraph 5. The amount withheld in the form of shares of Common Stock under this Paragraph 5 may not exceed the minimum statutory withholding obligation (based on the minimum statutory withholding rates for Federal and state purposes, including, without limitation, payroll taxes) unless otherwise elected by the Participant, in no event shall the Participant be permitted to elect less than the minimum statutory withholding obligation, and in no event shall the Participant be permitted to elect to have an amount withheld in the form of shares of Common Stock pursuant to this Paragraph 5 that exceeds the maximum individual tax rate for the employee in applicable jurisdictions.

6. Transferability . This Award is not transferable except as designated by the Participant by will or by the laws of descent and distribution or pursuant to a qualified domestic relations order.

7. Heirs and Successors . If any benefits deliverable to the Participant under this Award Agreement have not been delivered at the time of the Participant's death, such benefits shall be delivered to the Participant's Designated Beneficiary, in accordance with the provisions of this Award Agreement. The "Designated Beneficiary" shall be the beneficiary or beneficiaries designated by the Participant in a writing filed with the Company in such form and at such time as the Company shall require and in accordance with such rules and procedures established by the Company. If a deceased Participant fails to designate a beneficiary, or if the Designated Beneficiary does not survive the Participant, any rights that would have been exercisable by the Participant and any benefits distributable to the Participant shall be distributed to the legal representative of the estate of the Participant.

8. Administration . The authority to administer and interpret this Award and this Award Agreement shall be vested in the Committee, and the Committee shall have all powers with respect to this Award and this Award Agreement as it has with respect to the Plan. Any interpretation of this Award or this Award Agreement by the Committee and any decision made by it with respect to the Award or the Award Agreement is final and binding on all persons.

9. Addendum to Award Agreement . Notwithstanding any provision of this Award Agreement, if the Participant resides and/or works outside the United States of America (the "United States", "U.S." or "U.S.A."), this Award shall be subject to the special terms and conditions set forth in Appendix B (the "Addendum") for the Participant's country. Further, if Participant transfers residence and/or employment to another country reflected in the Addendum, the special terms and conditions for such country will apply to Participant to the extent the Company determines, in its sole discretion, that the application of such special terms and conditions is necessary or advisable for

legal or administrative reasons (or the Company may establish alternative terms and conditions as may be necessary or advisable to accommodate Participant's transfer). The Addendum shall constitute part of this Award Agreement.

10. Notices . Any notice required or permitted under this Award Agreement shall be deemed given when delivered personally, or when deposited in a United States Post Office, postage prepaid, addressed, as appropriate, to the Committee or the Company at the Company's principal offices, to the Participant at the Participant's address as last known by the Company or, in any case, such other address as one party may designate in writing to the other.

11. Governing Law . The validity, construction and effect of this Award Agreement shall be determined in accordance with the laws of the State of Illinois and applicable federal law.

12. Amendments . The Board may, at any time, amend or terminate the Plan, and the Committee may amend this Award Agreement, provided that, except as provided in the Plan, no amendment or termination may, in the absence of written consent to the change by the affected Participant (or, if the Participant is not then living, the affected beneficiary), adversely affect the rights of any Participant or beneficiary under this Award Agreement prior to the date such amendment or termination is adopted by the Board or the Committee, as the case may be. Without limiting the generality of the foregoing or of Paragraph 15, the Committee may amend or terminate this Award at any time prior to the Settlement Date in its sole discretion to exercise downward discretion in the amount payable under this Award if the Committee determines that the payout yielded or that would be yielded by this Award for the Performance Period does not accurately reflect the applicable performance for the Performance Period.

13. Award Not Contract of Employment . The Award does not constitute a contract of employment or continued service, and the grant of the Award shall not give the Participant the right to be retained in the employ or service of the Company or any Subsidiary, nor any right or claim to any benefit under the Plan or this Award Agreement, unless such right or claim has specifically accrued under the terms of the Plan and this Award Agreement.

14. Severability . If a provision of this Award Agreement is held invalid by a court of competent jurisdiction, the remaining provisions shall nonetheless be enforceable according to their terms. Further, if any provision is held to be overbroad as written, that provision shall be amended to narrow its application to the extent necessary to make the provision enforceable according to applicable law and enforced as amended.

15. Plan Governs/Other Terms . The Award evidenced by this Award Agreement is granted pursuant to the Plan, and this Award and this Award Agreement are in all respects governed by the Plan and subject to all of the terms and provisions thereof, whether such terms and provisions are incorporated in this Award Agreement by reference or are expressly cited. Notwithstanding any other provision of the Plan or this Award Agreement, (a) all Awards are subject to the Company's recoupment or clawback policies as applicable and as in effect from time to time, (b) if the Committee determines, in its sole discretion, that the Participant at any time has willfully engaged in any activity that the Committee determines was or is harmful to the Company or any of its Subsidiaries, any unpaid portion of the Award shall be forfeited and the Participant shall have no rights with respect thereto, (c) the Committee may, in its sole and absolute discretion, adjust any Performance Target or the calculation thereof, and (d) this Award is subject to forfeiture if the Participant fails to accept the Award within the first twelve (12) months following the Grant Date in accordance with procedures established by the Company.

16. Counterparts . This Award Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original and all of which together shall constitute one and the same instrument.

17. Special Section 409A Rules . It is intended that any amounts payable under this Award Agreement shall either be exempt from or comply with section 409A of the Code. The provisions of this Award shall be construed and interpreted in accordance with section 409A of the Code. Notwithstanding any other provision of this Award Agreement to the contrary, if any payment or benefit hereunder is subject to section 409A of the Code, and if such payment or benefit is to be paid or provided on account of the Participant's termination of employment (or other separation from service):

(a) and if the Participant is a specified employee (within the meaning of section 409A(a)(2)(B) of the Code) and if any such payment or benefit is required to be made or provided prior to the first day of the seventh month following the Participant's separation from service or termination of employment, such payment or benefit shall be delayed until the first day of the seventh month following the Participant's termination of employment or separation from service; and

(b) the determination as to whether the Participant has had a termination of employment (or separation from

service) shall be made in accordance with the provisions of section 409A of the Code and the guidance issued thereunder without application of any alternative levels of reductions of bona fide services permitted thereunder.

TENNECO INC.

_____
Senior Vice President and Chief Human Resources Officer

ACCEPTED:

_____
Type or Print Legal Name (Date)

_____
Signature

_____
Social Security Number or National ID

_____
Street Address

_____
City/State/Zip/Country

APPENDIX A
AFTERMARKET/RIDE PERFORMANCE (AMRP)

DEFINITIONS AND CALCULATION METHODOLOGIES

Calculation of Relative TSR Performance .

Calculation of TSR

$$\text{"TSR"} = \frac{\text{Change in Stock Price + Dividends Paid}}{\text{Beginning Stock Price}}$$

(i) Beginning Stock Price shall mean the average of the Closing Prices for each of the twenty (20) trading days immediately prior to the first day of the Performance Period;

(ii) Ending Stock Price shall mean the average of Closing Prices for each of the last twenty (20) trading days of the Performance Period;

(iii) Change in Stock Price shall equal the Ending Stock Price minus the Beginning Stock Price;

(iv) Dividends Paid shall mean the total of all dividends paid on one (1) share of stock during the Performance Period, provided that dividends shall be treated as though they are reinvested;

(v) Closing Price shall mean the last reported sale price on the applicable stock exchange or market of one share of stock for a particular trading day; and

(vi) In all events, TSR shall be adjusted to give effect to any stock dividends, stock splits, reverse stock splits, spin-offs and similar transactions.

Calculation of TSR Percentile Ranking

The TSR Percentile Ranking is computed by (A) computing the TSR for the Performance Period as described in the preceding paragraph and (b) computing the TSR for the Performance Period of each company that was in the peer group selected by the Committee for the Performance Period for the AMRP business (the "Peer Group"), provided that if a company in the Peer Group declares bankruptcy at any time during the Performance Period, the company will be removed from the Peer Group, and if a company in the Peer Group does not have publicly reported stock prices for the

whole Performance Period, the company will be removed from the Peer Group. The TSR Percentile Ranking is the percentage of TSRs of the Peer Group calculated that are lower than the TSR for the Performance Period (e.g., if the TSR is greater than 75% of the TSRs of the members of the Peer Group, the TSR Percentile Ranking is the 75 th percentile).

Calculation of Cumulative FCF .

(i) The Cumulative FCF means the sum of the FCF for the AMRP business for each of the three fiscal years included in the Performance Period.

(ii) "FCF" means, with respect to the AMRP business, the reported EBITDA for the Performance Year for the business, (i) plus (gain)/loss on asset sales, (ii) plus the expense of stock-based compensation, (iii) minus the increase/(decrease) in operating working capital, (iv) plus other operating cash flows, (v) minus cash paid for property, plant and equipment, (vi) minus cash paid for software-related intangibles, (vii) plus proceeds from asset sales, (viii) minus payments for net assets purchased, (ix) plus changes in other long-term operating assets and liabilities, (x) plus adjustments to exclude the impact of acquisitions and divestitures, (xi) plus adjustments to exclude the impact of litigation or claim judgments and settlements, and (xii) other significant adjustments approved by the Committee.

APPENDIX A
POWERTRAIN TECHNOLOGY (PT TECHNOLOGY)

DEFINITIONS AND CALCULATION METHODOLOGIES

Calculation of Relative TSR Performance .

Calculation of TSR

$$\text{"TSR"} = \frac{\text{Change in Stock Price + Dividends Paid}}{\text{Beginning Stock Price}}$$

(i) Beginning Stock Price shall mean the average of the Closing Prices for each of the twenty (20) trading days immediately prior to the first day of the Performance Period;

(ii) Ending Stock Price shall mean the average of Closing Prices for each of the last twenty (20) trading days of the Performance Period;

(iii) Change in Stock Price shall equal the Ending Stock Price minus the Beginning Stock Price;

(iv) Dividends Paid shall mean the total of all dividends paid on one (1) share of stock during the Performance Period, provided that dividends shall be treated as though they are reinvested;

(v) Closing Price shall mean the last reported sale price on the applicable stock exchange or market of one share of stock for a particular trading day; and

(vi) In all events, TSR shall be adjusted to give effect to any stock dividends, stock splits, reverse stock splits, spin-offs and similar transactions.

Calculation of TSR Percentile Ranking

The TSR Percentile Ranking is computed by (A) computing the TSR for the Performance Period as described in the preceding paragraph and (b) computing the TSR for the Performance Period of each company that was in the peer group selected by the Committee for the Performance Period for the PT Technology business (the "Peer Group"), provided that if a company in the Peer Group declares bankruptcy at any time during the Performance Period, the company will be removed from the Peer Group, and if a company in the Peer Group does not have publicly reported stock prices for the whole Performance Period, the company will be removed from the Peer Group. The TSR Percentile Ranking is the percentage of TSRs of the Peer Group calculated that are lower than the TSR for the Performance Period (e.g., if the TSR is greater than 75% of the TSRs of the members of the Peer Group, the TSR Percentile Ranking is the 75 th percentile).

Calculation of Cumulative FCF .

(i) The Cumulative FCF means the sum of the FCF for the PT Technology business for each of the three fiscal years included in the Performance Period.

(ii) "FCF" means, with respect to the PT Technology business, the reported EBITDA for the Performance Year for the business, (i) plus (gain)/loss on asset sales, (ii) plus the expense of stock-based compensation, (iii) minus the increase/(decrease) in operating working capital, (iv) plus other operating cash flows, (v) minus cash paid for property, plant and equipment, (vi) minus cash paid for software-related intangibles, (vii) plus proceeds from asset sales, (viii) minus payments for net assets purchased, (ix) plus changes in other long-term operating assets and liabilities, (x) plus adjustments to exclude the impact of acquisitions and divestitures, (xi) plus adjustments to exclude the impact of litigation or claim judgments and settlements, and (xii) other significant adjustments approved by the Committee.

APPENDIX B

ADDENDUM TO PERFORMANCE SHARE UNIT AWARD AGREEMENT

This Addendum to the Award Agreement includes additional terms and conditions that govern the Award if the Participant resides and/or works outside of the United States. If the Participant transfers to another country reflected in this Addendum, the additional terms and conditions for such country (if any) will apply to the Participant to the extent the Company determines, in its sole discretion, that the application of such terms and conditions is necessary or advisable for legal or administrative reasons (or the Company may establish alternative terms as may be necessary or advisable to accommodate the Participant's transfer). Capitalized terms not defined in this Addendum but defined the Award Agreement or the Plan shall have the same meaning as in the Award Agreement or the Plan.

ALL NON-U.S. COUNTRIES

1. Form of Settlement . Notwithstanding any provision in the Award Agreement to the contrary, if the Participant is resident or employed outside of the United States, the Company, in its sole discretion, may settle the PSUs in the form of a cash payment to the extent settlement in shares of Common Stock: (a) is prohibited under local law; (b) would require the Participant, the Company and/or its Subsidiaries to obtain the approval of any governmental and/or regulatory body in the Participant's country of residence (or country of employment, if different); (c) would result in adverse tax consequences for the Participant, the Company or the Participant's employer; or (d) is administratively burdensome. Alternatively, the Company, in its sole discretion, may settle the PSUs in the form of shares of Common Stock but require the Participant to sell such shares of Common Stock immediately or within a specified period following the Participant's Termination Date (in which case, this Addendum shall give the Company the authority to issue sales instructions on the Participant's behalf).

2. Withholding . For purposes of the Award Agreement the following provision shall replace Section 5 of the Award Agreement in its entirety.

> 5. Withholding . Regardless of any action the Company and/or its Subsidiaries take with respect to any or all income tax (including U.S. federal, state and local taxes and/or non-U.S. taxes), social contributions, payroll tax, payment on account or other tax-related withholding ("Tax-Related Items"), the Participant acknowledges that the ultimate liability for all Tax-Related Items legally due by the Participant is and remains the Participant's responsibility and that the Company and its Subsidiaries (a) make no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of the PSUs, including the grant of the PSUs, the vesting of the PSUs, the subsequent sale of any shares of Common Stock acquired and the receipt of any dividends; and (b) do not commit to structure the terms of the grant or any aspect of the PSUs to reduce or eliminate the Participant's liability for Tax-Related Items.
>
> Further, if the Participant becomes subject to taxation in more than one country between the Grant Date and the date of any relevant taxable or tax withholding event, as applicable, the Participant acknowledges that the Company and/or the Participant's employer (or former employer, as applicable) may be required to withhold or account for Tax-Related Items in more than one country.
>
> Prior to the relevant taxable or tax withholding event, as applicable, if the Participant's country of residence (and country of employment, if different) requires withholding of

Tax-Related Items, the Participant agrees to make adequate arrangements satisfactory to the Company and/or the Participant's employer to satisfy all Tax-Related Items. In this regard, the Participant authorizes the Company and/or the Participant's employer, or their respective agents, to satisfy the obligations with regard to all Tax-Related Items by one or a combination of the following: (i) the Company may withhold a sufficient number of whole shares of Common Stock otherwise issuable upon settlement of the PSUs that have an aggregate Fair Market Value sufficient to pay the Tax-Related Items required to be withheld, in which case the cash equivalent of the shares of Common Stock withheld will be used to settle the obligation to withhold the Tax-Related Items; (ii) the Participant's employer may withhold the Tax-Related Items required to be withheld from the Participant's regular salary and/or wages, or other amounts payable to the Participant; (iii) the Company (on the Participant's behalf and at the Participant's direction pursuant to this authorization) may sell a sufficient whole number of shares of Common Stock acquired upon settlement of the PSUs, resulting in sale proceeds sufficient to pay the Tax-Related Items required to be withheld; and (iv) the Participant may be required to provide a cash payment to satisfy the Tax-Related Items.

Depending on the withholding method, the Company may withhold or account for Tax-Related Items by considering applicable statutory withholding rates (as determined by the Company in good faith and in its sole discretion) or other applicable withholding rates, including maximum applicable rates. If the obligation for Tax-Related Items is satisfied by withholding from the shares of Common Stock to be delivered upon settlement of the Award, for tax purposes, the Participant is deemed to have been issued the full number of shares of Common Stock subject to the Award, notwithstanding that a number of shares of Common Stock are held back solely for the purpose of paying the Tax-Related Items. The Participant will have no further rights with respect to any shares of Common Stock that are retained by the Company pursuant to this provision.

The Participant agrees to pay to the Company or the Participant's employer any amount of Tax-Related Items that the Company or the Participant's employer may be required to withhold or account for as a result of the Participant's participation in the Plan that cannot be satisfied by the means previously described. The Company may refuse to issue or deliver shares of Common Stock or proceeds from the sale of shares of Common Stock until arrangements satisfactory to the Company have been made in connection with the Tax-Related Items.

3. Compliance with Local Law . The Participant agrees to repatriate all payments attributable to the shares of Common Stock and/or cash acquired under the Plan (including, but not limited to, dividends and any proceeds derived from the sale of shares of Common Stock) if required by and in accordance with local foreign exchange rules and regulations in the Participant's country of residence (and country of employment, if different). In addition, the Participant also agrees to take any and all actions, and consent to any and all actions taken by the Company and its Subsidiaries, as may be required to allow the Company and its Subsidiaries to comply with local laws, rules and regulations in the Participant's country of residence (and country of employment, if different). Finally, the Participant agrees to take any and all actions as may be required to comply with his or her personal legal and tax obligations under local laws, rules and regulations in the Participant's country of residence (and country of employment, if different).

4. No Advice Regarding Grant . No employee of the Company or its Subsidiaries is permitted to advise the Participant regarding his or her participation in the Plan or the acquisition or sale of shares of Common Stock underlying the PSUs. The Participant is hereby advised to consult with his or her own personal tax, legal and financial advisors before taking any action related to the Plan.

5. Insider Trading; Market Abuse Laws . By participating in the Plan, the Participant agrees to comply with the Company's policy on insider trading (to the extent that it is applicable to the Participant). The Participant acknowledges that, depending on the Participant's or the Participant's broker's country of residence or where the shares of Common Stock are listed, the Participant may be subject to insider trading restrictions and/or market abuse laws that may affect the Participant's ability to accept, acquire, sell or otherwise dispose of shares of Common Stock, rights to shares of Common Stock or rights linked to the value of shares of Common Stock during such times the Participant is considered to have "inside information" regarding the Company as defined in the laws or regulations in the Participant's country. Local insider trading laws and regulations may prohibit the cancellation or amendment of orders the Participant placed before the Participant possessed inside information. Furthermore, the Participant could be prohibited from (a) disclosing the inside information to any third party (other than on a "need to know" basis), and (b) "tipping" third parties or causing them otherwise to buy or sell securities. Third parties include fellow employees. Any restrictions under these laws or regulations are separate from and in addition to any restrictions that may be imposed under the Company insider trading policy. The Participant acknowledges that it is the Participant's responsibility to comply with any restrictions and is advised to speak to his or her personal advisor on this matter.

6. English Language . If the Participant is in a country where English is not an official language, the Participant acknowledges and agrees that it is the Participant's express intent that the Award Agreement, the Plan and all other documents, rules, procedures, forms, notices and legal proceedings entered into, given or instituted pursuant to the PSUs, be drawn up in English. If the Participant has received the Award Agreement, the Plan or any other rules, procedures, forms or documents related to the PSUs translated into a language other than English, and if the meaning of the translated version is different than the English version, the English version will control.

7. Not a Public Offering . Neither the grant of the PSUs under the Plan nor the issuance of the underlying shares of Common Stock upon settlement of the PSUs is intended to be a public offering of securities in the Participant's country of residence (and country of employment, if different). The Company has not submitted any registration statement, prospectus or other filings to the local securities authorities in jurisdictions outside of the United States unless otherwise required under local law.

8. Additional Requirements . The Company reserves the right to impose other requirements on the Award, any shares of Common Stock acquired pursuant to the Award and the Participant's participation in the Plan to the extent the Company determines, in its sole discretion, that such other requirements are necessary or advisable for legal or administrative reasons. Such requirements may include (but are not limited to) requiring the Participant to sign any agreements or undertakings that may be necessary to accomplish the foregoing.

9. Data Privacy . The Participant hereby explicitly and unambiguously consents to the collection, use, processing and transfer, in electronic or other form, of the Participant's personal data as described in this document by and among, as applicable, the Company, its affiliates and its Subsidiaries for the exclusive purpose of implementing, administering and managing the Participant's participation in the Plan.

The Participant understands that the Company (and/or his or her employer, if applicable) holds certain personal information about the Participant, including, but not limited to, the Participant's name, home address and telephone number, date of birth, email address, family size, marital status, sex, beneficiary information, emergency contacts, passport/visa information, age, language skills, driver's license information, nationality, C.V. (or resume), wage history, employment references, social insurance number, resident registration number or other identification number, salary, job title, employment or severance contract, current wage and

benefit information, personal bank account number, tax-related information, plan or benefit enrollment forms and elections, award or benefit statements, any shares of Common Stock or directorships in the Company, details of all awards or any other entitlements to shares of Common Stock awarded, canceled, purchased, vested, unvested or outstanding for purpose of managing and administering the Plan ("Data").

The Participant understands that Data may be transferred to any third parties assisting in the implementation, administration and management of the Plan including, but not limited to the affiliates of the Company and/or the third party administrator engaged by the Company to administer the Plan, or any successor. These third party recipients may be located in the Participant's country of residence (or employment, if different) or elsewhere, and the recipient's country may have different data privacy laws and protections than the Participant's country. The Participant understands that the Participant may request a list with the names and addresses of any potential recipients of the Data by contacting the Participant's human resources representative.

The Participant authorizes the recipients to receive, possess, use, retain and transfer the Data, in electronic or other form, for the purposes of implementing, administering and managing the Participant's participation in the Plan, including any requisite transfer of such Data as may be required to a broker or other third party with whom the Participant may elect to deposit any shares of Common Stock acquired. The Participant understands that Data will be held only as long as is necessary to implement, administer and manage the Participant's participation in the Plan.

The Participant understands that he or she may, at any time, view Data, request additional information about the storage and processing of Data, require any necessary amendments to Data or refuse or withdraw the consents herein, in any case without cost, by contacting in writing the Participant's human resources representative. The Participant understands, however, that refusing or withdrawing the Participant's consent may affect his or her ability to participate in the Plan. For more information on the consequences of the Participant's refusal to consent or withdrawal of consent, the Participant understands that he or she may contact the Participant's human resources representative.

Finally, the Company may rely on a different legal basis for the processing and/or transfer of Data in the future and/or request that the Participant provide another data privacy consent. If applicable and upon request of the Company or the Participant's employer, the Participant agrees to provide an executed acknowledgment or data privacy consent form (or any other acknowledgments, agreements or consents) to the Company or the Participant's employer that the Company and/or the Participant's employer may deem necessary to obtain under the data privacy laws in the Participant's country, either now or in the future. The Participant understands that the Participant will not be able to participate in the Plan if he or she fails to execute any such acknowledgment, agreement or consent requested by the Company and/or the Participant's employer.

10. Nature of Grant . In accepting the grant of PSUs, the Participant acknowledges, understands and agrees that:

(a) the Plan is established voluntarily by the Company, it is discretionary in nature and it may be modified, suspended o. terminated by the Committee at any time, as provided in the Plan and the Award Agreement;

(b) the grant of PSUs is exceptional, voluntary and occasional and does not create any contractual or other right to receive future grants of PSUs, or benefits in lieu of PSUs, even if PSUs have been granted in the past;

(c) all decisions with respect to future grants of PSUs or other grants, if any, will be at the sole discretion of the Company, including, but not limited to, the form and timing of an Award, the number of shares of Common Stock subject to an Award, and the vesting provisions applicable to the Award;

(d) the grant of PSUs and the Participant's participation in the Plan shall not create a right to employment or be interpreted as forming an employment or service contract with the Company, the Participant's employer or any Subsidiary and shall not interfere with the ability of the Participant's employer to terminate his or her employment or service relationship;

(e) the Participant is voluntarily participating in the Plan;

(f) the PSUs and the shares of Common Stock subject to the PSUs are not intended to replace any pension rights or compensation;

(g) the PSUs, the shares of Common Stock subject to the PSUs and the value of same, are an extraordinary item of compensation outside the scope of the Participant's employment (and employment contract, if any) and is not part of normal or expected compensation for any purpose, including, without limitation, calculating any severance, resignation, termination, redundancy, dismissal, end-of-service payments, holiday pay, bonuses, long-service awards, pension or retirement or welfare benefits or similar payments;

(h) the future value of the shares of Common Stock underlying the PSUs is unknown, indeterminable and cannot be predicted with certainty;

(i) unless otherwise determined by the Committee in its sole discretion, the Termination Date shall be effective from the date on which active employment or service ends and shall not be extended by any statutory or common law notice of termination period; the Committee or its delegate shall have the exclusive discretion to determine when the Termination Date occurs for purposes of this grant of PSUs;

(j) no claim or entitlement to compensation or damages shall arise from forfeiture of the PSUs resulting from the Participant ceasing to have rights under or to be entitled to PSUs, whether or not as a result of the Participant's termination of employment (for any reason whatsoever, whether or not later found to be invalid or in breach of employment laws in the jurisdiction where the Participant is employed or the terms of the Participant's employment agreement, if any), and in consideration of the grant of the PSUs to which the Participant is otherwise not entitled, the Participant irrevocably agrees never to institute any claim against the Company, its Subsidiaries or his or her employer;

(k) the Participant acknowledges and agrees that neither the Company nor any Subsidiary shall be liable for any exchange rate fluctuation between the Participant's local currency and the United States Dollar that may affect the value of the PSUs or of any amounts due pursuant to the settlement of the PSUs or the subsequent sale of any shares of Common Stock acquired upon settlement.

11. Electronic Delivery and Acceptance . The Company may, in its sole discretion, decide to deliver any documents related to current or future participation in the Plan by electronic means. The Participant hereby consents to receive such documents by electronic delivery and agree to participate in the Plan through an online or electronic system established and maintained by the Company or a third party designated by the Company. The Participant also agrees that all online acknowledgements shall have the same force and effect as a written signature.

ALL EUROPEAN UNION ("EU") COUNTRIES

1. EU Age Discrimination Rules . If the Participant is resident or employed in a country that is a member of the European Union, the grant of the Award and the Award Agreement are intended to comply with the age discrimination provisions of the EU Equal Treatment Framework Directive, as implemented into local law (the "Age Discrimination Rules"). To the extent that a court or tribunal of competent jurisdiction determines that any provision of the Award Agreement is invalid or unenforceable, in whole or in part, under the Age Discrimination Rules, the Company, in its sole discretion, shall have the power and authority to revise or strike such provision to the minimum extent necessary to make it valid and enforceable to the full extent permitted under local law.

2. Data Privacy Information and Consent .

(a) Data Collection and Usage . The Company and the Participant's employer may collect, process and use certain personal information about the Participant, including, but not limited to, the Participant's name, home address and telephone number, email address, date of birth, social insurance number, passport or other identification number, salary, nationality, job title, any shares of stock or directorships held in the Company, details of all PSUs or any other entitlement to shares of stock awarded, canceled, exercised, vested, unvested or outstanding in Participant's favor ("Data"), for the purposes of implementing, administering and managing the Plan. The legal basis, where required, for the processing of Data is the Participant's consent.

(b) Stock Plan Administration Service Providers . The Company transfers Data to Fidelity Stock Plan Services LLC and its affiliated companies, an independent service provider based in the United States, which is assisting the Company with the implementation, administration and management of the Plan. The Company may select a different service provider or additional service providers and share Data with such other provider serving in a similar manner. The Participant may be asked to agree on separate terms and data processing practices with the service provider, with such agreement being a condition to the ability to participate in the Plan.

(c) International Data Transfers . The Company and its service providers are based in the United States. The Participant's country or jurisdiction may have different data privacy laws and protections than the United States. For example, the European Commission has issued a limited adequacy finding with respect to the United States that applies only to the extent companies register for the EU-U.S. Privacy Shield program. The Company has certified under the EU-U.S. Privacy Shield Program and relies on it for its transfer of Data from European Union countries to the U.S. Elsewhere, its legal basis for the transfer of Data, where required, is the Participant's consent.

(d) Data Retention . The Company will hold and use the Data only as long as is necessary to implement, administer and manage the Participant's participation in the Plan, or as required to comply with legal or regulatory obligations, including under tax and security laws.

(e) Voluntariness and Consequences of Consent Denial or Withdrawal . The Participation in the Plan is voluntary and the Participant is providing the consents herein on a purely voluntary basis. If the Participant does not consent, or if the Participant later seeks to revoke the Participant's consent, the Participant's salary from or employment and career with the Participant's employer will not be affected; the only consequence of refusing or withdrawing the Participant's consent is that the Company would not be able to grant this Award of PSUs or other equity awards to the Participant or administer or maintain such awards.

(f) Data Subject Rights . The Participant may have a number of rights under data privacy laws in the Participant's jurisdiction. Depending on where the Participant is based, such rights may include the right to (i) request access or copies of Data the Company processes, (ii) rectification of incorrect Data, (iii) deletion of Data, (iv) restrictions on processing of Data, (v) portability of Data, (vi) lodge complaints with competent authorities in the Participant's jurisdiction, and/or (vii) receive a list with the names and addresses of any potential recipients of Data. To receive clarification regarding these rights or to exercise these rights, the Participant can contact his or her local human resources representative.

By accepting the PSUs and indicating consent via the Company's acceptance procedure, the Participant is declaring that he or she agrees with the data processing practices described herein and consents to the collection, processing and use of Data by the Company and the transfer of Data to the recipients mentioned above, including recipients located in countries which do not adduce an adequate level of protection from a European (or other non-U.S.) data protection law perspective, for the purposes described above.

Finally, upon request of the Company or the Participant's employer, the Participant agrees to provide an executed data privacy consent form (or any other agreements or consents) that the Company and/or the Participant's employer may deem necessary to obtain from the Participant for the purpose of administering the Participant's participation in the Plan in compliance with the data privacy laws in the Participant's country, either now or in the future. The Participant understands and agrees that the Participant will not be able to participate in the Plan if the Participant fails to provide any such consent or agreement requested by the Company and/or the Participant's employer.

ARGENTINA

1. Securities Law Information . Neither the PSUs nor the underlying shares of Common Stock are publicly offered or listed on any stock exchange in Argentina.

2. Nature of Grant . The following provision shall supplement Section 10 of the "All Non-US Countries" portion of this Addendum:

By accepting the Award, the Participant acknowledges and agrees that the grant of PSUs is made by the Company (not the Participant's employer) in its sole discretion and that the value of the PSUs or any shares of Common Stock acquired under the Plan shall not constitute salary or wages for any purpose under Argentine labor law, including, but not limited to, the calculation of (a) any labor benefits including, but not limited to, vacation pay, thirteenth salary, compensation in lieu of notice, annual bonus, disability, and leave of absence payments, etc., or (b) any termination or severance indemnities or similar payments.

If, notwithstanding the foregoing, any benefits under the Plan are considered salary or wages for any purpose under Argentine labor law, the Participant acknowledges and agrees that such benefits shall not accrue more frequently than on each Settlement Date.

AUSTRALIA

1. Australian Offer Document . The offer of PSUs is intended to comply with the provisions of the Corporations Act 2001, ASIC Regulatory Guide 49 and ASIC Class Order CO 14/1000. Additional details are set forth in the Offer Document for the offer of PSUs to Australian resident employees, which will be provided to the Participant with the Award Agreement.

2. Compliance with Law . Notwithstanding anything else in the Award Agreement, the Participant will not be entitled to, and shall not claim, any benefit under the Plan if the provision of such benefit would give rise to a breach of Part 2D.2 of the Corporations Act 2001 (Cth) (the "Corporations Act"), any other provision of the Corporations Act, or any other applicable statute, rule or regulation which limits or restricts the giving of such benefits. Further, the Participant's employer is under no obligation to seek or obtain the approval of its shareholders in general meeting for the purpose of overcoming any such limitation or restriction.

3. Tax Information . The Plan is a program to which Subdivision 83A-C of the Income Tax Assessment Act 1997 (Cth) (the "Act") applies (subject to the conditions in that Act).

BELGIUM

No country-specific provisions.

BRAZIL

1. Compliance with Law . By accepting the Award, the Participant agrees to comply with all applicable Brazilian laws and pay any and all applicable taxes associated with the vesting of the Award and the sale of any shares of Common Stock obtained.

2. Nature of Grant . The following provision shall supplement Section 10 of the "All Non-US Countries" portion of this Addendum:

The Participant expressly agrees that (i) the benefits provided under the Award Agreement and the Plan are the result of commercial transactions unrelated to the Participant's employment; (ii) the Award Agreement and the Plan are not part of the terms and conditions of the Participant's employment; and (iii) the income from the Award, if any, is not part of the Participant's remuneration from employment.

CANADA

1. Settlement . Notwithstanding anything to the contrary in the Award Agreement, Addendum or the Plan, the Award shall be settled only in shares of Common Stock (and may not be settled in cash).

2. Securities Law Information . The Participant acknowledges and agrees that he or she will sell shares of Common Stock acquired through participation in the Plan only outside of Canada through the facilities of a stock exchange on which the Common Stock is listed. Currently, the shares of Common Stock are listed on the New York Stock Exchange.

THE FOLLOWING PROVISIONS APPLY IF THE PARTICIPANT IS A RESIDENT OF QUEBEC

3. Use of English Language . If the Participant is a resident of Quebec, by accepting the Award, the Participant acknowledges and agrees that it is the Participant's express wish that the Award Agreement, this Addendum, as well as all other documents, notices and legal proceedings entered into, given or instituted pursuant to the Award, either directly or indirectly, be drawn up in English.

Utilisation de la langue anglaise . Si le Participant est un résident du Québec, en acceptant l'Attribution, le Participant reconnaît et convient avoir expressément exigé la rédaction en anglais de la Convention d'Attribution, de la présente Annexe, ainsi que de tous documents exécutés, avis donnés ou procédures judiciaires intentées relatifs, directement ou indirectement, à l'Attribution.

4. Data Privacy . The following provision shall supplement Section 9 of the "All Non-US Countries" portion of this Addendum:

The Participant hereby authorizes the Company and the Company's representatives to discuss with and obtain all relevant information from all personnel, professional or not, involved in the administration and operation of the Plan. The Participant further authorizes his or her employer, the Company, and any other Subsidiary to disclose and discuss the Plan with their respective advisors. The Participant further authorizes his or her employer, the Company, and any other Subsidiary to record such information and to keep such information in the Participant's employee file.

CHINA

The following provisions govern the Participant's participation in the Plan if the Participant is a national of the People's Republic of China ("China") resident in mainland China, as determined by the Company

in its sole discretion. Such provisions may also apply to non-PRC nationals, to the extent required by the Company or by the China State Administration of Foreign Exchange ("SAFE").

1. Exchange Control Approval . The settlement of the Award is conditioned upon the Company securing all necessary approvals from the SAFE to permit operation of the Plan.

2. Shares of Common Stock Must Be Held with Designated Broker . All shares of Common Stock issued upon settlement of the PSUs will be deposited into a personal brokerage account established with the Company's designated broker (or any successor broker designated by the Company), on the Participant's behalf. The Participant understands that the Participant generally may sell the shares of Common Stock at any time after they are deposited in such account, however, the Participant may not transfer the shares of Common Stock out of the brokerage account.

3. Cancellation of Award; Mandatory Sale of Shares Following Termination Date . Due to Chinese exchange control restrictions, to the extent that the Award has not been settled and unless otherwise determined by the Company in its sole discretion, the Award shall be cancelled on the 90th day following the Participant's Termination Date (or such earlier date as may be required by the SAFE). Further, the Participant shall be required to sell all shares of Common Stock acquired upon settlement of the PSUs no later than 90 days following the Participant's Termination Date (or such earlier date as may be required by the SAFE), in which case, this Addendum shall give the Company the authority to issue sales instructions on the Participant's behalf. If any shares of Common Stock remain outstanding on the 90th day following the Participant's Termination Date (or such earlier date as may be required by SAFE), the Participant hereby directs, instructs and authorizes the Company to issue sale instructions on the Participant's behalf.

The Participant agrees to sign any additional agreements, forms and/or consents that reasonably may be requested by the Company (or the Company's designated brokerage firm) to effectuate the sale of the shares of Common Stock (including, without limitation, as to the transfer of the sale proceeds and other exchange control matters noted below) and shall otherwise cooperate with the Company with respect to such matters. The Participant acknowledges that neither the Company nor the designated brokerage firm is under any obligation to arrange for such sale of shares of Common Stock at any particular price (it being understood that the sale will occur in the market) and that broker's fees and similar expenses may be incurred in any such sale. In any event, when the shares of Common Stock are sold, the sale proceeds, less any tax withholding, any broker's fees or commissions, and any similar expenses of the sale will be remitted to the Participant in accordance with applicable exchange control laws and regulations.

4. Exchange Control Restrictions . The Participant understands and agrees that, pursuant to local exchange control requirements, the Participant will be required immediately to repatriate to China the proceeds from the sale of any shares of Common Stock acquired under the Plan. The Participant further understands that such repatriation of proceeds may need to be effected through a special bank account established by the Company or its Subsidiaries, and the Participant hereby consents and agrees that proceeds from the sale of shares of Common Stock acquired under the Plan may be transferred to such account by the Company on the Participant's behalf prior to being delivered to the Participant and that no interest shall be paid with respect to funds held in such account. The proceeds may be paid to the Participant in U.S. dollars or local currency at the Company's discretion. If the proceeds are paid to the Participant in U.S. dollars, the Participant understands that a U.S. dollar bank account in China must be established and maintained so that the proceeds may be deposited into such account. If the proceeds are paid to the Participant in local currency, the Participant acknowledges that the Company is under no obligation to secure any particular exchange conversion rate and that the Company may face delays in converting the proceeds to local currency due to exchange control restrictions. The Participant agrees to bear any currency fluctuation risk between the time the shares of Common Stock are sold and the net

proceeds are converted into local currency and distributed to the Participant. The Participant further agrees to comply with any other requirements that may be imposed by the Company or its Subsidiaries in China in the future to facilitate compliance with exchange control requirements in China. The Participant acknowledges and agrees that the processes and requirements set forth herein shall continue to apply following the Participant's termination.

5. Administration . Neither the Company nor any of its Subsidiaries shall be liable for any costs, fees, lost interest or dividends or other losses the Participant may incur or suffer resulting from the enforcement of the terms of this Addendum or otherwise from the Company's operation and enforcement of the Plan, the Award Agreement and the Award in accordance with Chinese law including, without limitation, any applicable SAFE rules, regulations and requirements.

CZECHIA

No country-specific provisions.

FINLAND

No country-specific provisions.

FRANCE

1. Award Not French-Qualified . The PSUs are not granted under the French specific regime provided by Articles L.225-197-1 and seq. of the French Commercial Code, as amended.

2. Use of English Language . By accepting the Award, the Participant acknowledges and agrees that it is the Participant's express wish that the Award Agreement, this Addendum, as well as all other documents, notices and legal proceedings entered into, given or instituted pursuant to the Award, either directly or indirectly, be drawn up in English.

Utilisation de la langue anglaise . En acceptant l'Attribution, le Participant reconnaît et convient avoir expressément exigé la rédaction en anglais de la Convention d'Attribution, de la présente Annexe, ainsi que de tous documents exécutés, avis donnés ou procédures judiciaires intentées relatifs, directement ou indirectement, à l'Attribution.

GERMANY

No country-specific provisions.

INDIA

No country-specific provisions.

ITALY

1. Plan Document Acknowledgement . In accepting the Award, the Participant acknowledges that the Participant has received a copy of the Plan and the Award Agreement and has reviewed the Plan and the Award Agreement, including this Addendum, in their entirety and fully understands and accepts all provisions of the Plan and the Award Agreement, including this Addendum. The Participant further acknowledges that the Participant has read and specifically and expressly approves the following Sections of the Agreement: (a) Section 1 (General Terms of the Award), (b) Section 2 (Determination of Amount of Award), (b) Section 3 (Form and Timing of Settlement of Award), (c) Section 4 (Payment of Fair Market Value in Certain Cases) and (d) the terms and conditions of this Addendum.

JAPAN

No country-specific provisions.

KOREA

1. Data Privacy . By accepting the Award:

(a) The Participant agrees to the collection, use, processing and transfer of Data as described in Section 9 of the "All Non-U.S. Countries" portion of this Addendum; and

(b) The Participant agrees to the processing of the Participant's unique identifying information (resident registration number) as described in Section 9 of the "All Non-U.S. Countries" portion of this Addendum.

MEXICO

1. Nature of Grant . The following provision shall supplement Section 10 of the "All Non-US Countries" portion of this Addendum:

By participating in the Plan, the Participant acknowledges, understands and agrees that: (a) the right to acquire shares of Common Stock under the Plan is not related to the Participant's salary and other contractual benefits granted to the Participant by his or her employer ("Tenneco Mexico"); (b) any modification of the Plan or its termination shall not constitute a change or impairment to the terms and conditions of the Participant's employment; and (c) any benefit derived under the Plan is not a fringe benefit.

2. Policy Statement . The invitation the Company is making under the Plan is unilateral and discretionary and, therefore, the Company reserves the absolute right to amend it and discontinue it at any time without any liability.

The Company, with registered offices at 500 North Field Drive, Lake Forest, Illinois 60045 USA, is solely responsible for the administration of the Plan, and participation in the Plan and the acquisition of shares of Common Stock does not, in any way, establish an employment relationship between the

Participant and the Company nor does it establish any rights between the Participant and Tenneco Mexico since the Participant is participating in the Plan on a wholly commercial basis.

3. Plan Document Acknowledgment . By accepting the terms of the Award Agreement, the Participant acknowledges that he or she has received a copy of the Plan, has reviewed the Plan and the Award Agreement in their entirety and fully understands and accepts all provisions of the Plan and the Award Agreement.

In addition, by accepting the terms of the Award Agreement, the Participant further acknowledges that he or she has read and specifically and expressly approves the provisions contained within Section 10 of the Addendum to the Award Agreement in which the following is clearly described and established: (a) participation in the Plan does not constitute an acquired right; (b) the Plan and participation in the Plan is offered by the Company on a wholly discretionary basis; (c) participation in the Plan is voluntary; and (d) the Company and its Subsidiary are not responsible for any decrease in the value of the shares of Common Stock that the Participant may acquire under the Plan.

Finally, the Participant hereby declares that he or she does not reserve any action or right to bring any claim against the Company for any compensation or damages resulting from a termination of employment and withdrawal from the Plan, and therefore, the Participant grants a full and broad release to Tenneco Mexico, the Company and its Subsidiaries with respect to any claim that may arise under the Plan in this respect.

1. Naturaleza del Otorgamiento . La siguiente disposición complementará la Sección 10 de la porción de este Apéndice llamada "Todas los Países no-Estadounidenses" ("All Non-US Countries," en Inglés):

> *Al participar en el Plan, el Participante reconoce, entiende y acepta de que: (a) el derecho de adquirir Acciones por medio del Plan no se relaciona con el salario del Participante o cualquier beneficios contractuales que se hayan sido otorgados al Participante por su empleador "Tenneco México"; (b) cualquier modificación al Plan o la terminación del mismo no constituirá un cambio o impedimento a los términos y condiciones del empleo del Participante; y (c) cualquier beneficio derivado por medio del Plan no es un beneficio adicional.*

2. Declaración de Política . La invitación por parte de la Compañía bajo el Plan es unilateral y discrecional y, por lo tanto, la Compañía se reserva el derecho absoluto de modificar y discontinuar el Plan en cualquier momento sin ninguna responsabilidad.

La Compañía, con oficinas registradas ubicadas en 500 North Field Drive, Lake Forest, Illinois, 60045, EE.UU., es la única responsable por la administración del Plan, y la participación en el Plan y la adquisición de Acciones no establece, de forma alguna, una relación laboral entre el Participante y la Compañía, ni tampoco establece algún derecho entre el Participante y Tenneco México, ya que el Participante está participando en el Plan sobre una base completamente comercial.

3. Reconocimiento de los Documentos del Plan . Al aceptar los términos del Convenio del Premio, el Participante reconoce que ha recibido una copia del Plan, que ha revisado el Plan y el Convenio del Premio en su totalidad y que los ha entendido completamente y acepta todas las disposiciones contenidas en el Pan y en el Convenio del Premio.

Adicionalmente, al aceptar los términos del Convenio del Premio, el Participante reconoce además que ha leido y que aprueba específica y expresamente los términos y condiciones contenidos en la Sección 10 de este Apéndice del Convenio del Premio en lo cual se encuentra claramente descrito y establecido lo siguiente: (i) la participación en el Plan no constituye un derecho adquirido; (ii) el Plan y la participación en el mismo son ofrecidos por la Compañía de forma completamente discrecional; (iii) la participación en el Plan es voluntaria; y (iv) la Compañía y sus Subsidiarias no son responsables por cualquier disminución en el valor de las Acciones que el Participante podría adquirir por medio del Plan.

Finalmente, el Participante declara por medio del presente que no se reserva ninguna acción o derecho para interponer una demanda en contra de la Compañía por compensación o daño alguno que se podrían resultar de la terminación del empleo del Participante o su salida del Plan y, por lo tanto, el Participante otorga el más amplio finiquito al Tenneco México, la Compañía y sus Subsidiarias con respecto a cualquier demanda que pudiera originarse en virtud del Plan en este respecto.

POLAND

No country-specific provisions.

PORTUGAL

1. Language Consent . The Participant hereby expressly declares that he or she has full knowledge of the English language and has read, understood and fully accepted and agreed with the terms and conditions established in the Plan and the Award Agreement.

Conhecimento da Lingua . O Participante declara expressamente que tem pleno conhecimento da língua inglesa e que leu, compreendeu e livremente aceitou e concordou com os termos e condições estabelecidas no Plano e no Acordo.

RUSSIA

1. Securities Law Information . These materials do not constitute advertising or an offering of securities in Russia nor do they constitute placement of the shares of Common Stock in Russia. Any shares of Common Stock issued pursuant to the PSUs shall be delivered to the Participant through a brokerage account in the United States. The Participant may hold shares of Common Stock in his or her brokerage account in the United States. However, in no event will shares of Common Stock issued to the Participant and/or share certificates or other instruments be delivered to the Participant in Russia. The issuance of shares of Common Stock pursuant to the PSUs described herein has not and will not be registered in Russia and hence, the shares of Common Stock described herein may not be admitted or used for offering, placement or public circulation in Russia.

SOUTH AFRICA

1. Securities Law Information and Acceptance of the Award . Neither the Award nor the underlying shares of Common Stock shall be publicly offered or listed on any stock exchange in South Africa. The offer is intended to be private pursuant to Section 96 of the Companies Act and is not subject to the supervision of any South African governmental authority.

The offer of the Award must be finalized on or before the 180th day following the Grant Date. If the Participant has not accepted or declined the Award on or before the 180th day following the Grant Date, the Participant will be deemed to accept the Award.

SPAIN

1. Securities Law Information . The PSUs and the shares of Common Stock described in the Award Agreement and this Addendum do not qualify under Spanish regulations as securities. No "offer of securities to the public," as defined under Spanish law, has taken place or will take place in the Spanish territory. The Award Agreement (including this Addendum) has not been nor will it be registered with the *Comisión Nacional del Mercado de Valores* , and does not constitute a public offering prospectus.

2. Labor Law Acknowledgement . In accepting the Award, the Participant consents to participation in the Plan and acknowledges that the Participant has received a copy of the Plan. The Participant understands and agrees that except as provided for in Section 3 of the Award Agreement, the Participant's termination of employment for any reason (including for the reasons listed below) automatically will result in the loss of the Award that may have been granted to Participant and that has not vested as of the Termination Date.

In particular, the Participant understands and agrees that any unvested PSUs as of the Participant's Termination Date will be forfeited without entitlement to the underlying shares of Common Stock or to any amount as indemnification in the event of a termination by reason of, including, but not limited to: resignation, disciplinary dismissal adjudged to be with cause, disciplinary dismissal adjudged or recognized to be without good cause (*i . e* ., subject to a " *despido improcedente* "), individual or collective layoff on objective grounds, whether adjudged to be with cause or adjudged or recognized to be without cause, material modification of the terms of employment under Article 41 of the Workers' Statute, relocation under Article 40 of the Workers' Statute, Article 50 of the Workers' Statute, unilateral withdrawal by the Service Recipient, and under Article 10.3 of Royal Decree 1382/1985.

Furthermore, the Participant understands that the Company has unilaterally, gratuitously and discretionally decided to grant the Award under the Plan to individuals who may be employees of the Company or its Subsidiaries. The decision is a limited decision that is entered into upon the express assumption and condition that any grant will not economically or otherwise bind the Company or its Subsidiaries on an ongoing basis other than to the extent set forth in the Award Agreement. Consequently, the Participant understands that the Award is granted on the assumption and condition that the Award and the shares of Common Stock issued upon settlement shall not become a part of any employment or contract (with the Company or the Participant's employer) and shall not be considered a mandatory benefit, salary for any purposes (including severance compensation) or any other right whatsoever. Furthermore, the Participant understands and freely accepts that there is no guarantee that any benefit whatsoever will arise from the Award, which is gratuitous and discretionary, since the future value of the underlying shares of Common Stock is unknown and unpredictable. In addition, the Participant understands that the grant of the Award would not be made to the Participant but for the assumptions and conditions referred to above; thus, the Participant acknowledges and freely accepts that should any or all of the assumptions be mistaken or should any of the conditions not be met for any reason, then any grant to Participant of the Award shall be null and void.

SWEDEN

No country-specific provisions.

THAILAND

No country-specific provisions.

UNITED KINGDOM

1. Withholding . The following provision shall supplement Section 2 of the "All Non-US Countries" portion of this Addendum:

The Participant hereby agrees that he or she is liable for all Tax-Related Items and hereby covenants to pay all such Tax-Related Items, as and when requested by the Company or (if different) his or her employer or by Her Majesty Revenue & Customs ("HMRC") (or any other tax authority or any other relevant authority). The Participant also hereby agrees to indemnify and keep indemnified the Company and (if different) his or her employer against any Tax - Related Items that they are required to pay or withhold or have paid or will pay on the Participant's behalf to HMRC (or any other tax authority or any other relevant authority).

Notwithstanding the foregoing, if the Participant is a director or executive officer of the Company (within the meaning of Section 13(k) of the Securities Exchange Act of 1934), the Participant may not be able to indemnify the Company or the Participant's employer for the amount owed if the indemnification could be considered to be a loan. In this case, the amount which is owed and not collected or paid by the Participant within 90 days after the end of the UK tax year in which an event giving rise to the taxable event occurs may constitute an additional benefit to the Participant on which UK national insurance contributions may be payable. The Participant understands that he or she will be responsible for reporting and paying any income tax due on this additional benefit directly to HMRC under the self-assessment regime and for paying to the Company or the Participant's employer (as appropriate), the amount of any employee national insurance contributions due on this additional benefit, which may also be recovered from the Participant by any of the means referred to in the Plan or this Award Agreement.

2. Exclusion of Claim . The Participant acknowledges and agrees that the Participant will have no entitlement to compensation or damages insofar as such entitlement arises or may arise from the Participant ceasing to have rights under or to be entitled to the Award, whether or not as a result of termination of employment (whether the termination is in breach of contract or otherwise), or from the loss or diminution in value of the Award. Upon the grant of the Award, the Participant will be deemed to have waived irrevocably any such entitlement.

EXHIBIT 10.44

TENNECO INC. 2006 LONG-TERM INCENTIVE PLAN
SPECIAL RESTRICTED STOCK UNIT AND
CASH INCENTIVE AWARD AGREEMENT

Participant: Jason Hollar

Effective as of December 10, 2018 (the "Grant Date"), the Participant has been granted (a) a Full Value Award under the Tenneco Inc. 2006 Long-Term Incentive Plan (the "Plan") in the form of restricted stock units with respect to 23,020 shares of Common Stock ("Restricted Stock Units") and (b) a Cash Incentive Award under the Plan in an amount equal to $250,000 (the "Cash Incentive Award"). The Award is subject to the following terms and conditions (sometimes referred to as this "Award Agreement") and the terms and conditions of the Plan as the same has been and may be amended from time to time. Terms used in this Award Agreement are defined elsewhere in this Award Agreement; provided, however, that, capitalized terms used herein and not otherwise defined shall have the meaning set forth in the Plan. The term "Award" as referred to herein includes both the Full Value Award and the Cash Incentive Award.

1. Dividend Cash Amounts. The Full Value Award contains the right to receive cash credits to a hypothetical bookkeeping account (a "Dividend Cash Account") in respect of dividends paid with respect to shares of Common Stock in accordance with the following:

(a) If a dividend with respect to shares of Common Stock is payable in cash, then, as of the applicable dividend payment date, the Participant's Dividend Cash Account shall be credited with an amount (a "Dividend Cash Amount") equal to (i) the cash dividend payable with respect to a share of Common Stock, multiplied by (ii) the number of Restricted Stock Units outstanding on the applicable dividend record date.

(b) If a dividend with respect to shares of Common Stock is payable in shares of Common Stock, then, as of the applicable dividend payment date, the Participant's Dividend Cash Account shall be credited with a Dividend Cash Amount in an amount equal to (i) the number of shares of Common Stock distributed in the dividend with respect to a share of Common Stock, divided by (ii) the Fair Market Value of a share of Common Stock on the dividend payment date, multiplied by (iii) the number of Restricted Stock Units outstanding on the applicable dividend record date.

The Dividend Cash Amounts credited to the Participant's Dividend Cash Account shall be subject to the same vesting provisions as the Restricted Stock Units to which the Dividend Cash Amounts relate and shall be settled in accordance with Paragraph 3. No Dividend Cash Amounts with respect to a Restricted Stock Unit shall be credited under this Award Agreement for any period after the Vesting Date (as defined in Paragraph 2) applicable to such Restricted Stock Unit. Amounts credited to a Participant's Dividend Cash Account shall not be credited with any investment earnings.

2. Vesting and Forfeiture of Restricted Stock Units and Dividend Cash Amounts. All Restricted Stock Units and Dividend Cash Amounts credited to the Participant's Dividend Cash Account shall be unvested unless and until they become vested and nonforfeitable in accordance with this Paragraph 2. Subject to the terms and conditions of this Award Agreement and the Plan, one hundred percent (100%) of

the Restricted Stock Units and associated Dividend Cash Amounts awarded hereunder shall vest on the third anniversary of the Grant Date (the "Vesting Date"), provided that the Participant is continuously employed by the Company or a Subsidiary through the applicable Vesting Date. Notwithstanding the foregoing:

(a) if the Participant's Termination Date occurs by reason of Total Disability (as defined below) or death, any unvested Restricted Stock Units that are outstanding on the Termination Date (and any associated Dividend Cash Amounts) shall immediately vest on the Termination Date and the Termination Date shall be the "Vesting Date" for purposes of this Award Agreement; and

(b) upon the occurrence of a Change in Control, unless otherwise specifically prohibited under applicable laws, or by the rules and regulations of any applicable governmental agencies or national securities exchange, all unvested Restricted Stock Units that are outstanding on the Change in Control (and associated Dividend Cash Amounts) shall immediately vest on the Change in Control and the Change in Control shall be the "Vesting Date" for purposes of this Award Agreement.

All Restricted Stock Units and associated Dividend Cash Amounts that are not vested upon the Participant's Termination Date shall immediately expire and shall be forfeited and the Participant shall have no further rights with respect to such Restricted Stock Units or Dividend Cash Amounts. In addition, the Full Value Award is subject to forfeiture if the Participant fails to accept the Full Value Award within the first twelve (12) months following the Grant Date in accordance with procedures established by the Company. In the event of forfeiture for any reason, the balance in the Participant's Dividend Cash Account shall be reduced by the amount of any Dividend Cash Amounts that are forfeited. For purposes of this Award Agreement, the term "Total Disability" means an event that results in the Participant being (A) unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than twelve (12) months, or (B) by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than twelve (12) months, receiving income replacement benefits for a period of not less than three (3) months under an accident and health plan covering employees of the Company or its Subsidiaries.

3. Settlement and Payment of Full Value Award . Subject to the terms and conditions of this Award Agreement, Restricted Stock Units and associated Dividend Cash Amounts that have become vested in accordance with Paragraph 2 shall be settled as of the applicable Vesting Date. The date on which settlement occurs is referred to as the "Settlement Date." Unless otherwise determined by the Committee in accordance with the terms of the Plan or as otherwise provided herein, (a) settlement of the vested Restricted Stock Units on the Settlement Date shall be made in the form of shares of Common Stock with one share of Common Stock being issued in settlement of each Restricted Stock Unit, plus an amount of cash equal to the Fair Market Value of any fractional Restricted Stock Unit being settled as of such Settlement Date and (b) settlement of the vested Dividend Cash Amounts on the Settlement Date shall be paid in a cash lump sum payment. Upon the settlement of any vested Restricted Stock Units, such Restricted Stock Units shall be cancelled and upon payment of any Dividend Cash Amounts the balance in the Participant's Dividend Cash Account shall be reduced by the amount paid to the Participant pursuant to subparagraph (b).

4. Vesting and Payment of Cash Incentive Award . The Cash Incentive Award shall be unvested, and the Participant shall have no right to payment of the Cash Incentive

Award, unless and until it becomes vested and nonforfeitable in accordance with this Paragraph 4. Subject to the terms and conditions of this Award Agreement, one hundred percent (100%) of the Cash Incentive Award shall become vested on the date of the consummation of the separation of the Company's aftermarket and ride performance businesses and the Company's powertrain technology business, to be effected through a spin-off (the "Spin-off"), provided that the Participant's Termination Date has not occurred as of the effective date of the Spin-off. If the Spin-off does not occur or if the Participant's Termination Date occurs prior to the Spin-off, the Participant shall have no right to payment of the Cash Incentive Award. If the Cash Incentive Award becomes vested pursuant to this Paragraph 4, it will be paid to the Participant within thirty (30) days of the Spin-off.

5. Withholding. All Awards and distributions under the Plan, including this Award and any distribution in respect of this Award, are subject to withholding of all applicable taxes, and the delivery of any cash or other benefits under the Plan or this Award is conditioned on satisfaction of the applicable tax withholding obligations. Such withholding obligations may be satisfied, at the Participant's election, (a) through cash payment by the Participant, (b) through the surrender of shares of Common Stock that the Participant already owns, or (c) through the surrender of shares of Common Stock to which the Participant is otherwise entitled under the Plan; provided, however, that any withholding obligations with respect to any Participant shall be satisfied by the method set forth in subparagraph (c) of this Paragraph 5 unless the Participant otherwise elects in accordance with this Paragraph 5; and provided further that any withholding with respect to payments of Dividend Cash Amounts and the Cash Incentive Award shall be satisfied by the method set forth in subparagraph (a) of this Paragraph 5. The amount withheld in the form of shares of Common Stock under this Paragraph 5 may not exceed the minimum statutory withholding obligation (based on the minimum statutory withholding rates for Federal and state purposes, including, without limitation, payroll taxes) unless otherwise elected by the Participant, in no event shall the Participant be permitted to elect less than the minimum statutory withholding obligation, and in no event shall the Participant be permitted to elect to have an amount withheld in the form of shares of Common Stock pursuant to this Paragraph 5 that exceeds the maximum individual tax rate for the employee in applicable jurisdictions.

6. Transferability. This Award is not transferable except as designated by the Participant by will or by the laws of descent and distribution or pursuant to a qualified domestic relations order.

7. Heirs and Successors. If any benefits deliverable to the Participant under this Award Agreement have not been delivered at the time of the Participant's death, such benefits shall be delivered to the Participant's Designated Beneficiary, in accordance with the provisions of this Award Agreement. The "Designated Beneficiary" shall be the beneficiary or beneficiaries designated by the Participant in a writing filed with the Company in such form and at such time as the Company shall require and in accordance with such rules and procedures established by the Company. If a deceased Participant fails to designate a beneficiary, or if the Designated Beneficiary does not survive the Participant, any rights that would have been exercisable by the Participant and any benefits distributable to the Participant shall be distributed to the legal representative of the estate of the Participant.

8. Administration. The authority to administer and interpret this Award and this Award Agreement shall be vested in the Committee, and the Committee shall have all powers with respect to this Award and this Award Agreement as it has with respect to the Plan. Any interpretation of this Award or this Award Agreement by the Committee and any decision made by it with respect to the Award or this Award Agreement is final and binding on all persons.

9. Addendum to Award Agreement . Notwithstanding any provision of this Award Agreement, if the Participant resides and/or works outside the United States of America (the "United States", "U.S." or "U.S.A."), this Award shall be subject to the special terms and conditions set forth in the addendum to this Award Agreement (the "Addendum") for the Participant's country. Further, if the Participant transfers residence and/or employment to another country reflected in the Addendum, the special terms and conditions for such country will apply to the Participant to the extent the Company determines, in its sole discretion, that the application of such special terms and conditions is necessary or advisable for legal or administrative reasons (or the Company may establish alternative terms and conditions as may be necessary or advisable to accommodate the Participant's transfer). The Addendum shall constitute part of this Award Agreement.

10. Adjustment of Award . The number of Restricted Stock Units awarded pursuant to this Award may be adjusted by the Committee in accordance with the Plan to reflect certain corporate transactions which affect the number, type or value of the Restricted Stock Units. Without limiting the generality of the foregoing, any Restricted Stock Units that are outstanding on the date of the Spin-off, shall be adjusted in connection with the Spin-off in accordance with the adjustment principles applicable to restricted stock units generally in connection with the Spin-off as described in the operative documents relating to the Spin-off provided that fifty percent (50%) of the outstanding Restricted Stock Units will be adjusted and converted into restricted stock units with respect to stock of the spun-off company and fifty percent (50%) of the outstanding Restricted Stock Units will be adjusted and will remain as restricted stock units with respect to stock of the Company.

11. Notices . Any notice required or permitted under this Award Agreement shall be deemed given when delivered personally, or when deposited in a United States Post Office, postage prepaid, addressed, as appropriate, to the Committee or the Company at the Company's principal offices, to the Participant at the Participant's address as last known by the Company or, in any case, such other address as one party may designate in writing to the other.

12. Governing Law . The validity, construction and effect of this Award Agreement shall be determined in accordance with the laws of the State of Illinois and applicable federal law.

13. Amendments . The Board may, at any time, amend or terminate the Plan, and the Committee may amend this Award Agreement, provided that, except as provided in the Plan, no amendment or termination may, in the absence of written consent to the change by the Participant (or, if the Participant is not then living, the affected beneficiary), adversely affect the rights of the Participant or his or her beneficiary under this Award Agreement prior to the date such amendment or termination is adopted by the Board or the Committee, as the case may be.

14. Award Not Contract of Employment . The Award does not constitute a contract of employment or continued service, and the grant of the Award shall not give the Participant the right to be retained in the employ or service of the Company or any Subsidiary, nor any right or claim to any benefit under the Plan or this Award Agreement, unless such right or claim has specifically accrued under the terms of the Plan and this Award Agreement.

15. Unfunded Obligation . The Dividend Cash Account shall not be funded, no trust, escrow or other provisions shall be established to secure payments and distributions due from the Dividend Cash Account and the Dividend Cash Account shall be regarded as unfunded for purposes of the Employee Retirement Income Security Act of 1974, as amended, and the Code. The Participant shall be treated as a general, unsecured creditor of the Company with respect to amounts credited to the Dividend Cash Account, and shall have no rights to any specific assets of the Company. Any amounts credited to the Dividend Cash

Account will remain general assets of the Company and shall be payable solely from the general assets of the Company.

16. Severability . If a provision of this Award Agreement is held invalid by a court of competent jurisdiction, the remaining provisions shall nonetheless be enforceable according to their terms. Further, if any provision is held to be overbroad as written, that provision shall be amended to narrow its application to the extent necessary to make the provision enforceable according to applicable law and enforced as amended.

17. Plan Governs . The Award evidenced by this Award Agreement is granted pursuant to the Plan, and this Award and this Award Agreement are in all respects governed by the Plan and subject to all of the terms and provisions thereof, whether such terms and provisions are incorporated in this Award Agreement by reference or are expressly cited.

18. Counterparts . This Award Agreement may be executed in one or more counterparts, each of which shall be deemed to be an original and all of which together shall constitute one and the same instrument.

19. Special Section 409A Rules . It is intended that any amounts payable under this Award Agreement shall either be exempt from or comply with section 409A of the Code. The provisions of this Award shall be construed and interpreted in accordance with section 409A of the Code. Notwithstanding any other provision of this Award Agreement to the contrary, if any payment or benefit hereunder is subject to section 409A of the Code, and if such payment or benefit is to be paid or provided on account of the Participant's termination of employment (or other separation from service):

(a) and if the Participant is a specified employee (within the meaning of section 409A(a)(2)(B) of the Code) and if any such payment or benefit is required to be made or provided prior to the first day of the seventh month following the Participant's separation from service or termination of employment, such payment or benefit shall be delayed until the first day of the seventh month following the Participant's termination of employment or separation from service; and

(b) the determination as to whether the Participant has had a termination of employment (or separation from service) shall be made in accordance with the provisions of section 409A of the Code and the guidance issued thereunder without application of any alternative levels of reductions of bona fide services permitted thereunder.

ACCEPTED:

PARTICIPANT:

TENNECO INC.:

_____

Electronic Signature

_____

Acceptance Date

EXHIBIT 21

TENNECO INC.

Company Name	Ownership Type (a)	Primary Jurisdiction
A.E. Group Machines Limited	Indirect	United Kingdom
AE International Limited	Indirect	United Kingdom
Anand I-Power Limited	Indirect	India
Anqing TP Goetze Liner Co., Ltd.	Indirect	China
Anqing TP Goetze Piston Ring Co., Ltd.	Indirect	China
Anqing TP Powder Metallurgy Co. Ltd.	Indirect	China
Armstrong Properties (Pty.) Ltd.	Indirect	South Africa
Ateliers Juliette Adam SAS	Indirect	France
Autopartes Walker, S. de R.L. de C.V.	Indirect	Mexico
Beck Arnley Holdings LLC	Indirect	United States
Carter Automotive Company LLC	Indirect	United States
CATAI s.r.l.	Indirect	Italy
CED'S Inc.	Indirect	Illinois
Clevite Industries Inc.	Indirect	Delaware
Componentes Venezolanos de Direccion, S.A.	Indirect	Venezuela
Cooperatief Federal-Mogul Dutch Investments B.A.	Direct	Netherlands
Coventry Assurance Ltd.	Direct	Bermuda
Dongsuh Federal-Mogul Co., Ltd.	Indirect	South Korea
DRiV Automotive Inc.	Indirect	United States
DRiV Incorporated	Direct	United States
DRiV IP LLC	Direct	United States
Farloc Argentina S.A.I.C. y F.	Indirect	Argentina
FDML Holdings Limited	Indirect	United Kingdom
Federal Mogul (Thailand) Ltd.	Indirect	Thailand
Federal Mogul Aftermarket Egypt Ltd.	Indirect	Egypt

Company Name	Ownership Type (a)	Primary Jurisdiction
Federal Mogul Argentina S.A.	Indirect	Argentina
Federal Mogul Dis Ticaret Anonim Sirketi	Indirect	Turkey
Federal Mogul Hungary Kft.	Indirect	Hungary
Federal Mogul Powertrain Otomotiv Anonim Sirketi	Indirect	Turkey
Federal Mogul SAS	Indirect	France
Federal Mogul Services Sarl	Indirect	France
Federal Mogul Systems Protection SAS	Indirect	France
Federal-Mogul (Anqing) Powder Metallurgy Co., Ltd.	Indirect	China
Federal-Mogul (Changshu) Automotive Parts Co., Ltd.	Indirect	China
Federal-Mogul (China) Co., Ltd.	Indirect	China
Federal-Mogul (Chongqing) Friction Materials Co., Ltd.	Indirect	China
Federal-Mogul (Dalian) Co., Ltd.	Indirect	China
Federal-Mogul (Langfang) Automotive Components Co., Ltd.	Indirect	China
Federal-Mogul (Proprietary) Limited	Indirect	South Africa
Federal-Mogul (Shanghai) Automotive Parts Co., Ltd.	Indirect	China
Federal-Mogul (T&N) Hong Kong Limited	Indirect	Hong Kong
Federal-Mogul (Tianjin) Surface Treatment Co., Ltd.	Indirect	China
Federal-Mogul (Vietnam) Ltd.	Indirect	Vietnam
Federal-Mogul Aftermarket Espana, S.A.	Indirect	Spain
Federal-Mogul Aftermarket France SAS	Indirect	France
Federal-Mogul Aftermarket GmbH	Indirect	Germany
Federal-Mogul Aftermarket Southern Africa (Pty) Limited	Indirect	South Africa
Federal-Mogul Aftermarket UK Limited	Indirect	United Kingdom
Federal-Mogul Anand Bearings India Limited	Direct	India
Federal-Mogul Anand Sealings India Limited	Indirect	India
Federal-Mogul Asia Investments Holding Korea, Ltd.	Indirect	South Korea

Company Name	Ownership Type (a)	Primary Jurisdiction
Federal-Mogul Asia Investments Limited	Indirect	United Kingdom
Federal-Mogul Automotive GmbH & Co. KG	Indirect	Germany
Federal-Mogul Automotive Pty Ltd	Indirect	Australia
Federal-Mogul Automotive Verwaltungs GmbH	Direct	Germany
Federal-Mogul Betriebsgrundstucke Burscheid GmbH	Indirect	Germany
Federal-Mogul Bimet Spolka Akcyjna	Indirect	Poland
Federal-Mogul Bradford Limited	Indirect	United Kingdom
Federal-Mogul Bremsbelag GmbH	Indirect	Germany
Federal-Mogul Burscheid Beteiligungs GmbH	Indirect	Germany
Federal-Mogul Burscheid GmbH	Indirect	Germany
Federal-Mogul Canada Limited	Direct	Canada
Federal-Mogul Chassis LLC	Indirect	United States
Federal-Mogul Componentes de Motores Ltda.	Indirect	Brazil
Federal-Mogul Controlled Power Limited	Indirect	United Kingdom
Federal-Mogul Coventry Limited	Indirect	United Kingdom
Federal-Mogul de Costa Rica, S.A.	Direct	Costa Rica
Federal-Mogul de Guatemala, Sociedad Anonima	Direct	Guatemala
Federal-Mogul de Matamoros, S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul de Mexico, S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul de Venezuela, C.A.	Indirect	Venezuela
Federal-Mogul Deva (Qingdao) Automotive Parts Co., Ltd.	Indirect	China
Federal-Mogul Deva GmbH	Indirect	Germany
Federal-Mogul Dimitrovgrad LLC	Indirect	Russia
Federal-Mogul Distribucion de Mexico, S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul Dong Feng (Shiyan) Engine Components Co., Ltd.	Indirect	China
Federal-Mogul EMEA Distribution Services	Indirect	Belgium
Federal-Mogul Employee Trust Administration Limited	Indirect	United Kingdom

Company Name	Ownership Type (a)	Primary Jurisdiction
Federal-Mogul Engineering Limited	Indirect	United Kingdom
Federal-Mogul FIL-P43, S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul FIL-S43, S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul Filtration LLC	Indirect	United States
Federal-Mogul Finance 1, LLC	Indirect	United States
Federal-Mogul Finance 2, LLC	Indirect	United States
Federal-Mogul Financial Services Poland Sp.z.o.o.	Indirect	Poland
Federal-Mogul Financial Services S.A.S.	Indirect	France
Federal-Mogul Financing Corporation	Direct	United States
Federal-Mogul Friction Products a.s.	Indirect	Czech Republic
Federal-Mogul Friction Products Barcelona, S.L.	Indirect	Spain
Federal-Mogul Friction Products Co., Ltd.	Indirect	China
Federal-Mogul Friction Products GmbH	Indirect	Germany
Federal-Mogul Friction Products International GmbH	Indirect	Germany
Federal-Mogul Friction Products Limited	Indirect	United Kingdom
Federal-Mogul Friction Products Ploiesti SRL	Indirect	Romania
Federal-Mogul Friction Products, S.A.	Indirect	Spain
Federal-Mogul Friction Spain, S.L.	Indirect	Spain
Federal-Mogul Friedberg GmbH	Indirect	Germany
Federal-Mogul Garennes SAS	Indirect	France
Federal-Mogul Germany Investments Holding GmbH	Indirect	Germany
Federal-Mogul Global Aftermarket EMEA	Indirect	Belgium
Federal-Mogul Global Growth Limited	Indirect	United Kingdom
Federal-Mogul GmbH	Indirect	Switzerland
Federal-Mogul Goetze (India) Limited	Indirect	India
Federal-Mogul Gorzyce Sp. z o.o.	Indirect	Poland

Company Name	Ownership Type (a)	Primary Jurisdiction
Federal-Mogul Holding Deutschland GmbH	Indirect	Germany
Federal-Mogul Holding Sweden AB	Direct	Sweden
Federal-Mogul Holdings, Ltd.	Indirect	Mauritius
Federal-Mogul Iberica, S.L.	Indirect	Spain
Federal-Mogul Ignition GmbH	Indirect	Germany
Federal-Mogul Ignition LLC	Indirect	United States
Federal-Mogul Ignition Products India Limited	Indirect	India
Federal-Mogul Ignition Products SAS	Indirect	France
Federal-Mogul Industria de Autopecas Ltda.	Indirect	Brazil
Federal-Mogul Investment Ltd.	Indirect	British Virgin Islands
Federal-Mogul Investments B.V.	Indirect	Netherlands
Federal-Mogul Italy S.r.l.	Indirect	Italy
Federal-Mogul Izmit Piston ve Pim Uretim Tesisleri A.S.	Indirect	Turkey
Federal-Mogul Japan K.K.	Indirect	Japan
Federal-Mogul Juarez S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul Lighting, S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul Limited	Indirect	United Kingdom
Federal-Mogul Luxembourg S.a.r.l.	Indirect	Luxembourg
Federal-Mogul Motorparts (India) Limited	Indirect	India
Federal-Mogul Motorparts (Netherlands) B.V.	Direct	Netherlands
Federal-Mogul Motorparts (Pinghu) Trading Limited	Indirect	China
Federal-Mogul Motorparts (Qingdao) Co., Ltd.	Indirect	China
Federal-Mogul Motorparts (Singapore) Pte. Ltd.	Indirect	Singapore
Federal-Mogul Motorparts (Thailand) Limited	Direct	Thailand
Federal-Mogul Motorparts (Zhejiang) Co., Ltd.	Indirect	China
Federal-Mogul Motorparts Colombia S.A.S.	Indirect	Columbia
Federal-Mogul Motorparts Holding B.V.	Indirect	Netherlands

Company Name	Ownership Type (a)	Primary Jurisdiction
Federal-Mogul Motorparts Holding GmbH	Direct	Germany
Federal-Mogul Motorparts LLC	Direct	United States
Federal-Mogul Motorparts Management (Shanghai) Co., Ltd.	Indirect	China
Federal-Mogul Motorparts Minority Holding B.V.	Indirect	Netherlands
Federal-Mogul Motorparts Philippines, Inc.	Indirect	Philippines
Federal-Mogul Motorparts Ploiesti SRL	Indirect	Romania
Federal-Mogul Motorparts Poland Sp.z.o.o.	Indirect	Poland
Federal-Mogul Motorparts Pty Ltd	Indirect	Australia
Federal-Mogul Motorparts Services SRL	Indirect	Romania
Federal-Mogul MP US LLC	Indirect	United States
Federal-Mogul Naberezhnye Chelny	Indirect	Russia
Federal-Mogul Nürnberg GmbH	Indirect	Germany
Federal-Mogul of South Africa (Proprietary) Limited	Indirect	South Africa
Federal-Mogul Operations France S.A.S.	Indirect	France
Federal-Mogul Piston Rings, LLC	Indirect	United States
Federal-Mogul Plasticos Puntanos, S.A.	Indirect	Argentina
Federal-Mogul Powertrain (Netherlands) B.V.	Direct	Netherlands
Federal-Mogul Powertrain Eastern Europe B.V.	Indirect	Netherlands
Federal-Mogul Powertrain IP LLC	Indirect	United States
Federal-Mogul Powertrain Italy S.R.L	Indirect	Italy
Federal-Mogul Powertrain LLC	Direct	United States
Federal-Mogul Powertrain Mexico Distribucion S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul Powertrain Russia GmbH	Indirect	Germany
Federal-Mogul Powertrain Solutions India Private Limited	Indirect	India
Federal-Mogul Powertrain Systems S A (Proprietary) Limited	Indirect	South Africa
Federal-Mogul Powertrain Vostok OOO	Indirect	Russia
Federal-Mogul Products US LLC	Indirect	United States

Company Name	Ownership Type (a)	Primary Jurisdiction
Federal-Mogul Pty Ltd	Indirect	Australia
Federal-Mogul R&L Friedberg Casting GmbH & Co. KG	Indirect	Germany
Federal-Mogul Risk Advisory Services LLC	Indirect	United States
Federal-Mogul S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul S.A.	Indirect	Belgium
Federal-Mogul Sealing System (Nanchang) Co., Ltd.	Indirect	China
Federal-Mogul Sealing Systems GmbH	Indirect	Germany
Federal-Mogul Sejong Co., Ltd	Indirect	Korea
Federal-Mogul Sejong Tech Ltd	Indirect	South Korea
Federal-Mogul Serina Co., Ltd.	Indirect	Thailand
Federal-Mogul Sevierville, LLC	Indirect	United States
Federal-Mogul Shanghai Bearing Co., Ltd.	Indirect	China
Federal-Mogul Shanghai Compound Material Co., Ltd.	Indirect	China
Federal-Mogul Singapore Investments Pte. Ltd.	Indirect	Singapore
Federal-Mogul Sistemas Automotivos Ltda.	Indirect	Brazil
Federal-Mogul Sistemas de Limpadores de Para-Brisas Ltda	Indirect	Brazil
Federal-Mogul Sorocaba-Holding Ltda	Indirect	Brazil
Federal-Mogul SP Mexico, S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul Systems Protection Hungary Kft.	Indirect	Hungary
Federal-Mogul Systems Protection Morocco SARL AU	Indirect	Morocco
Federal-Mogul Technology Limited	Indirect	United Kingdom
Federal-Mogul TP Europe GmbH & Co KG	Indirect	Germany
Federal-Mogul TP Liner Europe Otomotiv Ltd. Şti	Indirect	Turkey
Federal-Mogul TP Liners, Inc.	Indirect	United States
Federal-Mogul TP Piston Rings GmbH	Indirect	Germany

Company Name	Ownership Type (a)	Primary Jurisdiction
Federal-Mogul TPR (India) Limited	Indirect	India
Federal-Mogul Transaction LLC	Indirect	United States
Federal-Mogul UK Investments Limited	Indirect	United Kingdom
Federal-Mogul UK Powertrain Limited	Indirect	United Kingdom
Federal-Mogul Valve Train International LLC	Indirect	United States
Federal-Mogul Valve Train S. de R.L. de C.V.	Indirect	Mexico
Federal-Mogul Valvetrain GmbH	Indirect	Germany
Federal-Mogul Valvetrain La Source SAS	Indirect	France
Federal-Mogul Valvetrain Limited	Direct	United Kingdom
Federal-Mogul Valvetrain s.r.o.	Indirect	Czech Republic
Federal-Mogul Valvetrain Schirmeck SAS	Indirect	France
Federal-Mogul VCS Holding B.V.	Indirect	Netherlands
Federal-Mogul VCS, LLC	Indirect	Russia
Federal-Mogul Vermogensverwaltungs GmbH	Indirect	Germany
Federal-Mogul Verwaltungs-und Beteiligungs-GmbH	Indirect	Germany
Federal-Mogul Wiesbaden GmbH	Indirect	Germany
Federal-Mogul World Trade (Asia) Limited	Indirect	Hong Kong
Federal-Mogul World Wide LLC	Indirect	United States
Federal-Mogul Yura (Qingdao) Ignition Co., Ltd.	Indirect	China
Federal-Mogul Zhengsheng (Changsha) Piston Ring Co., Ltd.	Indirect	China
Felt Products MFG. CO. LLC	Indirect	United States
Ferodo America, LLC	Indirect	United States
Ferodo Limited	Indirect	United Kingdom
F-M Holding Daros AB	Indirect	Sweden
F-M Holding Goteborg AB	Indirect	Sweden
F-M Holding Mexico, S.A. de C.V.	Direct	Mexico

Company Name	Ownership Type (a)	Primary Jurisdiction
FM International, LLC	Indirect	United States
F-M Motorparts Limited	Indirect	United Kingdom
F-M Motorparts TSC LLC	Indirect	United States
FM Participacoes e Investimentos LTDA	Indirect	Brazil
FM PBW Bearings Private Limited	Indirect	India
F-M Trademarks Limited	Indirect	United Kingdom
F-M TSC Real Estate Holdings LLC	Indirect	United States
Fonciere de Liberation	Indirect	France
Forjas y Maquinas, S. de R.L. de C.V.	Indirect	Mexico
Frenos Hidraulicos Automotrices, S.A. de C.V.	Indirect	Mexico
Fric-Rot S.A.I.C.	Indirect	Argentina
Gasket Holdings, LLC	Indirect	United States
Gillet Exhaust Manufacturing Limited	Indirect	United Kingdom
Gillet Pressings Cardiff Limited	Indirect	United Kingdom
Goetze Wohnungsbau GmbH	Indirect	Germany
ISA Installations Steuerungs und Automatislerungs GmbH	Indirect	Germany
J.W. Hartley (Motor Trade) Limited	Indirect	United Kingdom
Jurid do Brasil Sistemas Automotivos Ltda.	Indirect	Brazil
KB Autosys Co., Ltd.	Indirect	Korea
KB Autosys India Private Ltd.	Indirect	India
KB Autosys (Zhangjiagang) Co., Ltd.	Indirect	China
Kinetic Pty. Ltd.	Indirect	Australia
Kontich	Direct	Belgium
Leeds Piston Ring & Engineering Co. Limited	Indirect	United Kingdom
Maco Inversiones S.A.	Indirect	Argentina
McCord Payen de Mexico S. de R.L. de C.V.	Indirect	Mexico

Company Name	Ownership *Type (a)*	Primary *Jurisdiction*
McPherson Strut Company LLC	Indirect	Delaware
Monroe Amortisor Imalat Ve Ticaret Anonim Sirketi	Indirect	Turkey
Monroe Australia Pty. Limited	Indirect	Australia
Monroe Czechia s.r.o.	Indirect	Czech Republic
Monroe Holding, S. de R.L. de C.V.	Indirect	Mexico
Monroe Manufacturing (Proprietary) Ltd.	Indirect	South Africa
Monroe Mexico, S. de R.L. de C.V.	Indirect	Mexico
Monroe Packaging BVBA	Indirect	Belgium
Monroe Ride Performance Sweden AB	Indirect	Sweden
Monroe Springs (Australia) Pty. Ltd.	Indirect	Australia
Montagewerk Abgastechnik Emden GmbH	Indirect	Germany
Motocare India Private Limited	Indirect	India
Muzzy-Lyon Auto Parts LLC	Indirect	United States
Parts Zone (Thailand) Co., Ltd.	Indirect	Thailand
Payen International Limited	Indirect	United Kingdom
Piston Rings (UK) Limited	Indirect	United Kingdom
Precision Modular Assembly Corp.	Indirect	Delaware
Productos de Frenos Automotrices de Calidad S.A. de C.V.	Indirect	Mexico
Proveedora Walker S. de R.L. de C.V.	Indirect	Mexico
Pullman Standard Inc.	Indirect	Delaware
Qingdao Tenneco FAWSN Automobile Parts Co., Ltd.	Indirect	China
Raimsa, S. de R.L. de C.V.	Indirect	Mexico
Ride Performance Canada Inc.	Indirect	Canada
Ride Performance Japan Ltd.	Indirect	Japan
Ride Performance Korea Limited	Indirect	Korea

Company Name	Ownership Type (a)	Primary Jurisdiction
Ride Performance Mexico Holding LLC	Indirect	United States
Sapav Marketing Ltd	Indirect	Cyprus
Saxid	Indirect	France
SAXID Limited	Indirect	United Kingdom
Saxid s.r.l.	Indirect	Italy
Servicio de Componentes Automotrices, S. de R.L. de C.V.	Indirect	Mexico
Servicios Administrativos Industriales, S. de R.L. de C.V.	Indirect	Mexico
Shanghai Tenneco Exhaust System Co., Ltd.	Indirect	China
Sibirica Energy Limited	Indirect	Cyprus
Sintration Limited	Indirect	United Kingdom
Speyside Real Estate, LLC	Indirect	United States
Subensambles Internacionales, S. de R.L. de C.V.	Indirect	Mexico
T&N de Mexico S. de R.L. de C.V.	Indirect	Mexico
T&N Industries, LLC	Indirect	United States
TA (Australia) Group Pty. Ltd.	Indirect	Australia
Taiwan Federal-Mogul Motorparts Co., Limited	Indirect	Taiwan
TecCom GmbH	Indirect	Germany
Tenneco (Beijing) Exhaust System Co., Ltd.	Indirect	China
Tenneco (Beijing) Ride Control System Co., Ltd.	Indirect	China
Tenneco (Changzhou) Ride Performance Co., Ltd.	Indirect	China
Tenneco (China) Co., Ltd.	Indirect	China
Tenneco (Dalian) Exhaust System Co. Ltd.	Indirect	China
Tenneco (Guangzhou) Co., Ltd.	Indirect	China
Tenneco (Jingzhou) Ride Performance Co., Ltd.	Indirect	China
Tenneco (Mauritius) Limited	Indirect	Mauritius

Company Name	Ownership Type (a)	Primary Jurisdiction
Tenneco (MSCan) Operations Inc.	Indirect	Canada (BC)
Tenneco (MUSA)	Indirect	California
Tenneco (Suzhou) Co., Ltd.	Indirect	China
Tenneco (Suzhou) Emission System Co., Ltd.	Indirect	China
Tenneco (Suzhou) Ride Control Co., Ltd.	Indirect	China
Tenneco (Tianjin) Ride Performance Co. Ltd.	Indirect	China
Tenneco (TM Asia) Ltd.	Indirect	Taiwan
Tenneco (TM Belgium) BVBA	Indirect	Belgium
Tenneco Asheville Inc.	Indirect	Delaware
Tenneco Asia Inc.	Indirect	Delaware
Tenneco Automotie Nederland B.V.	Indirect	Netherlands
Tenneco Automotive (Thailand) Limited	Indirect	Thailand
Tenneco Automotive Brasil Ltda.	Indirect	Brazil
Tenneco Automotive Deutschland GmbH	Indirect	Germany
Tenneco Automotive Eastern Europe Sp. z.o.o.	Indirect	Poland
Tenneco Automotive Europe BVBA	Indirect	Belgium
Tenneco Automotive Europe Coordination Center BVBA	Indirect	Belgium
Tenneco Automotive Foreign Sales Corporation Limited	Indirect	Jamaica
Tenneco Automotive France S.A.S.	Indirect	France
Tenneco Automotive Holdings South Africa Pty. Limited	Indirect	South Africa
Tenneco Automotive Iberica S.A.	Indirect	Spain
Tenneco Automotive Inc. Nevada	Direct	Nevada
Tenneco Automotive India Private Limited	Indirect	India
Tenneco Automotive Italia S.r.l.	Indirect	Italy
Tenneco Automotive Operating Company Inc.	Direct	Delaware
Tenneco Automotive Polska Sp. z.o.o.	Indirect	Poland

Company Name	Ownership Type (a)	Primary Jurisdiction
Tenneco Automotive Port Elizabeth (Proprietary) Limited	Indirect	South Africa
Tenneco Automotive Portugal – Componentes Para Automovel, Unipessoal, LDA.	Indirect	Portugal
Tenneco Automotive RSA Company	Indirect	Delaware
Tenneco Automotive Second RSA Company	Indirect	Delaware
Tenneco Automotive Services Societe Par Actions Simplifiee	Indirect	France
Tenneco Automotive Servicios Mexico, S. de R.L. de C.V.	Indirect	Mexico
Tenneco Automotive Trading Company	Indirect	Delaware
Tenneco Automotive UK Limited	Indirect	United Kingdom
Tenneco Automotive Volga LLC	Indirect	Russia
Tenneco Automotive Walker Inc.	Indirect	Delaware
Tenneco Brake, Inc.	Indirect	Delaware
Tenneco CA Czech Republic s.r.o.	Indirect	Czech Republic
Tenneco CA Mexico, S. de R.L. de C.V.	Indirect	Mexico
Tenneco CA Netherlands BV	Indirect	Netherlands
Tenneco Canada Inc.	Indirect	Canada
Tenneco Clean Air Argentina S.A.I.C.	Indirect	Argentina
Tenneco Clean Air India Private Limited	Indirect	India
Tenneco Clean Air Spain, S.L.U.	Indirect	Spain
Tenneco Clean Air US Inc.	Indirect	United States
Tenneco Deutschland Holdinggesellschaft mbH	Indirect	Germany
Tenneco Eastern European Holdings S.a.r.l.	Indirect	Luxembourg
Tenneco Eberspaecher (Beijing) Exhaust System Co., Ltd.	Indirect	China
Tenneco Emission Control (Pty) Ltd	Indirect	South Africa
Tenneco Etain Societe Par Actions Simplifiee	Indirect	France
Tenneco Europe Limited	Indirect	Delaware

Company Name	Ownership Type (a)	Primary Jurisdiction
Tenneco FAWSN (Changchun) Automobile Parts Co., Ltd.	Indirect	China
Tenneco FAWSN (Foshan) Automobile Parts Co., Ltd.	Indirect	China
Tenneco FAWSN (Tianjin) Automobile Parts Co., Ltd.	Indirect	China
Tenneco Fusheng (Chengdu) Automobile Parts Co., Ltd.	Indirect	China
Tenneco Global Holdings Inc.	Indirect	Delaware
Tenneco GmbH	Indirect	Germany
Tenneco Holdings Danmark ApS	Indirect	Denmark
Tenneco Hong Kong Holdings Limited	Indirect	Hong Kong
Tenneco Hungary Korlatolt Felelossegu Tarsasag	Indirect	Hungary
Tenneco Indústria de Autopeças Ltda.	Indirect	Brazil
Tenneco Innovacion S.L.	Indirect	Spain
Tenneco International Holding Corp.	Indirect	Delaware
Tenneco International Luxembourg S.a.r.l.	Indirect	Luxembourg
Tenneco International Manufacturing S.a.r.l.	Indirect	Luxembourg
Tenneco Japan Ltd.	Indirect	Japan
Tenneco Korea Limited	Indirect	Korea
Tenneco Lingchuan (Chongqing) Exhaust System Co., Ltd.	Indirect	China
Tenneco Management (Europe) Limited	Indirect	United Kingdom
Tenneco Mauritius China Holdings Ltd.	Indirect	Mauritius
Tenneco Mauritius Holdings Limited	Indirect	Mauritius
Tenneco Mexico, S. de R.L. de C.V.	Indirect	Mexico
Tenneco Ride Control South Africa (Pty) Ltd.	Indirect	South Africa
Tenneco Ride Performance US 4 LLC	Indirect	United States
Tenneco Ride Performance US 5 LLC	Indirect	United States
Tenneco RP Germany GmbH	Indirect	Germany

Company Name	Ownership Type (a)	Primary Jurisdiction
Tenneco Silesia spolka z ograniczona odpowiedzialnoscia	Indirect	Poland
Tenneco SpinCo Incorporated	Direct	United States
Tenneco Sverige AB	Indirect	Sweden
Tenneco Walker (Tianjin) Exhaust System Co., Ltd.	Indirect	China
Tenneco Zwickau GmbH	Indirect	Germany
Tenneco-Eberspaecher (Dalian) Exhaust System Co., Ltd.	Indirect	China
Tenneco-Walker (U.K.) Limited	Indirect	United Kingdom
The Pullman Company	Indirect	Delaware
The Tenneco Automotive (UK) Pension Scheme Trustee Limited	Indirect	United Kingdom
Thompson and Stammers (Dunmow) Number 6 Limited	Indirect	United Kingdom
Thompson and Stammers (Dunmow) Number 7 Limited	Indirect	United Kingdom
TM S.r.l. in liquidation	Indirect	Italy
TMC Texas Inc.	Indirect	Delaware
TPR Federal-Mogul Tennessee, Inc.	Indirect	United States
United Piston Ring, Inc.	Indirect	United States
VTD Vakuumtechnik Dresden GmbH	Indirect	Germany
Walker Australia Pty. Limited	Indirect	Australia
Walker Danmark ApS	Indirect	Denmark
Walker Electronic Silencing, Inc.	Indirect	Delaware
Walker Europe, Inc.	Indirect	Delaware
Walker Exhaust (Thailand) Company Limited	Indirect	Thailand
Walker Gillet (Europe) GmbH	Indirect	Germany
Walker Limited	Indirect	United Kingdom
Walker Manufacturing Company	Indirect	Delaware
Walker UK Ltd	Indirect	United Kingdom
Wellworthy Limited	Indirect	United Kingdom

Company Name	Ownership Type (a)	Primary Jurisdiction
Wimetal Societe Par Actions Simplifiee	Indirect	France
Wuhan Tenneco Exhaust System Co., Ltd.	Indirect	China
Yura Federal Mogul Sejong Ignition Limited Liability Company	Indirect	South Korea

(a) Ownership type indicates whether each subsidiary or affiliate is directly owned by Tenneco Inc., indirectly owned by a subsidiary of Tenneco Inc. (in each case, such subsidiary or affiliate may be partially or wholly owned), or a combination thereof.

EXHIBIT 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-17485, 333-41535, 333-33934, 333-101973, 333-113705, 333-142475, 333-159358, 333-192928 and 333-227648) and the Registration Statements on Form S-3 (Nos. 333-224786 and 333-227646) of Tenneco Inc. of our report dated March 15, 2019 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

Milwaukee, Wisconsin
March 15, 2019

Exhibit 24

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange *Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing* requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Brian J. Kesseler
Name: Brian J. Kesseler

Exhibit 24.1

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019

/s/ Roger J. Wood
Name: Roger J. Wood

Exhibit 24.2

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Jason M. Hollar
Name: Jason M. Hollar

Exhibit 24.3

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ John S. Patouhas
Name: John S. Patouhas

Exhibit 24.4

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Gregg M. Sherrill
Name: Gregg M. Sherrill

Exhibit 24.5

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Keith Cozza
Name: Keith Cozza

Exhibit 24.6

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Thomas C. Freyman
Name. Thomas C. Freyman

Exhibit 24.7

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Dennis J. Letham
Name: Dennis J. Letham

Exhibit 24.8

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Roger B. Porter
Name: Roger B. Porter

Exhibit 24.9

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ James S. Metcalf
Name: James S. Metcalf

Exhibit 24.10

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ David B. Price, Jr.
Name: David B. Price, Jr.

Exhibit 24.11

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Paul T. Stecko
Name: Paul T. Stecko

Exhibit 24.12

TENNECO INC.
POWER OF ATTORNEY

The undersigned does hereby appoint Brandon B. Smith, Jason M. Hollar, Ron Hundzinski and Marco DeSanto, and each of them, with full power to act alone, as his true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to execute the Annual Report on Form 10-K for the year ended December 31, 2018 of Tenneco Inc., including any and all amendments thereto, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or any one of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument this 27th day of February, 2019 .

/s/ Jane L. Warner
Name: Jane L. Warner

EXHIBIT 31.1

CERTIFICATION PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT

I, Brian J. Kesseler, certify that:

1 I have reviewed this annual report on Form 10-K of Tenneco Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5 The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of the registrant's internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions).

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ BRIAN J. KESSELER
Brian J. Kesseler
Co-Chief Executive Officer

Dated: March 15, 2019

EXHIBIT 31.2

CERTIFICATION PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT

I, Roger J. Wood, certify that:

1. I have reviewed this annual report on Form 10-K of Tenneco Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of the registrant's internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions)
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ ROGER J. WOOD
Roger J. Wood
Co-Chief Executive Officer

Dated: March 15, 2019

EXHIBIT 31.3

CERTIFICATION PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT

I, Jason M. Hollar, certify that:

1. I have reviewed this annual report on Form 10-K of Tenneco Inc ;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of the registrant's internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ JASON M. HOLLAR
Jason M. Hollar
Executive Vice President and Chief Financial Officer

Dated: March 15, 2019

EXHIBIT 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the accompanying Annual Report on Form 10-K of Tenneco Inc. (the "Company") for the period ended December 31, 2018, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), and pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, Brian J. Kesseler, as Co-Chief Executive Officer of the Company, Roger J. Wood, as Co-Chief Executive Officer of the Company and Jason M. Hollar, as Chief Financial Officer of the Company, hereby certify that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ BRIAN J. KESSELER
Brian J. Kesseler
Co-Chief Executive Officer

/s/ ROGER J. WOOD
Roger J. Wood
Co-Chief Executive Officer

/s/ JASON M. HOLLAR
Jason M. Hollar
Executive Vice President and Chief Financial Officer

March 15, 2019

This certification shall not be deemed "filed" by the Company for purposes of Section 18 of the Securities Exchange Act of 1934. In addition, this certification shall not be deemed to be incorporated by reference into any filing under the Securities Exchange Act of 1933 or the Securities Exchange Act of 1934.

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.