TENNECO INC
Form 10-K/A
September 08, 2017
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K/A
(Amendment No. 1)
(Mark One)
þ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2016
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 (Address of principal executive offices)	60045 (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
Common Stock, par value $.01 per share	New York and Chicago Stock Exchanges

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 þ 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 þ
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 þ No ¨
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files). Yes þ 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. þ

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

Large accelerated filer þ	Accelerated filer ¨	Non-accelerated filer ¨	Smaller reporting company ¨
		(Do not check if a smaller reporting 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 þ

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant as of June 30, 2016, 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, 2016, was approximately $2.6 billion.

Common Stock, par value $.01 per share, outstanding as of February 17, 2017 was 54,300,982.

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 17, 2017	Part III

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EXPLANATORY NOTE

Tenneco Inc. (together with its subsidiaries, "Tenneco," the "Company," "we" and "our") is filing this Amendment No. 1 on Form 10-K/A (the "Form 10-K/A") to its Annual Report on Form 10-K for the year ended December 31, 2016, originally filed with the Securities and Exchange Commission on February 24, 2017 (the "Original Filing"), to make the certain changes as described below.

In preparing the consolidated financial statements for the quarter ended June 30, 2017, the Company identified deficiencies in its internal control over financial reporting. These deficiencies, when aggregated together, resulted in a material weakness in the Company's internal control over financial reporting in China as of June 30, 2017. Specifically, the Company did not have people with appropriate authority and experience in key positions in China to ensure adherence to Company policies and US GAAP. Additionally, we did not have adequate international oversight to prevent the intentional mischaracterization of the nature of accounting transactions related to payments received from suppliers by certain purchasing and accounting personnel at the Company's China subsidiaries.

The material weakness identified as of June 30, 2017 caused us to reevaluate our previous conclusions on internal control over financial reporting as of December 31, 2016, and we have now concluded that the material weakness relating to our internal control over financial reporting in China existed as of December 31, 2016. As a result, we have restated our December 31, 2016 report on internal control over financial reporting, and we have also concluded that our disclosure controls and procedures were not effective as of December 31, 2016.

The material weakness described above resulted in immaterial errors impacting our previously issued consolidated financial statements for the years ended December 31, 2016, 2015 and 2014, each interim and year-to-date period in those respective years, and the first interim period in 2017. We evaluated these errors and concluded that they did not, individually or in the aggregate, result in a material misstatement of our previously issued consolidated financial statements and that such financial statements may continue to be relied upon.

This Form 10-K/A amends Management's Report on Internal Control Over Financial Reporting for the year ended December 31, 2016 as set forth in the Original Filing. This Form 10-K/A also amends the Original Filing to correct the immaterial errors to the consolidated financial statements, arising from the foregoing, an unrelated immaterial error relating to our accrual for certain substrate liabilities and certain previously known adjustments relating to revenue reporting for transactions where we earned a fee as an agent, as described in more detail in Note 16 thereto. Revisions to the Original Filing have been made to the following items solely as a result of and to reflect these revisions:

- Item 1 - Business
- Item 1A - Risk Factors
- Item 6 - Selected Financial Data
- Item 7 - Management's Discussion and Analysis of Financial Condition and Results of Operations
- Item 8 - Financial Statements and Supplementary Data
- Item 9A - Controls and Procedures
- Item 15 - Exhibits, Financial Statement Schedules

As required by Rule 12b-15 under the Securities Exchange Act of 1934, the Company's principal executive officer and principal financial officer are providing new currently dated certifications. In addition, the Company is filing a new consent from PricewaterhouseCoopersLLP. Accordingly, this Form 10-K/A amends Part IV - Item 15 in the Original Filing to reflect the filing of the new certifications and consent.

Except as described above, this Form 10-K/A does not amend, update or change any other items or disclosures in the Original Filing and does not purport to reflect any information or events subsequent to the filing thereof. As such, this Form 10-K/A speaks only as of the date the Original Filing was filed, and the Company has not undertaken herein to amend, supplement or update any information contained in the Original Filing to give effect to any subsequent events. Accordingly, this Form 10-K/A should be read in conjunction with the Company's filings made with the Securities and Exchange Commission subsequent to the filing of the Original Filing, including any amendment to those filings.

Concurrently with the filing of this Form 10-K/A, we are also filing an amendment to our Quarterly Report on Form 10-Q for the quarter ended March 31, 2017. Future Annual Reports on Form 10-K and Quarterly Reports on Form 10-Q will reflect the revisions for financial information included in this Form 10-K/A and the Form 10-Q/A for the quarter ended March 31, 2017.

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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, including the section entitled "Outlook" appearing in Item 7 of this report. The words "may," "will," "believe," "should," "could," "plan," "expect," "anticipate," "estimate," and similar expressions (and 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 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;
- 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 light trucks, which tend to be higher margin products for our customers and us, to other lower margin vehicles, for which we may or may not have supply arrangements;
- changes in consumer demand for our automotive, commercial 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;
- the overall highly competitive nature of the automobile 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);
- the loss of any of our large original equipment manufacturer ("OEM") 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 OEMs or any change in customer demand due to delays in the adoption or enforcement of worldwide emissions regulations;
- 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, exchange rate 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;
- 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;
- increases in the costs of raw materials, including our ability to successfully reduce the impact of any such cost increases through materials substitutions, cost reduction initiatives, customer recovery and other methods;
- 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;
- 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;
- 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;
- changes in distribution channels or competitive conditions in the markets and countries where we operate, including the impact of increasing competition from lower cost, private-label products on our aftermarket business;
- customer acceptance of new products;

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- 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;
- our ability to realize our business strategy of improving operating performance;
- our ability to successfully integrate any acquisitions that we complete and effectively manage our joint ventures and other third-party relationships;
- 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;
- the potential impairment in the carrying value of our long-lived assets and goodwill or our deferred tax assets;
- potential volatility in our effective tax rate;
- natural disasters, such as earthquakes and flooding, and any resultant disruptions in the supply or production of goods or services to us or by us or in demand by our customers;
- 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; and
- the timing and occurrence (or non-occurrence) of other transactions, events and circumstances which may be beyond our control.

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 distributes highly engineered products for both original equipment vehicle manufacturers ("OEMs") and the repair and replacement markets, or aftermarket, worldwide. We are one of the world's largest producers of clean air and ride performance products and systems for light vehicle, commercial truck, off-highway and other vehicle applications. 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. Building a stronger presence in these markets complements our core businesses of supplying ride performance and clean air products and systems to original equipment and aftermarket customers worldwide. Our common stock is traded on the New York Stock Exchange ("NYSE") and the Chicago Stock Exchange under the symbol "TEN."
Corporate Governance and Available Information
We have established a comprehensive approach to corporate governance for the purpose of defining responsibilities, setting high standards of professional and personal conduct and assuring compliance with such responsibilities and standards. As part of its annual review process, the Board of Directors monitors developments in the area of corporate governance. Listed below are some of the key elements of our corporate governance policies.
For more information about these matters, see our definitive Proxy Statement for the Annual Meeting of Stockholders to be held on May 17, 2017.
Independence of Directors

- Eight of our ten directors are independent under the NYSE listing standards.
- Independent directors are scheduled to meet separately in executive session after every regularly scheduled Board of Directors meeting.
- We have a lead independent director, Mr. Paul T. Stecko.

Audit Committee

- All members meet the independence standards for audit committee membership under the NYSE listing standards and applicable Securities and Exchange Commission ("SEC") rules.
- Two members of the Audit Committee, Mr. Dennis J. Letham and Mr. Thomas C. Freyman, have been designated by the Board as "audit committee financial experts," as defined in the SEC rules, and all members of the Audit Committee satisfy the NYSE's financial literacy requirements.
- The Audit Committee operates under a written charter which governs its duties and responsibilities, including its sole authority to appoint, review, evaluate and replace our independent auditors.
- The Audit Committee has adopted policies and procedures governing the pre-approval of all audit, audit-related, tax and other services provided by our independent auditors.

Compensation/Nominating/Governance Committee

- All members meet the independence standards for compensation and nominating committee membership under the NYSE listing standards and applicable SEC rules.
- The Compensation/Nominating/Governance Committee operates under a written charter that governs its duties and responsibilities, including the responsibility for executive compensation.
- We have an Executive Compensation Subcommittee which has the responsibility to consider and approve compensation for our executive officers which is intended to qualify as "performance based compensation" under Section 162(m) of the Internal Revenue Code.

Corporate Governance Principles

- We have adopted Corporate Governance Principles, including qualification and independence standards for directors.

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Stock Ownership Guidelines

- We have adopted Stock Ownership Guidelines to align the interests of our executives with the interests of stockholders and promote our commitment to sound corporate governance.
- The Stock Ownership Guidelines apply to the independent directors, the Chairman and Chief Executive Officer, and all other officers with a rank of Vice President or higher.

Communication with Directors

- The Audit Committee has established a process for confidential and anonymous submission by our employees, as well as submissions by other interested parties, regarding questionable accounting or auditing matters.
- Additionally, the Board of Directors has established a process for stockholders to communicate with the Board of Directors, as a whole, or any independent director.

Codes of Business Conduct and Ethics

- We have adopted a Code of Ethical Conduct for Financial Managers, which applies to our Chief Executive Officer, Chief Operating Officer, Chief Financial Officer, Controller and other key financial managers. This code is filed as Exhibit 14 to this report.
- We also operate under a Code of Conduct that applies to all directors, officers and employees and includes provisions ranging from restrictions on gifts to conflicts of interests. All salaried employees are required to affirm annually their acceptance of, and compliance with, the Code of Conduct.

Related Party Transactions Policy

- We have adopted a Policy and Procedure for Transactions With Related Persons, under which our Audit Committee must generally pre-approve transactions involving more than $120,000 with our directors, executive officers, five percent or greater stockholders and their immediate family members.

Equity Award Policy

- We have adopted a written policy for all issuances by our company of compensatory awards in the form of our common stock or any derivative of our common stock.

Clawback Policy

- We have adopted a clawback policy under which we will, in specified circumstances, require reimbursement of annual and long-term incentives paid to an executive officer. We will continue to review this policy as final rulemaking is adopted regarding clawbacks under the Dodd-Frank Wall Street Reform and Consumer Protection Act.

Personal Loans to Executive Officers and Directors

- We comply with and operate in a manner consistent with the legislation outlawing extensions of credit in the form of a personal loan to or for our directors or executive officers.

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 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. All such statements and reports can also be found at the internet site maintained by the SEC at http://www.sec.gov.

Our Audit Committee, Compensation/Nominating/Governance Committee and Executive Compensation Subcommittee 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.

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CONTRIBUTIONS OF MAJOR BUSINESSES

For information concerning our operating segments, geographic areas and major products or groups of products, see Note 11 to the consolidated financial statements of Tenneco Inc. included in Item 8. The following tables summarize for each of our reportable segments for the periods indicated: (i) net sales and operating revenues; (ii) earnings before interest expense, income taxes and noncontrolling interests (“EBIT”); and (iii) expenditures for plant, property and equipment. See also “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included in Item 7 for information about certain costs and charges included in our results; our current six operating segments (North America Clean Air, North America Ride Performance, Europe, South America and India Clean Air, Europe, South America and India Ride Performance, Asia Pacific Clean Air and Asia Pacific Ride Performance); and management's announced reportable segment changes on February 7, 2017 that our Clean Air and Ride Performance product lines in India, which have been reported as part of the Europe, South America and India segments, will now be reported with their respective product lines in the Asia Pacific segments, bringing the high growth markets in India and China both under the Asia Pacific segments, effective with the first quarter of 2017. Within each geographical area, each operating segment manufactures and distributes either clean air or ride performance products primarily for the original equipment and aftermarket industries. Each of the six operating segments constitutes a reportable segment. Costs related to other business activities, primarily corporate headquarters functions, are disclosed separately from the six operating segments as "Other". We evaluate segment performance based primarily on earnings before interest expense, income taxes, and noncontrolling interests. Products are transferred between segments and geographic areas on a basis intended to reflect as nearly as possible the "market value" of the products.

Net Sales and Operating Revenues:

	2016		2015		2014	
	(Dollar Amounts in Millions)					
Clean Air Division						
North America	$3,016	35 %	$2,839	35 %	$2,801	34 %
Europe, South America & India	2,081	24 %	1,935	23 %	2,088	25 %
Asia Pacific	1,080	13 %	1,037	13 %	1,022	12 %
Intergroup sales	(108)	(1)%	(116)	(1)%	(139)	(2)%
Total Clean Air Division	6,069	71 %	5,695	70 %	5,772	69 %
Ride Performance Division						
North America	1,243	14 %	1,323	16 %	1,361	16 %
Europe, South America & India	1,045	12 %	972	12 %	1,070	13 %
Asia Pacific	323	4 %	275	3 %	269	3 %
Intergroup sales	(81)	(1)%	(84)	(1)%	(91)	(1)%
Total Ride Performance Division	2,530	29 %	2,486	30 %	2,609	31 %
Total Tenneco Inc.	$8,599	100 %	$8,181	100 %	$8,381	100 %

EBIT:

	2016		2015		2014	
	(Dollar Amounts in Millions)					
Clean Air Division						
North America	$220	43 %	$244	48 %	$237	49 %
Europe, South America & India	103	20 %	52	10 %	59	12 %
Asia Pacific	145	28 %	111	22 %	99	20 %
Total Clean Air Division	468	91 %	407	80 %	395	81 %
Ride Performance Division						
North America	157	30 %	155	31 %	143	29 %

Europe, South America & India	25	5 %	(5)	(1)%	40	8 %
Asia Pacific	54	10 %	38	7 %	35	7 %
Total Ride Performance Division	236	45 %	188	37 %	218	44 %
Other	(188)	(36)%	(87)	(17)%	(124)	(25)%
Total Tenneco Inc.	$516	100 %	$508	100 %	$489	100 %

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Expenditures for Plant, Property and Equipment:

	2016			2015			2014		
	(Dollar Amounts in Millions)								
Clean Air Division									
North America	$103	30	%	$95	32	%	$83	26	%
Europe, South America & India	76	22	%	74	25	%	84	26	%
Asia Pacific	46	13	%	43	15	%	56	18	%
Total Clean Air Division	225	65	%	212	72	%	223	70	%
Ride Performance Division									
North America	55	16	%	34	12	%	35	11	%
Europe, South America & India	50	15	%	42	14	%	47	15	%
Asia Pacific	9	3	%	6	2	%	10	3	%
Total Ride Performance Division	114	34	%	82	28	%	92	29	%
Other	4	1	%	1	—	%	2	1	%
Total Tenneco Inc.	$343	100	%	$295	100	%	$317	100	%

Interest expense, income taxes, and noncontrolling interests that were not allocated to our operating segments are:

	2016	2015	2014
	(Millions)		
Interest expense (net of interest capitalized)	$92	$ 67	$ 91
Income tax expense	—	146	131
Noncontrolling interests	68	54	42

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DESCRIPTION OF OUR BUSINESS

We design, manufacture and sell clean air and ride performance systems and products for light vehicle, commercial truck, off-highway and other applications, and generated revenues of $8.6 billion in 2016. We serve both original equipment manufacturers (OEMs) and replacement markets worldwide through leading brands, including Monroe®, Rancho®, Clevite® Elastomers, Axios™, Kinetic®, and Fric-Rot™ ride performance products and Walker®, XNOx®, Fonos™, DynoMax® and Thrush® clean air products.

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 most leading OEMs, commercial truck and off-highway engine manufacturers, and aftermarket distribution channels.

Overview of Parts Industry for Vehicles and Engines

The parts industry for vehicles and engines is generally separated into two categories: (1) "original equipment" or "OE" parts that are sold in large quantities directly for use by manufacturers of light vehicles, commercial trucks and off-highway engines; and (2) "aftermarket" or replacement parts that are sold in varying quantities to wholesalers, retailers and installers. In the OE category, parts suppliers are generally divided into tiers — "Tier 1" suppliers that provide their products directly to OEMs, and "Tier 2" or "Tier 3" suppliers that sell their products principally to other suppliers for combination into those other suppliers' own product offerings.

"Light vehicles" are comprised of: (1) passenger cars and (2) light trucks which include sport-utility vehicles (SUVs), crossover vehicles (CUVs), pick-up trucks, vans and multi-purpose passenger vehicles. Demand for OE light vehicle automotive parts is generally a function of the number of new vehicles produced, which in turn depends on prevailing economic conditions and consumer preferences. 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, by further expanding business with existing customers and by serving new customers in existing or new markets. Companies with a global presence and advanced technology, engineering, manufacturing and support capabilities, such as our company, are better positioned to take advantage of these opportunities.

Increasing vehicle emissions regulations are driving opportunities for increasing clean air content on vehicles and engines. Additionally, the increase and expansion in mandated diesel emission control and noise regulations or standards in North America, Europe, China, Japan, Brazil, Russia, India and South Korea have enabled suppliers such as us to serve customers beyond light vehicles. Certain parts suppliers that have traditionally supplied the automotive industry also develop and produce components and integrated systems for commercial truck, off-highway and other applications, such as medium- and heavy-duty trucks, buses, stationary engines, agricultural and construction equipment, locomotive and marine engines and recreational two-wheelers and all-terrain vehicles. We foresee this diversification of content and applications as a source of future growth.

Demand for aftermarket products is driven by general economic conditions, the number of vehicles in operation, the age and distance driven of the vehicle fleet, and the average useful life and quality of vehicle parts. Although more vehicles are on the road than ever before, the aftermarket has experienced longer replacement cycles due to the improved quality and increased average useful life of vehicle parts that has come to pass as a result of technological innovation. Parts suppliers are increasingly being required to deliver innovative aftermarket products to drive increased aftermarket demand. Global economic downturns generally impact aftermarket sales less adversely than OE sales, as customers forego new vehicle purchases and keep their vehicles longer, thereby increasing demand for repair and maintenance parts and services.

Industry Trends

As the dynamics of the customers we serve change, so do the roles, responsibilities and relationships of the participants. Key trends that we believe are affecting parts suppliers include:

General Economic Factors and Production Levels

Global light vehicle production has increased at a steady pace over the past three years, increasing 3% in 2014, 2% in 2015 and 5% in 2016. The overall rate of growth in 2016 was primarily driven by the 14% growth in China, while

partially offset by declines in South America and Japan/Korea, down 10% and 3%, respectively. IHS Markit projects global light vehicle production will grow 2% in 2017. Production of commercial trucks globally and off-highway equipment in regulated regions has weakened over the past three years with production about flat in 2014, declining 8% in 2015, and declining 2% in 2016. IHS and Power Systems Research forecast these markets to increase 2% in 2017.

Increasing Environmental Standards

OE manufacturers and their parts suppliers are designing and developing products to respond to increasingly stringent environmental requirements, growth in engines using diesel and alternative fuels, and increased demand for better fuel economy. Government regulations require substantial reductions in vehicle tailpipe criteria pollutant emissions, longer warranty periods for a vehicle's pollution control equipment and additional equipment to control fuel vapor emissions. The products that our clean air

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division provides reduce the tailpipe emissions of criteria pollutants. In addition, regulations have been adopted to regulate greenhouse gas emissions of carbon dioxide. Reducing CO_2 emissions requires improving fuel economy; as a result improved combustion efficiency and reduction of vehicle mass have become priorities. Manufacturers are responding to all of these regulations with new technologies for gasoline- and diesel-fueled vehicles that minimize pollution and improve fuel economy.

As a leading supplier of clean air systems with strong technical capabilities, we are well positioned to benefit from the more rigorous environmental standards being adopted around the world. 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.

To meet stricter air quality regulations, we have developed and sold diesel particulate filters (DPFs) in Europe, for example, for the Audi A4, BMW 1 series passenger cars and Scania trucks and in North America for GM Duramax engine applications, the Ford Super Duty, the Chrysler Ram Heavy Duty, and off-highway applications for Caterpillar and John Deere in North America and Europe, and Kubota in Japan. These particulate filters, coupled with converters, reduce emissions of particulate matter by up to 90 percent. In addition, we have development and production contracts for our selective catalytic reduction (SCR) systems with light and commercial vehicle manufacturers. These SCR systems reduce emissions of nitrogen oxides by up to 95 percent. In China, South America, Europe, and Japan, we have development and production contracts for complete turnkey SCR systems that include the urea dosing technology acquired in 2007 and now sold globally under the name XNOx®. Regulations in the U.S. and European markets, which require reductions in carbon dioxide emissions and improvements in fuel economy, are creating increased demand for our fabricated manifolds, maniverters, integrated turbocharger/manifold modules, electronic exhaust valves, and lightweight components. Lastly, for various off-highway customers, we offer emission aftertreatment systems designed to meet environmental regulations or their equivalent outside of the U.S. Both commercial truck and off-highway customers are embracing the concept of turnkey aftertreatment systems which require aftertreatment electronic control units (ECUs) as well as related control software which we have developed and sold to several customers.

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, spending $154 million in 2016, $146 million in 2015, and $169 million in 2014, net of customer reimbursements. Such expenses reimbursed by our customers totaled $137 million in 2016, $145 million in 2015, and $159 million in 2014, including building prototypes and incurring other costs on behalf of our customers. We also fund and sponsor university and other independent research to advance our clean air and ride performance development efforts.

By investing in technology, we have been able to expand our product offerings and penetrate new markets. For example, we developed DPFs which were first sold in Europe and then offered in North America. Since these original innovations, we have developed T.R.U.E-Clean® systems with our partners, a product used to regenerate DPFs. We have also built prototypes of urea SCR systems for locomotive and marine engines. We expanded our suite of NOx-reduction technologies, developing prototypes of SCR systems using gaseous ammonia, absorbed on a solid salt, as the reductant or a hydrocarbon lean NOx catalyst (HC-LNC for NOx reduction) that relies on hydrocarbons, ethanol, or other reductants instead of urea. We successfully developed and sold fabricated manifolds, previously used only on gasoline engines, into the passenger car diesel segment. We developed our prototype aftertreatment system for large engines, up to 4500 horsepower, used in line haul locomotives. On the ride performance side of our business, we co-developed with Öhlins Racing AB a continuously controlled electronic suspension system offered by OEMs such

as Volvo, Audi, Ford, VW, Mercedes Benz and BMW.

Enhanced Vehicle Safety and Handling

To serve the needs of their customers and meet government mandates, OEMs are seeking parts suppliers that invest in new technologies, capabilities and products that advance vehicle safety, such as roll-over protection systems, computerized electronic suspension, and safer, more durable materials. Those suppliers able to offer such innovative products and technologies have a distinct competitive advantage.

Tenneco offers adjustable and adaptive damping as well as semi-active suspension systems designed to improve vehicle stability, handling, safety and control. Our systems are based on various technologies including DRiV™ digital valve, Continuously Variable Semi-Active (CVSA) damping and Kinetic® roll control, and Actively Controlled Car (ACOCAR)™. In the aftermarket, we supply premium Monroe® branded brakes that complement our ride performance offerings. In addition, we continue to promote the Safety Triangle™ of Steering-Stopping-Stability to educate consumers about the detrimental effect of worn shock absorbers on vehicle steering and stopping distances.

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Outsourcing and Demand for Systems and Modules

OEMs 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. Modules and systems being produced by parts suppliers are described as follows:

- "Modules" are groups of component parts arranged in close physical proximity to each other within a vehicle. Modules are often assembled by the supplier and shipped to the OEM for installation in a vehicle as a unit. Integrated shock and spring units, seats, instrument panels, axles and door panels are examples.
- "Systems" are groups of component parts located throughout a vehicle which operate together to provide a specific vehicle functionality. Emission control systems, anti-lock braking systems, safety restraint systems, roll control systems and powertrain systems are examples.

This shift towards fully integrated modules and systems created the role of the Tier 1 systems integrator, a supplier responsible for executing a broad array of activities, including design, development, engineering, and testing of component parts, modules and systems. As an established Tier 1 supplier, we have produced modules and systems for various vehicle platforms produced worldwide, supplying ride performance modules for the Chevrolet Silverado, GMC Sierra, Chevrolet Malibu, Chevrolet Impala and Chevrolet Cruze and emission control systems for the Chevrolet Colorado, GMC Canyon, Ford Super Duty, Ford Focus, Chevrolet Silverado, GMC Sierra, Chevrolet Malibu, Opel Astra, and VW Golf. In addition, we continue to design other modules and systems for platforms yet to be introduced to the global marketplace.

Global Reach of OE Customers

Changing market dynamics are driving OEMs and their parts suppliers to expand their global reach:

- Growing Importance of Growth Markets: Because the North American and Western European automotive regions are mature, OEMs are increasingly focusing on other markets for growth opportunities, such as India, China and Thailand. As OEMs have penetrated new regions, growth opportunities for suppliers have emerged.
- Governmental Tariffs and Local Parts Requirements: Many governments around the world require vehicles sold within their country to contain specified percentages of locally produced parts. Additionally, some governments place high tariffs on imported parts.
- Location of Production Closer to End Markets: As OEMs and parts suppliers have shifted production globally to be closer to their end markets, suppliers have expanded their reach, capturing sales in other markets and taking advantage where possible of relatively low labor costs.
- Global Rationalization of OE Vehicle Platforms (described below).

Because of these trends, OEMs are increasingly seeking suppliers capable of supporting vehicle platforms on a global basis. They want suppliers like Tenneco with design, production, engineering and logistics capabilities that can be accessed not just in North America and Europe but also in many other regions of the world.

Global Rationalization of OE Vehicle Platforms

OEMs have standardized on global platforms designing basic mechanical structures that are suitable for a number of similar vehicle models and able to accommodate different features for more than one region. This standardization will drive production of light vehicles designed on global platforms to grow. Accordingly light vehicle platforms whose annual production exceed one million units are expected to grow from 52 percent of global OE production in 2016 to 57 percent in 2021 based on data provided by IHS Automotive.

With such global platforms, OEMs realize significant economies of scale by limiting variations in items such as steering columns, brake systems, transmissions, axles, exhaust systems, support structures and power window and door lock mechanisms. The shift towards standardization can also benefit parts suppliers. They can experience greater economies of scale, lower material costs, and reduced development costs.

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, although there are more vehicles on the road than ever before, the global aftermarket has not kept pace with that growth. Accordingly, aftermarket suppliers have focused on reducing costs and providing product differentiation through advanced technology and recognized brand names. With our long history of technological innovation, strong brands and operational effectiveness, we believe we are well positioned to leverage our products and technology.

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Changing Aftermarket Distribution Channels and Increased Competition from Lower cost, Private-Label Products
From 2003 to 2016, the number of traditional jobber stores declined in the U.S. Major aftermarket retailers, such as AutoZone and Advance Auto Parts, have continued their work to expand their retail outlets and commercial distribution strategies to sell directly and more effectively to parts installers, which historically had purchased the majority of their needs from local warehouse distributors and jobbers. The size and number of consolidations as well as key customer distribution center footprint expansions have increased in the last a few years, including Advance Auto Parts' purchase of Carquest (which included WorldPac), Auto Zone's purchase of Interamerican Motor Company, O'Reilly Auto Parts' purchase of V.I.P., and more recently Bond Auto, to expand their entrance into the Northeast U.S. market, and Icahn Enterprises L.P.'s agreement to acquire Pep Boys. We are well positioned to respond to these trends and feel our strategy and portfolio of customers are in line with the market changes and opportunities. We make and sell high-quality products marketed under premium brands that appeal to aftermarket retailers and the customers they serve. In addition, our breadth of suspension and emissions control products and a reputation for customer service provide benefits to both wholesalers and retailers.
More recently, our aftermarket business is facing increasing competition from 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.
Analysis of Revenues
The table below provides, for each of the years 2014 through 2016, information relating to our net sales and operating revenues, by primary product lines and customer categories.

	Net Sales Year Ended December 31,		
	2016	2015	2014
	(Millions)		
Clean Air Products & Systems			
Aftermarket	$305	$318	$318
Original Equipment			
OE Value-add	3,736	3,489	3,559
OE Substrate(1)	2,028	1,888	1,895
	5,764	5,377	5,454
	6,069	5,695	5,772
Ride Performance Products & Systems			
Aftermarket	937	941	976
Original Equipment	1,593	1,545	1,633
	2,530	2,486	2,609
Total Revenues	$8,599	$8,181	$8,381

(1) See “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included in Item 7 for a discussion of substrate sales.

Brands
We have two of the most recognized brands in the industry: Monroe® used for ride control products and Walker® for exhaust products. We differentiate our products and their value proposition with our brands:

- Monroe®, Kinetic®, Fric-Rot™, Gas-Matic®, Sensa-Trac®, OESpectrum®, and Quick-Strut® for ride performance products,
- Walker®, Fonos™, XNOx®, Mega-Flow®, Quiet-Flow®, and Tru-Fit® for clean air products,
- DynoMax® and Thrush® for performance clean air products,
- Rancho® for suspension products for high performance light trucks, and

• Clevite® Elastomers and Axios™ for noise, vibration and harshness (NVH) control components.

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Customers

We strive to develop long-standing business relationships with our customers around the world. In each of our operating segments, 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.

In 2016, we served more than 80 different OEMs and commercial truck and off-highway engine manufacturers worldwide, and our products were included on nine of the top 10 passenger car models produced for sale in Europe and eight of the top 10 light truck models produced for sale in North America for 2016.

During 2016, our OE customers included the following manufacturers of light vehicles, commercial trucks and off-highway equipment and engines:

North America	Europe	Asia
AM General	Agco Corp	Austem
BMW	AvtoVAZ	Beijing Automotive
Caterpillar	BMW	BMW
CNH Industrial	Caterpillar	Brilliance Automobile
Daimler AG	CNH Industrial (Iveco)	Chang'an Automotive
FCA	Daimler AG	China National Heavy-Duty Truck Group
Ford Motor	Deutz AG	Daimler AG
General Motors	Ford Motor	Dongfeng Motor
Harley-Davidson	Geely Automobile	FCA
Honda Motors	General Motors	First Auto Works
Hyundai Motor	John Deere	Ford Motor
John Deere	Mazda Motor	Geely Automobile
Navistar International	McLaren Automotive	General Motors
Nissan Motor	Nissan Motor	Great Wall Motor
Paccar	Paccar	Isuzu Motor Company
Toyota Motor	PSA Peugeot Citroen	Jiangling Motors
Volkswagen Group	Renault	JND
Volvo Global Truck	Suzuki Motor	Kubota
	Tata Motors	Nissan Motor
	Toyota Motor	SAIC Motor
	Volkswagen Group	Tata Motors
	Volvo Global Truck	Toyota Motor
		Weichai Power
		Yuchai Group

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Australia	South America	India
Ford Motor	Agrale S.A.	Ashok Leyland
General Motors	CNH Industrial (Iveco)	BMW
Toyota Motor	Daimler AG	Daimler AG
	FCA	Ford Motor
	Ford Motor	General Motors
	General Motors	Mahindra & Mahindra
	Navistar International	Nissan Motor
	Nissan Motor	Suzuki Motor
	PSA Peugeot Citroen	Tata Motors
	Randon S.A.	Toyota Motor
	Renault	Volkswagen Group
	Toyota Motor	
	Volkswagen Group	

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

Customer	2016	2015	2014
General Motors Company	17 %	15 %	15 %
Ford Motor Company	13 %	14 %	13 %

During 2016, our aftermarket customers were comprised of full-line and specialty warehouse distributors, retailers, jobbers, installer chains and car dealers. These customers included National Auto Parts Association (NAPA), Advance Auto Parts, Uni-Select, O'Reilly Auto Parts, Aftermarket Auto Parts Alliance, and AutoZone in North America; Temot Autoteile GmbH, Autodistribution International, Group Auto Union, Auto Teile Ring and AP United in Europe; and Rede Presidente in South America. We believe our aftermarket revenue mix is balanced, with our top 10 aftermarket customers accounting for 63 percent of our net aftermarket sales and our aftermarket sales representing 14 percent of our total net sales in 2016.

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. For OE sales, we believe that we rank among the top two suppliers for certain key clean air and ride performance products and systems in many regions of the world. In the aftermarket, we believe that we are a leader in supplying clean air and ride performance products for light vehicles for the key applications we serve throughout the world.

Seasonality

Our OE and aftermarket 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 generally. Our aftermarket operations, also affected by seasonality, 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. During periods of economic recession, OE sales traditionally decline due to reduced consumer demand for automobiles and other capital goods. Aftermarket sales tend not to be as adversely affected during periods of economic downturn, as consumers forego new vehicle purchases and keep their vehicles longer, thereby increasing demand for repair and maintenance services. By participating in both the OE and aftermarket segments, we generally see a smaller revenue

decline during economic downturns than the overall change in OE production.

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Clean Air Systems

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 products and systems designed to reduce pollution and optimize engine performance, acoustic tuning and weight, including the following:

- 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;
- Selective Catalytic Reduction (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; and
- 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 system 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 OEM'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.

We supply our clean air offerings to approximately 30 light vehicle manufacturers for use on approximately 225 light vehicle models, including six of the top 10 passenger car models produced in Europe and seven of the top 10 light truck models produced in North America for 2016. We also supply clean air products to approximately 30 manufacturers of commercial trucks, off-highway equipment and engines, and other vehicles including BMW Motorcycle, Caterpillar, CNHTC, Daimler Trucks, Deutz, FAW Truck, Ford, Harley-Davidson, John Deere, Kubota, Scania and Weichai Power.

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We acquired our original clean air product line in 1967 with the acquisition of Walker Manufacturing Company, which was founded in 1888, and became one of Europe's leading OE clean air systems suppliers with the acquisition of Heinrich Gillet GmbH & Co. in 1994. Throughout this document, the term "Walker" refers to our subsidiaries and affiliates that produce clean air products and systems.

In the aftermarket, we manufacture, market and distribute replacement mufflers for virtually all North American, European, and Asian light vehicle models under brand names including Quiet-Flow® and Tru-Fit® in addition to offering a variety of other related products such as pipes and catalytic converters (Walker® Perfection). We also serve the specialty exhaust aftermarket with offerings that include Mega-Flow® exhaust products for heavy-duty vehicle applications and DynoMax® high performance exhaust products. We continue to emphasize product-value differentiation with other aftermarket brands such as Walker®, Thrush® and Fonos.™

Ride Performance Systems

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 including:

- Shock absorbers — A broad range of mechanical shock absorbers and related components for light- and heavy-duty vehicles, including twin-tube and monotube shock absorbers;
- Struts — A complete line of struts and strut assemblies for light vehicles;
- Vibration control components (Clevite® Elastomers, Axios)™— 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;
- Monroe® Intelligent Suspension Portfolio:

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;

Semi-active and active suspension systems — Shock absorbers and suspension systems such as CVSAe and ACOCAR™ that electronically adjust a vehicle's performance based on certain inputs such as steering and braking; and

Kinetic H2/CVSA Continuously Variable Semi Active suspension system (Formerly known as CES) — In 2011, we won the Supplier of the Year award from Vehicle Dynamics International magazine, which recognizes outstanding achievement in global automotive suspension and chassis engineering, for the Kinetic H2/CVSA Continuously Variable Semi Active suspension system installed on the McLaren MP4-12C; and

- Other — We also offer other ride performance products such as load assist products, springs, steering stabilizers, adjustable suspension systems, suspension kits and modular assemblies.

We supply our ride performance offerings to approximately 30 light vehicle manufacturers for use on over 200 light vehicle models, including six of the top 10 passenger car models produced in Europe and eight of the top 10 light truck models produced in North America for 2016. We also supply ride performance products and systems to over 40 manufacturers of commercial truck, off-highway and other vehicles including Caterpillar, Daimler Trucks, John Deere, Navistar, Paccar, Scania and Volvo Truck.

In the ride performance aftermarket, we manufacture, market and distribute replacement shock absorbers for virtually all North American, European and Asian light vehicle models under several brand names including Gas-Matic®, Sensa-Trac®, Monroe® Reflex® and Monroe® Adventure,™ Quick-Strut®, as well as Clevite® Elastomers and Axios™ for elastomeric vibration control components. We also sell ride performance offerings for commercial truck and other

aftermarket segments, such as our Gas-Magnum® shock absorbers for the North American commercial category.
We entered the ride performance product line in 1977 with the acquisition of Monroe Auto Equipment Company, which was founded in 1916 and which introduced the world's first modern tubular shock absorber in 1930. When the term "Monroe" is used in this document it refers to our subsidiaries and affiliates that produce ride performance products and systems.

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Financial Information About Geographic Areas

Refer to Note 11 of the consolidated financial statements of Tenneco Inc. included in Item 8 of this report for financial information about geographic areas.

Sales, Marketing and Distribution

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

For OE sales, our sales and marketing team is an integrated group of professionals, including skilled engineers and program managers, who are organized by customer and product type (e.g., ride performance and clean air). Our sales and marketing teams are centered on meeting the customer's needs with 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 OEMs. Our business capture process involves working closely with the OEM 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, and assisting with developing component/system specifications and test procedures. Given that the OE business involves 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 customer and region and covers multiple product lines. We sell aftermarket products through four primary channels of distribution: (1) the traditional three-step distribution system of full-line warehouse distributors, jobbers and installers; (2) the specialty two-step distribution system of specialty warehouse distributors that carry only specified automotive product groups and installers; (3) direct sales to retailers; and (4) direct sales to installer chains. 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 from end-users, we run print, online and outdoor advertisements and offer pricing promotions. We offer business-to-business services to customers with TA-Direct, an on-line order entry and customer service tool. In addition, we maintain detailed web sites for each of our Walker®, Monroe®, Rancho®, DynoMax®, and Monroe® brake brands and our heavy-duty products.

Manufacturing and Engineering

We focus on achieving superior product quality at the lowest delivered cost possible using productive, reliable and safe manufacturing processes to achieve that goal. Our manufacturing strategy is a component of our Tenneco Business System (TBS) which is a holistic approach to how we work that creates standardized processes and gives us a common business language across business units and geographies. By driving speed and predictability, the Tenneco Business System enables us to accelerate growth, achieve cost leadership and create high-performance teams. Manufacturing Operations is one of the value streams that comprise the Tenneco Business System. It is focused on optimizing operations across all Tenneco manufacturing facilities to drive predictable performance and become the global benchmark. Within the Manufacturing Operations value stream, there are nine principles: health and safety; environmental management; continuous improvement; design for manufacturing; total quality management; material control; visual management; total productive maintenance; and high performance teams. Our goal is to have zero accidents, zero problems with deliveries, zero quality issues, and zero waste. When we eliminate these issues, we will deliver better service to our customers because we'll have better quality and better cost. We'll have a safer environment for our employees, and we'll become more predictable. We deploy new technology to differentiate our products from our competitors’ and to achieve higher quality and productivity. We continue to adapt our capacity to customer demand, both expanding capabilities in growth areas as well as reallocating capacity away from segments in decline.

Clean Air

We operate 63 clean air manufacturing facilities worldwide, of which 16 facilities are located in North America, 24 in Europe, South America and India, and 23 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, two joint ventures in which we hold a noncontrolling interest operate a total of two manufacturing facilities in Europe.

Within each of our clean air manufacturing facilities, operations are organized by component (e.g., muffler, catalytic converter, pipe, resonator and manifold). Our manufacturing systems incorporate cell-based designs, allowing work-in-process to move through the operation with greater speed and flexibility. We continue to invest in plant and equipment to stay competitive in the industry. For instance, in our Smithville, Tennessee, OE manufacturing facility, we have developed a muffler assembly cell that utilizes laser welding. This allows for quicker change-over times in the process as well as less material used and less weight

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for the product. There is also a reduced cycle time compared to traditional joining and increased manufacturing precision for superior durability and performance. In 2007, we introduced the Measured and Matched Converter technique in North America. This allows us to maintain the optimum GBD (Gap Bulk Density) in our converter manufacturing operations with Tenneco proprietary processing. This process, coupled with cold spinning of the converter body, versus traditional cone to can welding, allows for more effective use of material through reduced welding, lower cost, and better performance of the product. In 2009, we introduced low-cost fabricated diesel manifolds in Europe which utilize advanced manufacturing processes such as deep drawing, laser welding, and furnace brazing.

To strengthen our position as a Tier 1 OE systems supplier, we have developed some of our clean air manufacturing operations into "just-in-time" or "JIT" systems. In this system, a JIT facility located close to our OE customer's manufacturing plant receives product components from both our manufacturing operations and independent suppliers, and then assembles and ships products to the OEMs on an as-needed basis. To manage the JIT functions and material flow, we have advanced computerized material requirements planning systems linked with our customers' and supplier partners' resource management systems. We have 25 clean air JIT assembly facilities worldwide, of which two facilities are located in North America, ten in Europe and India, and 13 in Asia Pacific.

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 to the OEMs, supplying complete emission control systems from the manifold to the tailpipe, to provide full emission and noise control. We expanded our engineering capabilities with acquisitions in 2007 and 2012 of Combustion Component Associates' technology for use in mobile emission and stationary engine applications, respectively. That technology, with its urea and hydrocarbon injectors, electronic controls and software, is marketed and sold globally under the XNOx® name for use in selective catalytic reduction (SCR) and other exhaust aftertreatment systems. We also offer a complete suite of alternative full system NOx aftertreatment technologies, including the Hydrocarbon Lean NOx Catalyst (HC-LNC) technology under joint development with General Electric, and Solid SCR™ technology licensed from Amminex, an engineering and manufacturing company located in Denmark. We also developed advanced predictive engineering tools, including KBM&E (Knowledge Based Manufacturing & Engineering). The innovation of our KBM&E (which we call TEN-KBM&E) is a modular toolbox set of CAD embedded applications for manufacturing and engineering compliant design. The encapsulated TEN-KBM&E content is driven by an analytical method which continuously captures and updates the knowledge of our main manufacturing and engineering processes. Our global engineering capabilities are standardized through the use of the ATLAS Global PDM (Product Data Management) system, enabling a more efficient transfer of knowledge around the world.

Ride Performance

We operate 28 ride performance manufacturing facilities worldwide, of which nine facilities are located in North America, 13 in Europe, South America and India, and six 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, four in Europe, South America and India, and one 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.

To strengthen our position as a Tier 1 OE module supplier, we have developed four of our ride performance manufacturing facilities into JIT assembly facilities located in Europe and India.

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.

Conventional shock absorbers and struts generally develop an appropriate compromise between ride comfort and handling. Our innovative gas-charged shock absorbers and struts provide both ride comfort and vehicle control, resulting in improved handling, reduced vibration and a wider range of vehicle control. This technology can be found in our premium quality OESpectrum® shock absorbers. We further enhanced this technology by adding the SafeTech™ fluon banded piston, which improves shock absorber performance and durability. We introduced the Monroe® Reflex® shock absorber, which incorporates our

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Impact Sensor™ device. This technology permits the shock absorber to automatically switch in a matter of milliseconds between firm and soft compression damping when the vehicle encounters rough road conditions, and thus maintaining better tire-to-road contact and improving handling and safety. We developed the Quick-Strut® which simplifies and shortens the installation of aftermarket struts. This technology combines the spring and upper mount into a single, complete module, eliminating the need for special tools and skills required previously. We have also developed an innovative computerized electronic suspension system, which features dampers developed by Tenneco and electronic valves designed by Öhlins Racing AB. The Continuously Variable Semi Active ("CVSA") electronic suspension ride performance system is featured on Audi, Volvo, Ford, Volkswagen, BMW, and Mercedes Benz vehicles. To help make electronic suspension more affordable to a wider range of vehicles, we are designing an innovative, electronically-controlled DRiV™ suspension system that features hydraulic valve technology we purchased in 2014 from Sturman Industries.

Quality Management

Tenneco's Quality Management System is an important part of product and process development and validation. Design engineers establish performance and reliability standards in the product's design stage, and use prototypes to confirm that the component/system can be manufactured to specifications. Quality Management is also integrated into the launch and manufacturing process, with team members at every stage of the work-in-process, ensuring finished goods are being fabricated to meet customers' requirements.

The Quality Management System is detailed in Tenneco's Global Business Policy Manual. The Global Business Policy Manual complies with the ISO/TS 16949:2009, ISO 9001:2008 specifications, and customers' specific requirements. We continue to monitor all new and proposed standards and are planning to implement required new standards in advance of their due date. All of Tenneco's manufacturing facilities, where it has been determined that certification is necessary to serve the customer, or would provide an advantage in securing additional business, have successfully achieved the applicable standard's requirements. Each employee is expected to follow the relevant standards, policies, and procedures contained in the Global Business Policy Manual.

Global Procurement Management

Our direct and indirect material costs represent a significant component of our cost structure. To ensure that our material acquisition process provides both a local and global competitive advantage, in addition to meeting regional legislative requirements, we have designed globally integrated standard processes which are managed by global teams of commodity specialists. Each global commodity strategy is tailored to regional requirements while leveraging our global scale to deliver the most cost effective solutions at a local level.

Business Strategy

We strive to strengthen our global market position by designing, manufacturing, delivering and marketing technologically innovative clean air and ride performance products and systems for OEMs and the aftermarket. We work toward achieving a balanced mix of products, markets and customers by capitalizing on emerging trends, specific regional preferences and changing customer requirements. We target both mature and developing markets for light vehicles, commercial trucks, off-highway engines and other vehicle or engine applications. We further enhance our operations by focusing on operational excellence in all functional areas.

The key components of our business strategy are described below:

Develop and Commercialize Advanced Technologies

We develop and commercialize technologies that allow us to expand into new, fast-growing market segments and serve our existing customers. By anticipating customer needs and preferences, we design advanced technologies that meet global market needs. For example, to help our customers meet the increasingly stringent emissions regulations being introduced around the world, we offer several technologies designed to reduce NOx emissions from passenger, commercial truck and off-highway vehicles. These technologies include an integrated Selective Catalytic Reduction (SCR) system that incorporates our XNOx® technology, electrical valves for diesel-powered vehicles with low-pressure exhaust gas recirculation systems, and diesel and gasoline particulate filters. We also offer a NOx absorber and a hydrocarbon lean NOx catalyst system, thermal management solutions, such as our T.R.U.E.-Clean®

active diesel particulate filter system and, through a consortium, thermoelectric generators that convert waste exhaust heat into electrical energy.

We expect demand for our products to continue to rise over the next several years. Advanced aftertreatment exhaust systems are required to comply with emissions regulations that affect light, commercial truck and off-highway vehicles as well as locomotive, marine and stationary engines. In addition, vehicle manufacturers are offering greater comfort, handling and safety features with products such as electronic suspension and adjustable dampers. Our CVSA electronic suspension dampers, which we co-developed with Öhlins Racing AB, are now sold to Volvo, Audi, Mercedes, VW, BMW, and Ford, among others, and our Clevite® engineered elastomers to manufacturers with unique NVH requirements. Our newest electronic suspension product

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DRiV™ is the first industry example of multiple digital valves coupled with smart switching for use in ride performance products that results in faster response, lighter weight, and reduced power consumption compared to existing analog products.

We continue to focus on introducing highly engineered systems and complex assemblies and modules that provide value-added solutions to our customers and increase our content on vehicles. Having many of our engineering and manufacturing facilities integrated electronically, we believe, has helped our products continue to be selected for inclusion in top-selling vehicles. In addition, our just-in-time and in-line sequencing manufacturing processes and distribution capabilities have enabled us to be more responsive to our customers' needs.

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 clean air and ride performance 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 truck and off-highway 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 engineer and build modular NOx-reduction systems for large engines that meet standards of the International Maritime Organization, among others. In 2015, we received three Product Design Assessment (PDA) certificates from the American Bureau of Shipping, one of the world's leading ship-classification societies, and two Approved-In-Principle (AIP) certificates from DNV GL, another leading global classification society and recognized advisor of the maritime industry.

Our revenues generated by our commercial truck, off-highway and other business sectors were 11 percent of our total annual OE revenues in 2016 and 12 percent in 2015.

Expand and Adjust Manufacturing Footprint and Engineering Capabilities

We continue to expand and adjust our global footprint to serve OE and aftermarket customers, building our capabilities to engineer and produce cost competitive, cutting-edge products around the world. In 2014, we opened our clean air research and development facility in Kunshan, China to enhance our engineering capabilities and develop China-specific solutions. In 2015, we opened new facilities in Jeffersonville, Indiana, Sanand, India, Stanowice, Poland and Suzhou, China. We also expanded our manufacturing operations in Celaya, Mexico that produce dampers and other ride performance products for light vehicles and commercial trucks and in Tredegar, U.K. to support growth on significant incremental new business. In addition, we built out our engineering capabilities in Poland, as well as the expansion of our testing capabilities in Germany. In 2016, we opened new facilities in Spring Hill, Tennessee and Lansing, Michigan to support our customers' growth. We also expanded our manufacturing operations in Puebla, Mexico and Birmingham, UK to support growth on significant incremental business. In addition, we built out our testing capabilities in Zwickau, Germany.

Besides expanding our manufacturing footprint and engineering capabilities to serve new customers or markets, we are re-aligning our production, supply chain and other operational functions to ensure standardization, remove redundancies, reduce transit costs, leverage economies of scale, and optimize manufacturing productivity. Adjusting to customer volumes we closed our assembly plant in St. Petersburg, Russia in 2016.

Maintain Our Aftermarket Leadership

We manufacture, market and sell leading, brand-name products to a diversified and global aftermarket customer base. Two of the most recognized brand-name products in the automotive parts industry are our Monroe® ride performance products and Walker® clean air products, which have been offered to consumers since the 1930s. We believe our brand equity in the aftermarket is a key asset especially as customers consolidate and distribution channels converge. We provide value differentiation by creating product extensions bearing our various brands. For example, we offer Monroe® Reflex® and Monroe® OESpectrum® dampers, Walker® Quiet-Flow® mufflers, Rancho® ride performance

products, DynoMax® exhaust products and Walker Ultra® catalytic converters, and in Europe, Walker and Aluminox Pro™ mufflers. Further, we market Monroe® Springs, Monroe® Steering and Suspension, and Monro-Magnum® (bus and truck shock line) in Europe and continue to grow our Monroe® Brake pads in North America. We continue to explore other opportunities for developing new product lines that will be marketed under our existing, well-known brands.

We strive to gain additional market share in the aftermarket business by adding new product offerings and increasing our market coverage of existing brands and products. For one, we offer an innovative ride performance product, the Quick-Strut®, that combines the dampers, spring and upper mount into a single, complete module that simplifies and shortens the installation process, eliminating the need for the special tools and skills required previously. Additionally, we find ways to benefit from the

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consolidation of, and the regional expansion by, our customers and gain business from our competitors given our strength and understanding in the markets and channels in which we do business.

Our success in the aftermarket strengthens our competitive position with OEMs, and vice versa. We gain timely market and product knowledge that can be used to modify and enhance our offerings for greater customer acceptance. We also can readily introduce aftermarket products by leveraging our experience in the OE market. An example of such is our suite of manifold converters and diesel particulate filters which were first sold in the OE market and then tailored for the aftermarket.

Execute Focused Transactions

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 have a licensing agreement for T.R.U.E.-Clean®, an exhaust aftertreatment technology used for automatic and active regeneration of Diesel Particulate Filters (DPFs), with Woodward Governor Company. This is an example of a technology which complements our array of existing clean air products, allowing us to provide integrated exhaust aftertreatment systems to commercial truck, off-highway and other vehicle manufacturers.

In February 2014, we secured the exclusive rights to the digital valve technology used in our DRiV™ suspension systems from Sturman Industries, Inc. DRiV™ systems feature electronically controlled dampers with hydraulic valves that can be used in a variety of vehicle damping applications.

In July 2015, we announced our intention to discontinue our Marzocchi motorcycle fork suspension product line and our mountain bike suspension product line, and liquidate our Marzocchi operations. In November 2015, we closed on the sale of certain assets related to our Marzocchi mountain bike suspension product line to the affiliates of Fox Factory Holding Corp.; and in December 2015, we closed on the sale of the Marzocchi motorcycle fork product line to an Italian company, VRM S.p.A.

In March 2016, we completed the disposition of the Gijon, Spain plant and signed an agreement to transfer ownership of the manufacturing facility in Gijon to German private equity fund Quantum Capital Partners A.G. (QCP). The transfer to QCP was effective March 31, 2016 and under a three year manufacturing agreement, QCP will also continue as a supplier to Tenneco.

We intend to continue to pursue strategic alliances, joint ventures, acquisitions and other transactions that complement 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. For example, on January 31, 2013, we announced our intent to reduce structural costs in Europe by approximately $60 million annually. With the disposition of the Gijon, Spain plant, which was completed at the end of the first quarter of 2016, the annualized rate essentially reached our target of $55 million, at the current exchange rates. In November 2015, we closed on the sale of certain assets related to our Marzocchi mountain bike suspension product line to the affiliates of Fox Factory Holding Corp.; and in December 2015, we closed on the sale of the Marzocchi motorcycle fork product line to an Italian company, VRM S.p.A. These actions were a part of our ongoing efforts to optimize our Ride Performance product line globally while continuously improving our operations and increasing profitability.

Strengthen Operational Excellence

We will continue to focus on operational excellence by optimizing our manufacturing footprint, enhancing our Six Sigma processes and Lean productivity tools, developing further 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. We will be mindful of the changing market conditions that might necessitate adjustments to our resources and manufacturing capacity around the world. We will remain committed to protecting the environment as well as the health and safety of our employees.

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Environmental Matters

We estimate that we and our subsidiaries will make expenditures for plant, property and equipment for environmental matters of approximately $5 million in 2017 and $3 million in 2018.

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 — Liquidity and Capital Resources” and Note 12 to the consolidated financial statements of Tenneco Inc. included in Item 8.

Employees

As of December 31, 2016, we had approximately 31,000 employees of whom approximately 43 percent were covered by collective bargaining agreements. European works councils cover 15 percent of our total employees, a majority of whom are also included under collective bargaining agreements. Several of our existing labor agreements in Mexico and one in the United States are scheduled for renegotiation in 2017. In addition, agreements covering plants in Argentina, Brazil, Europe, India and Thailand are expiring in 2017. We regard our employee relations as satisfactory.

Other

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. We manufacture and distribute our aftermarket products primarily under the Walker® and Monroe® brand names, which are well-recognized in the marketplace and 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.

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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 OEM 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, and European production remains below pre-crisis levels. More recently, light vehicle and commercial truck production has declined significantly in South America in 2014, 2015 and 2016 and persistent challenges in the Chinese economy going into 2017 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 continues to be weak in certain product applications, such as agricultural and construction equipment in the United States 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 restructurings 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 automotive, commercial truck and off-highway 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.

We are subject to, and could be further subject to, investigations by antitrust regulators and related lawsuits by other third parties. Developments in these investigations and related matters could have a material adverse effect on our consolidated financial position, results of operations or liquidity.

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 antitrust laws can result in significant penalties being imposed by antitrust authorities. Costs, charges and liabilities arising out of or related to these investigations and related claims can also be significant.

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 U.S., which allege anti-competitive conduct related to the activities subject to these investigations. More related lawsuits may be filed, including in other jurisdictions. Antitrust law investigations and related lawsuits often continue for several years and can result in significant penalties and liability. At this point, we cannot estimate the ultimate impact on our company from investigations into our antitrust compliance and related lawsuits. In light of the uncertainties and many variables involved in such investigations and related lawsuits, we cannot assure you that the ultimate resolution of these and other investigations and related lawsuits will not have a material adverse effect on our consolidated financial position, results of operations or

liquidity.

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 also impact the demand for new light vehicle purchases. 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; 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 large customers for future revenue. The loss of all or a substantial portion of our sales to 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 net sales. For example, during the fiscal year ended December 31, 2016, GM and Ford accounted for 17 percent and 13 percent of our net sales, respectively. The loss of all or a substantial portion of our sales to 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 make fewer sales to these customers for a variety of reasons, including but not limited to: (1) loss of awarded business; (2) reduced or delayed customer requirements; (3) strikes or other work stoppages affecting production by the customers; or (4) reduced demand for our customers' products.

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

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, and European production remains below pre-crisis levels. More recently, light vehicle and commercial truck production has declined significantly in South America in 2014, 2015 and 2016 and persistent challenges in the Chinese economy going into 2017 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 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 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, 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 incurring additional indebtedness, making investments, granting liens, selling assets and merging or consolidating with other companies. 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 receivables securitization program in the U.S. require us to maintain certain financial ratios. Our senior credit facility and our other debt instruments require us to comply with various operational and other covenants. If there were an event of default under any of our debt instruments that was not cured or waived, the holders of the defaulted debt could cause all amounts outstanding with respect to that debt 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 securitization program. We cannot assure you that our assets or cash flow would be sufficient to fully repay borrowings under our outstanding debt 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 debt 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 are 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 our business strategy of improving operating performance and generating cost savings and improvements.

We regularly implement strategic and other initiatives designed to improve our operating performance. For example, in 2013 we announced a cost reduction initiative in Europe to significantly reduce our annual structural costs in the region. 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, such as the significant production decreases we experienced during 2008 and 2009 as a result of the global economic crisis, and the lingering effects this crisis had in Europe in particular, where light vehicle production declined in 2012 and continues to remain below pre-crisis level. 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.

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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. For example, our consolidated results of operations were negatively impacted in 2016 primarily due to the strengthening of the U.S. dollar against the euro, Chinese yuan, Canadian dollar, Argentine peso, and the Brazilian real.

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 industries 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 Chrysler 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, such as the 2008 strike at American Axle which resulted in 30 GM facilities in North America being idled for several months, 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, during 2016 carbon steel prices as well as raw material prices to produce carbon steel and stainless steel increased significantly, with market pricing for carbon steel increasing up to 50% throughout the year driven by the increases in coking coal pricing and iron ore which doubled throughout 2016. In addition, both the European Union as well as the United States have imposed a variety of anti-dumping duties on carbon steel as well as stainless steel varying from 22% to 265% depending on the country of origin. This not only results in higher domestic pricing but limits opportunities in terms of off shore buying.

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.

With Tenneco 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.

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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.

We are subject to extensive government 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, that 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.

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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.

We may have difficulty competing favorably in the highly competitive automotive parts industry.

The 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.

Furthermore, due to the cost focus of our major 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 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 customers and necessary to win additional business.

The decreasing number of automotive parts customers and suppliers 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 automotive parts is decreasing in both the original equipment market and aftermarket. As a result, we are competing for business from fewer customers. Furthermore, consolidation and bankruptcies among automotive parts 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.

Longer product lives of 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. 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 would further adversely affect the demand for our aftermarket products. Aftermarket sales represented approximately 14 percent of our net sales in the fiscal years ended December 31, 2016 and 15 percent in the fiscal year ended December 31, 2015.

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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 will perform as planned or prove to be beneficial to our operations and cash flow. 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, particularly in China, 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 and countries, including Australia, Asia, North America, Europe, South Africa and South America, and sell our products worldwide. For the fiscal year ended December 31, 2016, approximately 51 percent 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 unrest, including any resultant acts of war, terrorism or similar events;
- exposure to local public health issues and the resultant impact on economic and political conditions;
- hyperinflation in certain foreign countries;
- controls on the repatriation of cash, including imposition or increase of withholding and other taxes on remittances and other payments by foreign subsidiaries;
- export and import restrictions and an unfavorable trade environment, including as a result of political conditions and changes in the laws in the United States and elsewhere; 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.

Impairment in the carrying value of long-lived assets and goodwill could negatively affect our operating results.
We have a significant amount of long-lived assets and goodwill on our consolidated balance sheet. Under generally accepted accounting principles, long-lived assets are required to be reviewed for impairment whenever adverse events or

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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 must be evaluated for impairment annually or more frequently if events indicate it is warranted. If the carrying value of our reporting units exceeds their current fair value as determined based on the discounted future cash flows of the related business, the goodwill is considered impaired and is reduced to fair value by a non-cash charge to earnings. Events and conditions that could result in impairment in the value of our long-lived assets and goodwill include changes in the industries in which we operate, particularly the impact of a downturn in the global economy, as well as competition and advances in technology, adverse changes in the regulatory environment, or other factors leading to reduction in expected long-term sales or profitability. We did not record any non-cash
asset impairment charges during the fiscal years ended December 31, 2016, 2015 or 2014.

The value of our deferred tax assets could become impaired, which could materially and adversely affect our operating results.

As of December 31, 2016, we had approximately $188 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.

We have identified a material weakness in our internal control over financial reporting which could, if not remediated, result in material misstatements in our financial statements.

Management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rule 13a-15(f) under the Securities Exchange Act of 1934, as amended. As disclosed in Part I, Item 4, management identified a material weakness in internal control over financial reporting related to the accounting for payments received from suppliers by certain purchasing and accounting personnel at the Company’s China subsidiaries. A material weakness (as defined in Rule 12b-2) is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of annual or interim financial statements will not be prevented or detected on a timely basis. As a result of this material weakness, management concluded that internal control over financial reporting was not effective based on criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in “Internal Control-An Integrated Framework (2013).” This material weakness resulted in a revision to our consolidated financial statements as of December 31, 2016, 2015 and 2014, each quarterly and year-to-date periods in those respective years, and the first quarterly period in 2017. We are actively engaged in developing and implementing a remediation plan designed to address this material weakness. If remedial measures are insufficient to address the material weakness, or if additional material weaknesses in internal control are discovered or occur in the future, our consolidated financial statements may contain material misstatements and we could be required to restate our financial results.

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.

Our Clean Air product line operates 63 manufacturing facilities worldwide, of which 16 facilities are located in North America, 24 in Europe, South America and India, and 23 in Asia Pacific. Clean Air also operates five engineering and technical facilities worldwide and shares three other such facilities with Ride Performance. Twenty-five of these manufacturing plants are JIT facilities. In addition, two joint ventures in which we hold a noncontrolling interest operate a total of two manufacturing facilities in Europe, all of which are JIT facilities.

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Our Ride Performance product line operates 28 manufacturing facilities worldwide, of which nine facilities are located in North America, 13 in Europe, South America and India, and six in Asia Pacific. Ride Performance also operates seven engineering and technical facilities worldwide and shares three other such facilities with Clean Air. Four of these manufacturing plants are JIT facilities located in Europe and India.

The above-described manufacturing locations are located in Argentina, Australia, Belgium, Brazil, Canada, China, Czech Republic, France, Germany, Hungary, India, Italy, Japan, Mexico, Poland, Portugal, Russia, Spain, South Africa, South Korea, Sweden, Thailand, the United Kingdom and the United States. We also have a sales office located in Singapore.

We own 48 and lease 62 of the properties described above. We hold 18 of the above-described international manufacturing facilities through eight joint ventures in which we own a controlling interest. In addition, two joint ventures in which we hold a noncontrolling interest operate a total of two manufacturing facilities in Europe. We also have distribution facilities at our manufacturing sites and at a few off-site locations, substantially all of which we lease.

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 have generally satisfactory title to the properties owned and used in our respective businesses.

ITEM 3.LEGAL PROCEEDINGS.

We are involved in environmental remediation matters, legal proceedings, claims, investigations and warranty obligations. 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 United States 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 expense or capitalize, as appropriate, expenditures for ongoing compliance with environmental regulations that relate to current operations. We expense costs related to an existing condition caused by past operations that do not contribute to current or future revenue generation. As of December 31, 2016, we have the obligation to remediate or contribute towards the remediation of certain sites, including one Federal Superfund site. At December 31, 2016, our aggregated estimated share of environmental remediation costs for all these sites on a discounted basis was approximately $15 million, of which $2 million is recorded in other current liabilities and $13 million is recorded in deferred credits and other liabilities in our consolidated balance sheet. For those locations where the liability was discounted, the weighted average discount rate used was 2.4 percent. The undiscounted value of the estimated remediation costs was $18 million. Our expected payments of environmental remediation costs are estimated to be approximately $2 million in 2017, $1 million each year beginning 2018 through 2021 and $12 million in aggregate thereafter.

Based on information known to us, 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 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 in excess of our share of remediation costs. Our understanding of the financial strength of other potentially responsible parties 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 potentially responsible party in the Federal Superfund site, or as a liable party at the other locations referenced herein, will be material to our consolidated financial position, results of operations, or liquidity.

Antitrust Investigations and Litigation

On March 25, 2014, representatives of the European Commission 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 March 25, 2014, we also received a related subpoena from the U.S. Department of Justice ("DOJ").

On November 5, 2014, the DOJ granted us conditional leniency pursuant to an agreement we entered into under the Antitrust Division's Corporate Leniency Policy. This agreement provides us with important benefits 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 us, nor seek any criminal fines or

penalties, in connection with the matters we reported to the DOJ. Additionally, there are limits on our liability related to any follow on civil antitrust litigation in the U.S. 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 our satisfying the DOJ and any court presiding over such follow on civil litigation.

Certain other competition agencies are also investigating possible violations of antitrust laws relating to products supplied by our company. We have cooperated and continue to cooperate fully with all of these antitrust investigations, and take other actions to minimize our potential exposure.

Tenneco and certain of its competitors are also currently defendants in civil putative class action litigation in the United States. 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

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purchasers, injunctive relief, damages and attorneys' fees. However, as explained above, because we received conditional leniency from the DOJ, our civil liability in these follow on actions 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.

Antitrust law investigations, civil litigation, and related matters often continue for several years and can result in significant penalties and liability. We intend to vigorously defend the Company and/or take other actions to minimize our potential exposure. In light of the many uncertainties and variables involved, we cannot estimate the ultimate impact that these matters may have on our company. Further, there can be no assurance that the ultimate resolution of these matters will not have a material adverse effect on our consolidated financial position, results of operations or liquidity.

Other Legal Proceedings, Claims and Investigations

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 consolidated financial position, results of operations or liquidity.

In addition, 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 nationwide. A small number of claims have been asserted against one of our subsidiaries by railroad workers alleging exposure to asbestos products in railroad cars. The substantial majority of the remaining claims are related to alleged exposure to asbestos in our automotive products although a significant number of those claims appear also to involve occupational exposures sustained in industries other than automotive. We believe, based on scientific and other evidence, it is unlikely that 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. 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 future consolidated financial position, results of operations or liquidity.

ITEM 4.MINE SAFETY DISCLOSURES.

Not applicable.

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ITEM 4.1.EXECUTIVE OFFICERS OF THE REGISTRANT.

The following provides information concerning the persons who serve as our executive officers as of February 24, 2017.

Name and Age	Offices Held
Gregg M. Sherrill (64)	Chairman and Chief Executive Officer
Brian J. Kesseler (50)	Chief Operating Officer
Josep Fornos (64)	Executive Vice President, Enterprise Business Initiatives
Timothy E. Jackson (60)	Executive Vice President, Technology, Strategy and Business Development
Kenneth R. Trammell (56)	Executive Vice President and Chief Financial Officer
Henry Hummel (49)	Executive Vice President, Clean Air
Martin Hendricks (54)	Executive Vice President, Ride Performance
Peng (Patrick) Guo (51)	Executive Vice President, Asia Pacific
Gregg Bolt (57)	Senior Vice President, Global Human Resources and Administration
James D. Harrington (56)	Senior Vice President, General Counsel and Corporate Secretary
Joseph A. Pomaranski (61)	Senior Vice President and General Manager, Global Aftermarket
John E. Kunz (52)	Vice President and Controller

Gregg M. Sherrill — Mr. Sherrill was named the Chairman and Chief Executive Officer of Tenneco in January 2007. Mr. Sherrill joined us from Johnson Controls Inc., where he served since 1998, most recently as President, Power Solutions. From 2002 to 2003, Mr. Sherrill served as the Vice President and Managing Director of Europe, South Africa and South America for Johnson Controls' Automotive Systems Group. Prior to joining Johnson Controls, Mr. Sherrill held various engineering and manufacturing assignments over a 22-year span at Ford Motor Company, including Plant Manager of Ford's Dearborn, Michigan engine plant, Chief Engineer, Steering Systems and Director of Supplier Technical Assistance. Mr. Sherrill became a director of our company in January 2007. Effective May 17, 2017, Mr. Sherrill will become our Executive Chairman.

Brian J. Kesseler - Mr. Kesseler was named Chief Operating Officer in January 2015. 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. Effective May 17, 2017, Mr. Kesseler will become our Chief Executive Officer.

Josep Fornos - Mr. Fornos was named Executive Vice President, Enterprise Business Initiatives in September 2015. He served as Executive Vice President, Clean Air Division from October 2014 to September 2015. Prior to that, Mr. Fornos served as Executive Vice President, Ride Performance Division from February 2013 to October 2014, as Executive Vice President and General Manager, Europe, South America and India from March 2012 to February 2013 and as Senior Vice President and General Manager, Europe, South America and India from July 2010 to March 2012. Prior to that, he had served as Vice President and General Manager, Europe Original Equipment Emission Control since March 2007. Mr. Fornos joined Tenneco in July 2000 as Vice President and General Manager, Europe Original Equipment Ride Control. Prior to joining Tenneco, Mr. Fornos spent a year at Lear Corporation as General Manager of the company's seating and wire and harness business in France, following Lear's acquisition of United Technologies Automotive. Mr. Fornos spent 16 years with United Technologies Automotive, holding several management positions in production, engineering and quality control in Spain and later having Europe-wide responsibility for engineering and quality control.

Timothy E. Jackson — Mr. Jackson has served as Executive Vice President, Technology, Strategy and Business Development since March 2012. He served as our Senior Vice President and Chief Technology Officer from March 2007 to March 2012. Prior to that, Mr. Jackson served as our Senior Vice President — Global Technology and General Manager, Asia Pacific since July 2005. From 2002 to 2005, Mr. Jackson served as Senior Vice President — Manufacturing, Engineering, and Global Technology. In August 2000, he was named Senior Vice President — Global Technology, a role he served in after joining us as Senior Vice President and General Manager — North American Original Equipment and Worldwide Program Management in June 1999. Mr. Jackson came to Tenneco from ITT Industries where he was President of that company's Fluid Handling Systems Division. With over 30 years of management experience, 25 within the automotive industry, he had also served as Chief Executive Officer for HiSan, a joint venture between ITT Industries and Sanoh Industrial Company.

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Mr. Jackson has also held senior management positions at BF Goodrich Aerospace and General Motors Corporation. Mr. Jackson will retire from the Company effective March 31, 2017.

Kenneth R. Trammell — Mr. Trammell has served as our Chief Financial Officer since September 2003. Mr. Trammell was a Senior Vice President from September 2003 until January 2006 when he became an Executive Vice President. He was our Vice President and Controller from September 1999 to September 2003 and Corporate Controller of Tenneco Inc. from April 1997 to November 1999. He joined Tenneco Inc. in May 1996 as Assistant Controller. Before joining Tenneco Inc., Mr. Trammell spent 12 years with the international public accounting firm of Arthur Andersen LLP, last serving as a senior manager.

Henry Hummel — Mr. Hummel became Executive Vice President, Clean Air in December 2016. Prior to that, Mr. Hummel was named Senior Vice President and General Manager, Clean Air Division in September 2015. He is responsible for leading Tenneco's Clean Air product line. Mr. Hummel joined Tenneco from GE Healthcare where, since October 2014, he had been serving as President and CEO of molecular imaging and computed tomography, leading the company's $3.5 billion global business focused on diagnostic imaging equipment and services. He had been with GE Healthcare for more than 20 years, managing global business and functions including operations, strategic planning, new product introductions, technology and business integration. In addition to his time with GE Healthcare, Mr. Hummel also spent time with Johnson Controls, Inc., serving as Vice President and General Manager Service North America and Covance, as Vice President and General Manager of the company's Madison, Wisconsin laboratories.

Martin Hendricks — Mr. Hendricks was named Executive Vice President, Ride Performance in February 2017. Mr. Hendricks joined Tenneco from Federal Mogul Corp. where he had been since May 2008, serving most recently as president, global braking and regional president, EMEA, based in Glinde, Germany. During his time at Federal Mogul, Mr. Hendricks has served in management and executive roles in both OE and aftermarket businesses and in the EMEA, North America and South America regions. His previous experience includes leadership positions with EurotaxGlass International AG, TRW and Robert Bosch. Mr. Hendricks has more than 25 years of experience with an extensive background in optimizing operations, driving sales and market share growth, integrating businesses and expanding in new markets.

Peng (Patrick) Guo — Mr. Guo became Executive Vice President, Asia Pacific in 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 Ashai 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.

Gregg Bolt — Mr. Bolt was named our Senior Vice President, Global Human Resources and Administration in February 2013. 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.

James D. Harrington — Mr. Harrington has served as our Senior Vice President, General Counsel and Corporate Secretary since June 2009 and is responsible for managing our worldwide legal affairs including corporate governance and compliance. Mr. Harrington joined us in January 2005 as Corporate Counsel and was named Vice President — Law in July 2007. Prior to joining Tenneco, he worked at Mayer Brown LLP in the firm’s corporate and securities practice.

Joseph A. Pomaranski - Mr. Pomaranski has served as our Senior Vice President and General Manager, Global Aftermarket since October 2014. Prior to this appointment, Mr. Pomaranski served as Vice President and General Manager, North America Aftermarket since November 2010. He served as Vice President, North America Aftermarket from August 2008 to November 2010. Prior to that, Mr. Pomaranski served as Vice President, North America Aftermarket Sales from May 1999 to August 2008. Mr. Pomaranski joined Tenneco in 1999 from Federal Mogul where he held the position of Director of Sales, Special Markets. Prior to that, he worked for Cooper

Automotive as Vice President of Sales. He began his career with Champion Spark Plug where he held various positions from 1977 to 1998.

John E. Kunz — Mr. Kunz has served as our Vice President and Controller since March 2015 and is our company's principal accounting officer with responsibility for Tenneco's corporate accounting and financial reporting globally. Prior to assuming his role as Controller, Mr. Kunz served as Vice President, Treasurer and Tax, responsible for our company's global tax function. Mr. Kunz also oversaw our company's treasury, insurance and investment activities including building and managing relationships with the banking community and rating agencies. Mr. Kunz joined Tenneco in 2004 from Great Lakes Chemical Corporation, where he rose through responsibility to become vice president and treasurer. Prior to joining Great Lakes in 1999, Mr. Kunz was director of corporate development at Weirton Steel Corporation, where he also held prior positions in capital planning, business development and financial analysis. Prior to that, Mr. Kunz spent four years with the international public accounting firm of KPMG.

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PART II

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

Our outstanding shares of common stock, par value $.01 per share, are listed on the New York and Chicago Stock Exchanges. The following table sets forth, for the periods indicated, the high and low sales prices of our common stock on the New York Stock Exchange Composite Transactions Tape.

	Sales Prices	
Quarter	High	Low
2016		
1st	$52.16	$34.45
2nd	57.73	44.55
3rd	58.97	44.68
4th	66.98	51.09
2015		
1st	$59.87	$49.14
2nd	61.73	55.01
3rd	58.20	39.13
4th	57.18	44.15

As of February 17, 2017, there were approximately 15,237 holders of record of our common stock, including brokers and other nominees.

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 initial dividend is payable on March 23, 2017 to stockholders of record as of March 7, 2017. While we currently expect to pay comparable quarterly cash dividends in the 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. The Company did not pay any dividends in fiscal years 2016, 2015 or 2014.

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.

See "Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters" included in Item 12 for information regarding securities authorized for issuance under our equity compensation plans.

Purchase of equity securities by the issuer and affiliated purchasers

The following table provides information relating to our purchase of shares of our common stock in the fourth quarter of 2016. 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 2016	560,073	$ 56.28	559,849	$ 160
November 2016	577,803	$ 55.24	576,500	$ 128
December 2016	263,200	$ 62.21	263,200	$ 112
Total	1,401,076	$ 56.96	1,399,549	$ 112

(1) Includes shares withheld upon vesting of restricted stock in the amount of 224 in October 2016 and 1,303 in November 2016.

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In October 2015, our Board of Directors expanded our company's share repurchase program, authorizing the repurchase of an additional $200 million of our company's outstanding common stock. This authorization was in addition to the $350 million share repurchase program our company announced in January 2015.
In February 2017, our Board of Directors authorized the repurchase of up to $400 million of the Company's outstanding common stock over the next three years. This includes the remaining amount authorized under earlier repurchase programs. The Company anticipates acquiring the shares through open market or privately negotiated transactions, which will be funded through cash from operations. The repurchase program does not obligate the Company to make repurchase within any specific time or situations, and opportunities in higher priority areas could affect the cadence of this program.
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., Borg Warner Inc., Cummins Inc., Johnson Controls Inc., Lear Corp., Magna International Inc., and Meritor, Inc. These comparisons assume an initial investment of $100 and the reinvestment of dividends.

	12/31/2011	12/31/2012	12/31/2013	12/31/2014	12/31/2015	12/31/2016
Tenneco Inc.	100.00	117.90	189.96	190.09	154.16	209.77
S&P 500	100.00	116.00	153.58	174.60	177.01	198.18
Peer Group	100.00	128.42	192.11	216.84	165.65	208.36

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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.

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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.

We are organized and manage our business along our two major product lines (clean air and ride performance) and three geographic areas (North America; Europe, South America and India; and Asia Pacific), resulting in six operating segments (North America Clean Air, North America Ride Performance, Europe, South America and India Clean Air, Europe, South America and India Ride Performance, Asia Pacific Clean Air and Asia Pacific Ride Performance). Within each geographical area, each operating segment manufactures and distributes either clean air or ride performance products primarily for the original equipment and aftermarket industries. Each of the six operating segments constitutes a reportable segment. Costs related to other business activities, primarily corporate headquarter functions, are disclosed separately from the six operating segments as "Other."

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TENNECO INC. AND CONSOLIDATED SUBSIDIARIES
SELECTED CONSOLIDATED FINANCIAL DATA

	Year Ended December 31,				
	2016(a)	2015(b)	2014(c)	2013(d)	2012(e)
	(Millions Except Share and Per Share Amounts)				
Statements of Income Data:					
Net sales and operating revenues —					
Clean Air Division					
North America	$3,016	$ 2,839	$ 2,801	$ 2,626	$ 2,469
Europe, South America & India	2,081	1,935	2,088	2,045	1,827
Asia Pacific	1,080	1,037	1,022	853	695
Intergroup sales	(108)	(116)	(139)	(120)	(108)
Total Clean Air Division	6,069	5,695	5,772	5,404	4,883
Ride Performance Division					
North America	1,243	1,323	1,361	1,265	1,223
Europe, South America & India	1,045	972	1,070	1,087	1,094
Asia Pacific	323	275	269	251	213
Intergroup sales	(81)	(84)	(91)	(83)	(93)
Total Ride Performance Division	2,530	2,486	2,609	2,520	2,437
Total Tenneco Inc.	$8,599	$ 8,181	$ 8,381	$ 7,924	$ 7,320
Earnings before interest expense, income taxes, and noncontrolling interests —					
Clean Air Division					
North America	$220	$ 244	$ 237	$ 229	$ 202
Europe, South America & India	103	52	59	57	54
Asia Pacific	145	111	99	82	71
Total Clean Air Division	468	407	395	368	327
Ride Performance Division					
North America	157	155	143	124	122
Europe, South America & India	25	(5)	40	(7)	41
Asia Pacific	54	38	35	22	5
Total Ride Performance Division	236	188	218	139	168
Other	(188)	(87)	(124)	(85)	(67)
Total Tenneco Inc.	$516	$ 508	$ 489	$ 422	$ 428
Interest expense (net of interest capitalized)	92	67	91	80	105
Income tax expense	—	146	131	122	19
Net income	424	295	267	220	304
Less: Net income attributable to noncontrolling interests	68	54	42	38	29
Net income attributable to Tenneco Inc.	$356	$ 241	$ 225	$ 182	$ 275
Weighted average shares of common stock outstanding —					
Basic	55,939,135	59,678,309	60,734,022	60,474,492	59,985,677
Diluted	56,407,436	60,193,150	61,782,508	61,594,062	61,083,510
Basic earnings per share of common stock	$6.36	$ 4.05	$ 3.70	$ 3.02	$ 4.58
Diluted earnings per share of common stock	$6.31	$ 4.01	$ 3.64	$ 2.96	$ 4.50

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	Years Ended December 31,				
	2016	2015	2014	2013	2012
	(Millions Except Ratio and Percent Amounts)				
Balance Sheet Data (at year end):					
Total assets(f)	$4,346	$3,970	$3,996	$3,817	$3,593
Short-term debt	90	86	60	83	113
Long-term debt(f)	1,294	1,124	1,055	1,006	1,052
Redeemable noncontrolling interests	40	41	34	20	15
Total Tenneco Inc. shareholders' equity	573	425	495	432	246
Noncontrolling interests	47	39	40	39	45
Total equity	620	464	535	471	291
Statement of Cash Flows Data:					
Net cash provided by operating activities	$489	$517	$341	$503	$365
Net cash used by investing activities	(340)	(303)	(339)	(266)	(273)
Net cash provided (used) by financing activities	(91)	(172)	20	(175)	(89)
Cash payments for plant, property and equipment	(325)	(286)	(328)	(244)	(256)
Other Data:					
EBITDA including noncontrolling interests(g)	$728	$711	$697	$627	$633
Ratio of EBITDA including noncontrolling interests to interest expense	7.91	10.61	7.66	7.84	6.03
Ratio of net debt (total debt less cash and cash equivalents) to EBITDA including noncontrolling interests(h)	1.42	1.30	1.19	1.29	1.49
Ratio of earnings to fixed charges(i)	4.55	5.73	4.38	4.32	3.55

NOTE: Our consolidated financial statements for the three years ended December 31, 2016, which are discussed in the following notes, are included in this Form 10-K/A under Item 8.

(a) 2016 includes $36 million in restructuring and related costs primarily related to manufacturing footprint improvements in North America Ride Performance, headcount reduction and cost improvement initiatives in Europe and China Clean Air, South America and Australia. Of the total $36 million we incurred in restructuring and related costs, $6 million was related to asset write-downs. 2016 also includes a net tax benefit of $110 million primarily relating to the recognition of a U.S. tax benefit for foreign taxes, $24 million in pre-tax interest charges related to the refinancing of our senior notes due in 2020 and $72 million in pension buyout charges.

(b) 2015 includes $63 million of restructuring and related costs primarily related to the European cost reduction efforts, exiting the Marzocchi suspension business, headcount reductions in Australia and South America, and the closure of a JIT plant in Australia. Of the total $63 million we incurred in restructuring and related costs, $10 million was related to asset write-downs and $4 million was in charges related to pension benefits.

(c) 2014 includes $49 million of restructuring and related costs primarily related to the European cost reduction efforts, headcount reductions in Australia and South America, the sale of a closed facility in Cozad, Nebraska and costs related to organizational changes. Of the total $49 million we incurred in restructuring and related costs, $3 million was related to non-cash asset write downs and $2 million was related to a non-cash charge on the sale of a closed facility. 2014 also includes $32 million in charges related to postretirement benefits, of which $21 million was a non-cash charge related to payments made to retirement plan participants out of pension assets and $11 million related to an adjustment to the postretirement medical liability, and $13 million in pre-tax interest charges related to the refinancing of our senior credit facility.

(d) 2013 includes $78 million of restructuring and related costs primarily related to European cost reduction efforts including the planned closing of the ride performance plant in Gijon, Spain and intended reductions to the

workforce at our ride performance plant in Sint-Truiden, our exit from the distribution of aftermarket exhaust products and ending production of leaf springs in Australia, headcount reductions in various regions, and the net impact of freezing our defined benefit plans in the United Kingdom. Of the total $78 million we incurred in restructuring and related costs, $3 million was related to non-cash asset write downs.

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(e) 2012 includes a $7 million asset impairment charge related to certain assets of our European Ride Performance business, a benefit of $5 million from property recoveries related to transactions originated by The Pullman Company before being acquired by Tenneco in 1996 and $18 million in pre-tax interest charges related to the refinancing of our senior credit facility and senior notes.

(f) In April 2015, the FASB issued Accounting Standard Update 2015-03, Simplifying the Presentation of Debt Issuance Costs, which requires debt issuance costs to be presented in the balance sheet as a direct deduction from the associated debt liability. For public business entities, the standard is effective for financial statements issued for fiscal years beginning after December 15, 2015, and interim periods within those fiscal years. Early adoption of the amendments in this update is permitted for financial statements that have not been previously issued. We adopted this standard for the first quarter of 2015 and applied retrospectively. The balance for unamortized debt issuance costs was $13 million, $12 million, $14 million, $13 million and $15 million at December 31, 2016, 2015, 2014, 2013 and 2012, respectively.

(g) EBITDA including noncontrolling interests is a non-GAAP measure defined as net income before extraordinary items, cumulative effect of changes in accounting principle, interest expense, income taxes, depreciation and amortization and noncontrolling interests. We use EBITDA including noncontrolling interests, together with GAAP measures, to evaluate and compare our operating performance on a consistent basis between time periods and with other companies that compete in our markets but which may have different capital structures and tax positions, which can have an impact on the comparability of interest expense, noncontrolling interests and tax expense. We also believe that using this measure allows us to understand and compare operating performance both with and without depreciation expense. We believe EBITDA including noncontrolling interests is useful to our investors and other parties for these same reasons.

EBITDA including noncontrolling interests should not be used as a substitute for net income or for net cash provided by operating activities prepared in accordance with GAAP. It should also be noted that EBITDA including noncontrolling interests may not be comparable to similarly titled measures used by other companies and, furthermore, that it excludes expenditures for debt financing, taxes and future capital requirements that are essential to our ongoing business operations. For these reasons, EBITDA including noncontrolling interests is of value to management and investors only as a supplement to, and not in lieu of, GAAP results. EBITDA including noncontrolling interests are derived from the statements of income (loss) as follows:

	Year Ended December 31,				
	2016	2015	2014	2013	2012
	(Millions)				
Net income	$356	$241	$225	$182	$275
Noncontrolling interests	68	54	42	38	29
Income tax expense	—	146	131	122	19
Interest expense, net of interest capitalized	92	67	91	80	105
Depreciation and amortization of other intangibles	212	203	208	205	205
Total EBITDA including noncontrolling interests	$728	$711	$697	$627	$633

(h) We present the ratio of net debt (total debt less cash and cash equivalents) to EBITDA including noncontrolling interests because management believes it is a useful measure of Tenneco's credit position and progress toward reducing leverage. The calculation is limited in that we may not always be able to use cash to repay debt on a dollar-for-dollar basis. Net debt balances are derived from the balance sheets as follows:

	Year Ended December 31,				
	2016	2015	2014	2013	2012
	(Millions)				
Total Debt	$1,384	$1,210	$1,115	$1,089	$1,165
Total Cash	349	288	285	280	223
Net Debt	$1,035	$922	$830	$809	$942

(i) For purposes of computing this ratio, earnings generally consist of income before income taxes and fixed charges excluding capitalized interest. Fixed charges consist of interest expense, the portion of rental expense considered representative of the interest factor and capitalized interest. See Exhibit 12 to this Form 10-K for the calculation of this ratio.

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

As you read the following review of our financial condition and results of operations, you should also read our consolidated financial statements and related notes in Item 8.

Executive Summary

We are one of the world’s leading manufacturers of clean air and ride performance products and systems for light vehicle, commercial truck and off-highway applications. We serve both original equipment (OE) vehicle designers and manufacturers and the repair and replacement markets, or aftermarket, globally through leading brands, including Monroe®, Rancho®, Clevite® Elastomers, Axios™, Kinetic® and Fric-Rot™ ride performance products and Walker®, XNOx®, Fonos™, DynoMax® and Thrush® clean air products. We serve more than 80 different original equipment manufacturers and commercial truck and off-highway engine manufacturers, and our products are included on nine of the top 10 car models produced for sale in Europe and eight of the top 10 light truck models produced for sale in North America for 2016. Our aftermarket customers are comprised of full-line and specialty warehouse distributors, retailers, jobbers, installer chains and car dealers. As of December 31, 2016, we operated 91 manufacturing facilities worldwide and employed approximately 31,000 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 2016, light vehicle production continued to improve from recent years in some of the geographic regions in which we operate. Light vehicle production was up two percent in North America, three percent in Europe, 10 percent in India and 14 percent in China. South America light vehicle production was down 10 percent and Australia was down eight percent from 2015 levels.

We are organized and manage our business along our two major product lines (clean air and ride performance) and three geographic areas (North America; Europe, South America and India; and Asia Pacific), resulting in six operating segments (North America Clean Air, North America Ride Performance, Europe, South America and India Clean Air, Europe, South America and India Ride Performance, Asia Pacific Clean Air and Asia Pacific Ride Performance). Within each geographical area, each operating segment manufactures and distributes either clean air or ride performance products primarily for the original equipment and aftermarket industries. Each of the six operating segments constitutes a reportable segment. Costs related to other business activities, primarily corporate headquarter functions, are disclosed separately from the six operating segments as "Other."

Total revenue for 2016 was $8,599 million, a five percent increase from $8,181 million in 2015, on strong global light vehicle revenues, driven by both the Clean Air and Ride Performance product lines. Excluding the impact of currency and substrate sales, revenue was up $460 million from $6,293 million to $6,753 million. The increase in revenue was primarily driven by stronger OE light vehicle volumes in North America Clean Air, Europe, South America and India and China and increased aftermarket Ride Performance sales in Europe and South America, new platforms in North America, Europe and China as well as higher commercial truck, off-highway and other Clean Air revenue, which were partially offset by lower commercial truck, off-highway and other Ride Performance revenue mainly in North America and Europe and lower aftermarket revenue in North America.

Cost of sales: Cost of sales for 2016 was $7,123 million, or 82.8 percent of sales, compared to $6,828 million, or 83.5 percent of sales in 2015. The following table lists the primary drivers behind the change in cost of sales ($ millions).

Year ended December 31, 2015	$6,828
Volume and mix	618
Material	(131)
Currency exchange rates	(179)
Restructuring	(36)
Other Costs	23
Year ended December 31, 2016	$7,123

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The increase in cost of sales was due to the year-over-year increase in volume and higher other costs, mainly manufacturing, partially offset by the impact of currency exchange rates, lower net material costs and lower restructuring.

Gross margin: Revenue less cost of sales for 2016 was $1,476 million, or 17.2 percent of sales, versus $1,353 million, or 16.5 percent of sales in 2015. The effect on gross margin resulting from year-over-year increase in volume, lower net material costs and lower restructuring costs was partially offset by higher other costs, mainly manufacturing, and unfavorable currency impact.

Engineering, research and development: Engineering, research and development expense was $154 million and $146 million in 2016 and 2015, respectively, mainly due to currency impact and the timing of customers' recoveries.

Selling, general and administrative (SG&A): Selling, general and administrative expense was up $98 million in 2016, at $589 million, compared to $491 million in 2015, mostly due to $72 million in pension buyout charges in 2016.

Depreciation and amortization: Depreciation and amortization expense was $212 million and $203 million for 2016 and 2015, respectively.

Earnings before interest expense, taxes and noncontrolling interests (“EBIT”) was $516 million for 2016, an increase of $8 million, when compared to $508 million in the prior year. Higher OE light vehicle volumes in North America Clean Air, Europe, South America and India and China, increased aftermarket Ride Performance sales in Europe and South America, new platforms in North America, Europe and China, higher commercial truck, off-highway and other Clean Air revenue, the benefit of our product cost leadership initiatives, lower restructuring and related expenses and savings from previous restructuring activities were partially offset by lower commercial truck, off-highway and other Ride Performance revenue mainly in North America and Europe, lower aftermarket revenue in North America, higher SG&A and engineering expenses and $33 million of negative currency. EBIT for 2015 also benefited from the timing of a customer recovery in China Clean Air of $5 million.

Results from Operations

Net Sales and Operating Revenues for Years 2016 and 2015

The tables below reflect our revenues for 2016 and 2015. We show the component of our OE revenue represented by substrate sales. While we generally have primary design, engineering and manufacturing responsibility for OE emission control systems, we do not manufacture substrates. Substrates are porous ceramic filters coated with a catalyst - typically, precious metals such as platinum, palladium and rhodium. These 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. As the need for more sophisticated emission control solutions increases to meet more stringent environmental regulations, and as we capture more diesel aftertreatment business, these substrate components have been increasing as a percentage of our revenue. 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 original equipment customers generally assume the risk of precious metals pricing volatility, it impacts our reported revenues. Presenting revenues that exclude “substrates” used in catalytic converters and diesel particulate filters removes this impact.

Additionally, 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 2015 table since this is the base period for measuring the effects of currency during 2016 on our operations. We believe investors find this information useful in understanding period-to-period comparisons in our revenues.

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	Year Ended December 31, 2016				
	Revenues	Substrate Sales	Value-add Revenues	Currency Impact on Value-add Revenues	Value-add Revenues excluding Currency
	(Millions)				
Clean Air Division					
North America	$3,003	$ 1,052	$ 1,951	$ (1)	$ 1,952
Europe, South America & India	1,989	735	1,254	(60)	1,314
Asia Pacific	1,077	241	836	(41)	877
Total Clean Air Division	6,069	2,028	4,041	(102)	4,143
Ride Performance Division					
North America	1,234	—	1,234	(13)	1,247
Europe, South America & India	1,019	—	1,019	(51)	1,070
Asia Pacific	277	—	277	(16)	293
Total Ride Performance Division	2,530	—	2,530	(80)	2,610
Total Tenneco Inc.	$8,599	$ 2,028	$ 6,571	$ (182)	$ 6,753

	Year Ended December 31, 2015				
	Revenues	Substrate Sales	Value-add Revenues	Currency Impact on Value-add Revenues	Value-add Revenues excluding Currency
	(Millions)				
Clean Air Division					
North America	$2,823	$ 979	$ 1,844	$ —	$ 1,844
Europe, South America & India	1,835	664	1,171	—	1,171
Asia Pacific	1,037	245	792	—	792
Total Clean Air Division	5,695	1,888	3,807	—	3,807
Ride Performance Division					
North America	1,313	—	1,313	—	1,313
Europe, South America & India	944	—	944	—	944
Asia Pacific	229	—	229	—	229
Total Ride Performance Division	2,486	—	2,486	—	2,486
Total Tenneco Inc.	$8,181	$ 1,888	$ 6,293	$ —	$ 6,293

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	Year Ended December 31, 2016 Versus Year Ended December 31, 2015 Dollar and Percent Increase (Decrease)			
	Revenues	Percent	Value-add Revenues excluding Currency	Percent
	(Millions Except Percent Amounts)			
Clean Air Division				
North America	$180	6 %	$ 108	6 %
Europe, South America & India	154	8 %	143	12 %
Asia Pacific	40	4 %	85	11 %
Total Clean Air Division	374	7 %	336	9 %
Ride Performance Division				
North America	(79)	(6)%	(66)	(5)%
Europe, South America & India	75	8 %	126	13 %
Asia Pacific	48	21 %	64	28 %
Total Ride Performance Division	44	2 %	124	5 %
Total Tenneco Inc.	$418	5 %	$ 460	7 %

Light Vehicle Industry Production by Region for Years Ended December 31, 2016 and 2015 (According to IHS Automotive, January 2017)

	Year Ended December 31,			
	2016	2015	Increase (Decrease)	% Increase (Decrease)
	(Number of Vehicles in Thousands)			
North America	17,849	17,495	354	2 %
Europe	21,515	20,936	579	3 %
South America	2,772	3,073	(301)	(10)%
India	4,171	3,807	364	10 %
Total Europe, South America & India	28,458	27,816	642	2 %
China	26,975	23,679	3,296	14 %
Australia	156	169	(13)	(8)%

Clean Air revenue was up $374 million in 2016 compared to 2015 with higher volumes in all segments. In North America, higher volumes drove a $218 million revenue increase due to increased OE light vehicle sales and new platforms offset partially by lower commercial truck, off-highway and other vehicle revenue and lower aftermarket revenue. Currency had a $1 million unfavorable impact on North American revenues. In the European, South American and Indian segment, higher volumes drove a $251 million increase in revenues mainly due to increased OE light vehicle sales across the region, higher commercial truck, off-highway and other vehicle revenue and new platforms in Europe. Currency had an $87 million unfavorable impact on European, South American and Indian revenues. In Asia Pacific, higher volumes of $121 million were mainly driven by increased OE light vehicle sales and new programs in China and higher commercial truck, off-highway and other vehicle revenue in China and Japan. Currency had a $52 million unfavorable impact on Asia Pacific revenues.

Ride Performance revenue was up $44 million in 2016 compared to 2015. In North America, lower volumes of $100 million were driven by lower volumes in OE light vehicle, commercial truck and aftermarket revenues net of favorable mix. Currency had a $13 million unfavorable impact on North American revenues. In the European, South American and Indian segment, higher volumes of $127 million were driven by increases in light vehicle sales across the region and higher aftermarket sales in Europe and South America, which were partially offset by lower commercial truck and off-highway vehicle revenues in Europe reflecting the sale of the Marzocchi specialty business. Currency had a $51 million unfavorable impact on European, South American and Indian revenues. In Asia Pacific, higher volumes of $66 million were mainly driven by increased OE light vehicle volumes in China. Currency had a $16 million unfavorable impact on Asia Pacific revenues.

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Net Sales and Operating Revenues for Years 2015 and 2014

The following tables reflect our revenues for the years of 2015 and 2014. See "Net Sales and Operating Revenues for Years 2016 and 2015" for a description of why we present these reconciliations of revenue.

	Year Ended December 31, 2015				
	Revenues	Substrate Sales	Value-add Revenues	Currency Impact on Value-add Revenues	Value-add Revenues excluding Currency
	(Millions)				
Clean Air Division					
North America	$2,823	$ 979	$ 1,844	$ (5)	$ 1,849
Europe, South America & India	1,835	664	1,171	(236)	1,407
Asia Pacific	1,037	245	792	(28)	820
Total Clean Air Division	5,695	1,888	3,807	(269)	4,076
Ride Performance Division					
North America	1,313	—	1,313	(29)	1,342
Europe, South America & India	944	—	944	(195)	1,139
Asia Pacific	229	—	229	(15)	244
Total Ride Performance Division	2,486	—	2,486	(239)	2,725
Total Tenneco Inc.	$8,181	$ 1,888	$ 6,293	$ (508)	$ 6,801

	Year Ended December 31, 2014				
	Revenues	Substrate Sales	Value-add Revenues	Currency Impact on Value-add Revenues	Value-add Revenues excluding Currency
	(Millions)				
Clean Air Division					
North America	$2,776	$ 1,006	$ 1,770	$ —	$ 1,770
Europe, South America & India	1,974	668	1,306	—	1,306
Asia Pacific	1,022	221	801	—	801
Total Clean Air Division	5,772	1,895	3,877	—	3,877
Ride Performance Division					
North America	1,351	—	1,351	—	1,351
Europe, South America & India	1,032	—	1,032	—	1,032
Asia Pacific	226	—	226	—	226
Total Ride Performance Division	2,609	—	2,609	—	2,609
Total Tenneco Inc.	$8,381	$ 1,895	$ 6,486	$ —	$ 6,486

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	Year Ended December 31, 2015 Versus Year Ended December 31, 2014 Dollar and Percent Increase (Decrease)			
	Revenues	Percent	Value-add Revenues excluding Currency	Percent
	(Millions Except Percent Amounts)			
Clean Air Division				
North America	$47	2 %	$ 79	4 %
Europe, South America & India	(139)	(7)%	101	8 %
Asia Pacific	15	1 %	19	2 %
Total Clean Air Division	(77)	(1)%	199	5 %
Ride Performance Division				
North America	(38)	(3)%	(9)	(1)%
Europe, South America & India	(88)	(9)%	107	10 %
Asia Pacific	3	1 %	18	8 %
Total Ride Performance Division	(123)	(5)%	116	4 %
Total Tenneco Inc.	$(200)	(2)%	$ 315	5 %

Light Vehicle Industry Production by Region for Years Ended December 31, 2015 and 2014 (Updated according to IHS Automotive, January 2017)

	Year Ended December 31,			
	2015	2014	Increase (Decrease)	% Increase (Decrease)
	(Number of Vehicles in Thousands)			
North America	17,495	17,029	466	3 %
Europe	20,936	20,151	785	4 %
South America	3,073	3,818	(745)	(20)%
India	3,807	3,594	213	6 %
Total Europe, South America & India	27,816	27,563	253	1 %
China	23,679	22,610	1,069	5 %
Australia	169	175	(6)	(3)%

Clean Air revenue was down $77 million in 2015 compared to 2014. In North America, higher OE light vehicle and aftermarket volumes were partially offset by lower commercial truck and off-highway vehicle volumes and unfavorable mix, which accounted for $92 million of the year-over-year increase in revenues. Currency had a $5 million unfavorable impact on North American revenues. In the European, South American and Indian region, higher volumes drove a $230 million increase in revenues mainly due to higher light vehicle volumes, higher commercial truck, off-highway and other vehicle volumes and new platforms in Europe, partially offset by lower year-over-year volumes in South America and lower aftermarket volumes in Europe. Currency had a $358 million unfavorable impact on European, South American and Indian revenues. The increase in Asia Pacific revenues was primarily driven by higher volumes of $70 million, mostly due to higher light vehicle production in China and new programs in China and Japan, partially offset by lower commercial truck vehicle volumes in China. Currency had a $36 million unfavorable impact on Asia Pacific revenues.

Ride Performance revenue was down $123 million in 2015 compared to 2014. In North America, lower volumes of $2 million driven by lower light vehicle and commercial truck, off-highway and other vehicle volumes, were partially

offset by higher aftermarket sales. Currency had a $29 million unfavorable impact on North American revenues. In the European, South American and Indian region, higher volumes of $104 million were driven by light vehicle and aftermarket increases in the region and higher commercial truck and off-highway vehicle revenues and new platforms in Europe. Currency had a $195 million unfavorable impact on European, South American and Indian revenues. In the Asia Pacific region, higher volumes of $19 million, mostly due to higher light vehicle production volumes in China, were partially offset by lower volumes in Australia. Currency had a $15 million unfavorable impact on Asia Pacific revenues.

Earnings before Interest Expense, Income Taxes and Noncontrolling Interests ("EBIT") for Years 2016 and 2015

	Year Ended December 31,		Change
	2016	2015	
	(Millions)		
Clean Air Division			
North America	$220	$244	$ (24)
Europe, South America & India	103	52	51
Asia Pacific	145	111	34
Total Clean Air Division	468	407	61
Ride Performance Division			
North America	157	155	2
Europe, South America & India	25	(5)	30
Asia Pacific	54	38	16
Total Ride Performance Division	236	188	48
Other	(188)	(87)	(101)
Total Tenneco Inc.	$516	$508	$ 8

The EBIT results shown in the preceding table include the following items, certain of which are discussed below under "Restructuring and Other Charges," which have an effect on the comparability of EBIT results between periods:

	Year Ended December 31,	
	2016	2015
	(Millions)	
Clean Air Division		
Europe, South America & India		
Restructuring and related expenses	$ 3	$ 6
Asia Pacific		
Restructuring and related expenses	4	4
Total Clean Air Division	$ 7	$ 10
Ride Performance Division		
North America		
Restructuring and related expenses	$ 6	$ 2
Europe, South America & India		
Restructuring and related expenses	20	49
Asia Pacific		
Restructuring and related expenses	1	2
Total Ride Performance Division	$ 27	$ 53
Other		
Restructuring and related expenses	$ 2	$ —
Pension/Postretirement charges (1)	72	4
Total Other	$ 74	$ 4

(1) Charges related to pension derisking.

EBIT for the Clean Air division was $468 million in 2016 compared to $407 million in 2015. EBIT for North America decreased $24 million, to $220 million, in 2016 versus 2015. The benefit from higher OE light vehicle sales, new

platforms and favorable currency was more than offset by lower aftermarket revenue, lower commercial truck and off-highway vehicle revenue, higher manufacturing costs and higher SG&A expense. Europe, South America and India's EBIT was $103 million in 2016 and $52 million in 2015. The benefit from higher light vehicle volumes, higher commercial truck, off-highway and other vehicle revenue, favorable mix and new platforms in Europe as well as lower restructuring and related expenses and year-over-year restructuring savings was partially offset by negative currency. EBIT for Asia Pacific increased $34 million to $145 million in 2016 from $111 million in 2015. EBIT benefited from increased OE light vehicle sales and new platforms in China, higher commercial truck, off-highway and other vehicle revenue in China and Japan as well as strong operational cost management, partially offset by higher SG&A expense and negative currency. For the Clean Air division, $7 million

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restructuring and related expenses were included in EBIT for 2016, whereas $10 million were included for 2015. EBIT for Clean Air division also benefited from the timing of a customer recovery in China of $5 million in 2015. Currency had a $23 million unfavorable impact on EBIT of the Clean Air division for 2016 when compared to 2015.
EBIT for the Ride Performance division was $236 million in 2016 compared to $188 million in 2015. EBIT for North America increased $2 million in 2016 to $157 million from $155 million in 2015. The benefit of improved operational cost management was partially offset by lower volumes in light vehicle, commercial truck and aftermarket revenues net of favorable mix, higher restructuring and related expenses and negative currency. Europe, South America and India's EBIT was $25 million in 2016 and negative $5 million in 2015. The benefit from higher light vehicle sales in the region, higher aftermarket sales in Europe and South America, lower restructuring and related expenses and savings from prior restructuring activities was partially offset by unfavorable mix in Europe, lower commercial truck, off-highway and other vehicle revenue in Europe reflecting the sale of the Marzocchi specialty business and negative currency. EBIT for Asia Pacific increased to $54 million in 2016 from $38 million in 2015, mainly driven by higher light vehicle volumes in China and lower restructuring and related expenses which were partially offset by higher SG&A and engineering expenses and negative currency. For the Ride Performance division, restructuring and related expenses of $27 million were included in EBIT for 2016 and $53 million for 2015. Currency had a $10 million unfavorable impact on EBIT of the Ride Performance division for 2016 when compared to 2015.
Currency had a $33 million unfavorable impact on overall company EBIT for 2016 as compared to 2015.

EBIT for Years 2015 and 2014

	Year Ended December 31,		Change
	2015	2014	
	(Millions)		
Clean Air Division			
North America	$244	$237	$ 7
Europe, South America & India	52	59	(7)
Asia Pacific	111	99	12
Total Clean Air Division	407	395	12
Ride Performance Division			
North America	155	143	12
Europe, South America & India	(5)	40	(45)
Asia Pacific	38	35	3
Total Ride Performance Division	188	218	(30)
Other	(87)	(124)	37
Total Tenneco Inc.	$508	$489	$ 19

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The EBIT results shown in the preceding table include the following items, certain of which are discussed below under “Restructuring and Other Charges,” which have an effect on the comparability of EBIT results between periods:

	Year Ended December 31,	
	2015	2014
	(Millions)	
Clean Air Division		
North America		
Restructuring and related expenses	$ —	$ 1
Europe, South America & India		
Restructuring and related expenses	6	10
Bad debt charge (1)	—	4
Asia Pacific		
Restructuring and related expenses	4	6
Total Clean Air Division	$ 10	$ 21
Ride Performance Division		
North America		
Restructuring and related expenses	$ 2	$ 5
Pension/Postretirement charges (2)	—	1
Europe, South America & India		
Restructuring and related expenses	49	22
Asia Pacific		
Restructuring and related expenses	2	1
Total Ride Performance Division	$ 53	$ 29
Other		
Restructuring and related expenses	$ —	$ 4
Pension/Postretirement charges (2)	4	31
Total Other	$ 4	$ 35

(1) Charge related to the bankruptcy of an aftermarket customer in Europe.
(2) Charges related to pension derisking and the correction of postretirement census data.

EBIT for the Clean Air division was $407 million in 2015 compared to $395 million in 2014. EBIT for North America increased $7 million to $244 million in 2015 versus 2014. The benefit from higher light vehicle and aftermarket sales and operational cost management was partially offset by lower volumes in commercial truck and off-highway vehicle, unfavorable mix and negative currency. Europe, South America and India's EBIT was $52 million in 2015 compared to $59 million in 2014. The benefit from higher light vehicle volumes, higher commercial truck, off-highway and other vehicle volumes and new platforms in the Europe, lower restructuring and related expenses, year-over-year restructuring savings and a charge related to the bankruptcy of an European aftermarket customer in prior year was more than offset by lower volumes in South America, lower aftermarket volumes in Europe, unfavorable mix, higher SG&A and engineering expenses and negative currency. EBIT for Asia Pacific increased $12 million to $111 million in 2015 from $99 million in 2014. EBIT benefited from higher light vehicle volumes in China, new platforms in China and Japan, strong operational cost management, lower restructuring and related expenses and year-over-year savings from prior restructuring activities, partially offset by lower commercial truck revenue in China. For the Clean Air division, restructuring and related expenses of $10 million were included in EBIT for 2015 and $17 million in 2014. EBIT for Clean Air division also benefited from the timing of a customer recovery in China of $5 million in 2015. EBIT for Clean Air division included a charge of $4 million related to the bankruptcy of an aftermarket customer in

Europe in 2014. Currency had a $22 million unfavorable impact on EBIT of the Clean Air division in 2015 when compared to 2014.

EBIT for the Ride Performance division was $188 million in 2015 compared to $218 million in 2014. EBIT for North America increased $12 million in 2015 to $155 million from $143 million in 2014. The benefit from increased aftermarket volumes, lower restructuring and related expenses and improved operational cost management was partially offset by lower light vehicle volumes, lower commercial truck, off-highway and other vehicle volumes and negative currency. Europe, South America and India's EBIT was a loss of $5 million in 2015 compared to an income of $40 million in 2014. The benefit from higher light vehicle and aftermarket volumes in the region, higher commercial truck, off-highway and other vehicle volumes and new platforms in Europe and savings from prior restructuring activities was more than offset by higher restructuring and

related expenses, higher SG&A and engineering expenses, unfavorable mix and negative currency. EBIT for Asia Pacific increased $3 million to $38 million in 2015 from $35 million in 2014. EBIT benefited from higher light vehicle volumes in China and operational cost management, partially offset by lower volumes in Australia and unfavorable currency. For the Ride Performance division, restructuring and related expenses of $53 million were included in EBIT in 2015 and $28 million in 2014. EBIT for the Ride Performance division included a charge of $1 million related to postretirement medical true-up in 2014. Currency had a $42 million unfavorable impact on EBIT of the Ride Performance division for 2015 when compared to last year. EBIT for the Ride Performance division also included a $7 million expense to adjust workers' compensation reserves in 2014.

Currency had a $64 million unfavorable impact on overall company EBIT in 2015 as compared to 2014.

EBIT as a Percentage of Revenue for Years 2016, 2015 and 2014

	Year Ended December 31,		
	2016	2015	2014
Clean Air Division			
North America	7%	9%	9%
Europe, South America & India	5%	3%	3%
Asia Pacific	13%	11%	10%
Total Clean Air Division	8%	7%	7%
Ride Performance Division			
North America	13%	12%	11%
Europe, South America & India	2%	(1)%	4%
Asia Pacific	19%	17%	15%
Total Ride Performance Division	9%	8%	8%
Total Tenneco Inc.	6%	6%	6%

In the Clean Air division, EBIT as a percentage of revenues for 2016 was up one percentage point compared to 2015. In North America, EBIT as a percentage of revenues for 2016 was down two percentage points compared to 2015. The benefit from higher OE light vehicle sales, new platforms and favorable currency was more than offset by lower aftermarket revenue, lower commercial truck and off-highway vehicle revenue, higher manufacturing costs and higher SG&A expense. Europe, South America and India's EBIT as a percentage of revenues for 2016 was up two percentage points compared to 2015. The benefit from higher light vehicle volumes, higher commercial truck, off-highway and other vehicle revenue, favorable mix and new platforms in Europe as well as lower restructuring and related expenses and year-over-year restructuring savings was partially offset by negative currency. EBIT as a percentage of revenues for Asia Pacific in 2016 was up two percentage points compared to 2015. EBIT benefited from increased OE light vehicle sales and new platforms in China, higher commercial truck, off-highway and other vehicle revenue in China and Japan as well as strong operational cost management, partially offset by higher SG&A expense, negative currency and the timing of a customer recovery in China.

In the Ride Performance division, EBIT as a percentage of revenues was up one percentage point compared to 2015. In 2016, EBIT as a percentage of revenues for North America was up one percentage point compared to 2015. The benefit of improved operational cost management was partially offset by lower volumes in light vehicle, commercial truck and aftermarket revenues net of favorable mix, higher restructuring and related expenses and negative currency. EBIT as a percentage of revenues in Europe, South America and India was up three percentage points compared to 2015. The benefit from higher light vehicle sales in the region, higher aftermarket sales in Europe and South America, lower restructuring and related expenses and savings from prior restructuring activities was partially offset by unfavorable mix in Europe, lower commercial truck, off-highway and other vehicle revenue in Europe reflecting the sale of the Marzocchi specialty business and negative currency. In Asia Pacific, EBIT as a percentage of revenues for 2016 was up two percentage points compared to 2015, mainly driven by higher light vehicle volumes in China and

lower restructuring and related expenses which were partially offset by higher SG&A and engineering expenses and negative currency.

In the Clean Air division, EBIT as a percentage of revenues in 2015 was even compared to 2014. In North America, EBIT as a percentage of revenues in 2015 was even compared to 2014. The benefit from higher light vehicle and aftermarket sales and operational cost management was offset by lower volumes in commercial truck and off-highway vehicle, unfavorable mix and negative currency. Europe, South America and India's EBIT as a percentage of revenues in 2015 was even compared to 2014. The benefit from higher light vehicle volumes, higher commercial truck, off-highway and other vehicle volumes and new platforms in Europe, lower restructuring and related expenses, year-over-year restructuring savings and a charge related to the bankruptcy of an European aftermarket customer in prior year was offset by lower volumes in South America, lower

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aftermarket volumes in Europe, unfavorable mix, higher SG&A and engineering expenses and negative currency. EBIT as a percentage of revenues for Asia Pacific in 2015 was up one percentage point compared to 2014. The benefit from higher light vehicle volumes in China, new platforms in China and Japan, strong operational cost management, lower restructuring and related expenses, year-over-year savings from prior restructuring activities and the timing of a customer recovery in China was partially offset by lower commercial truck revenue in China.

In the Ride Performance division, EBIT as a percentage of revenues was even compared to 2014. In 2015, EBIT as a percentage of revenues for North America was up one percentage point compared to 2014. The benefit from increased aftermarket volumes, lower restructuring and related expenses and improved operational cost management was partially offset by lower light vehicle volumes, lower commercial truck, off-highway and other vehicle volumes and negative currency. EBIT as a percentage of revenues in Europe, South America and India was down five percentage points compared to 2014. The benefit from higher light vehicle and aftermarket volumes in the region, higher commercial truck, off-highway and other vehicle volumes and new platforms in Europe and savings from prior restructuring activities was more than offset by higher restructuring and related expenses, higher SG&A and engineering expenses, unfavorable mix and negative currency. In Asia Pacific, EBIT as a percentage of revenues in 2015 was up two percentage points from 2014. The benefit from higher light vehicle volumes in China and operational cost management was partially offset by lower volumes in Australia and unfavorable currency.

Interest Expense, Net of Interest Capitalized

We reported interest expense in 2016 of $92 million (substantially all in our U.S. operations) net of interest capitalized of $6 million, and $67 million (substantially all in our U.S. operations) net of interest capitalized of $6 million in 2015. Included in 2016 was $24 million of expense related to the completion of our refinancing activities. Excluding the refinancing expenses, interest expense increased by $1 million in 2016 compared to 2015.

We reported interest expense in 2015 of $67 million (substantially all in our U.S. operations) net of interest capitalized of $6 million, and $91 million (substantially all in our U.S. operations) net of interest capitalized of $5 million in 2014. Included in 2014 was $13 million of expense related to our refinancing activities. The decrease was due to lower interest rates from the refinancing completed in December 2014 where we extended maturities, increased the size of our senior secured credit facility and reduced the rates on the credit facility and refinanced the senior unsecured notes with new maturity dates bearing lower interest rates.

On December 31, 2016, we had $740 million in long-term debt obligations that have fixed interest rates. Of that amount, $500 million is fixed through July 2026, $225 million is fixed through December 2024 and the remainder is fixed from 2016 through 2025. We also have $573 million in long-term debt obligations that are subject to variable interest rates. 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

We reported income tax expense of less than $1 million in 2016. The tax expense recorded in 2016 included a net tax benefit of $110 million primarily relating to recognizing a U.S. tax benefit for foreign taxes. In 2016, we completed our detailed analysis of our ability to recognize and utilize foreign tax credits within the carryforward period. As a result, we amended our 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 us in the U.S. Income tax expense also decreased in 2016 as a result of the mix of earnings in our various tax jurisdictions. We reported income tax expense of $146 million in 2015. The tax expense recorded in 2015 included a net tax benefit of $15 million primarily relating to prior year U.S. research and development tax credits, changes to uncertain tax positions, and prior year income tax adjustments. We reported an income tax expense of $131 million for 2014. The tax expense recorded in 2014 includes a net tax benefit of $11 million for prior year tax adjustments primarily relating to changes to uncertain tax positions and prior year income tax estimates.

Our uncertain tax position at December 31, 2016 and 2015 included exposures relating to the disallowance of deductions, global transfer pricing and various other issues. We believe it is reasonably possible that a decrease of up

to $17 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.

Our federal net operating loss ("NOL") has been fully utilized prior to 2014 as a result of amending our U.S. federal tax returns for years 2006 to 2012. The state NOLs expire in various tax years through 2031.

Restructuring and Other Charges

Over the past several years, we have adopted plans to restructure portions of our operations. These plans were approved by our Board of Directors and were designed to reduce operational and administrative overhead costs throughout the business.

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In 2014, we incurred $49 million in restructuring and related costs including non-cash charges of $5 million, primarily related to European cost reduction efforts, headcount reductions in Australia and South America, the sale of a closed facility in Cozad, Nebraska and costs related to organizational changes, of which $28 million was recorded in cost of sales, $9 million in SG&A, $7 million in engineering expense, $4 million in other expenses and $1 million in depreciation and amortization. In 2015, we incurred $63 million in restructuring and related costs including asset write-downs of $10 million, primarily related to European cost reduction efforts, exiting the Marzocchi suspension business, headcount reductions in Australia and South America, and the closure of a JIT plant in Australia, of which $46 million was recorded in cost of sales, $11 million in SG&A, $1 million in engineering expense, $1 million in other expense and $4 million in depreciation and amortization expense. In 2016, we incurred $36 million in restructuring and related costs including asset write-downs of $6 million, primarily related to manufacturing footprint improvements in North America Ride Performance, headcount reduction and cost improvement initiatives in Europe and China Clean Air, South America and Australia, of which $17 million was recorded in cost of sales, $12 million in SG&A, $1 million in engineering, $2 million in other expense and $4 million in depreciation and amortization expense.

Amounts related to activities that are part of our restructuring plans are as follows:

	December 31, 2015 Restructuring Reserve (Millions)	2016 Expenses	2016 Cash Payments	Impact of Exchange Rates	December 31, 2016 Restructuring Reserve
Employee Severance, Termination Benefits and Other Related Costs	$30	30	(45)	—	$ 15

On January 31, 2013, we announced our intent to reduce structural costs in Europe by approximately $60 million annually. During the first quarter of 2016, we reached an annualized run rate on this cost reduction initiative of $49 million.

With the disposition of the Gijon plant, which was completed at the end of the first quarter, the annualized rate essentially reached our target of $55 million at the current exchange rates at that time. In 2014, we incurred $49 million in restructuring and related costs, of which $31 million was related to this initiative including $3 million for non-cash asset write downs. In 2015, we incurred $63 million in restructuring and related costs, of which $22 million was related to this initiative. In 2016, we incurred $36 million in restructuring and related costs, of which $20 million was related to this initiative and certain ongoing matters. For example, we closed the Gijon plant in 2013, but subsequently re-opened it in July 2014 with about half of its prior
workforce after the employees' works council successfully filed suit challenging the closure decision. Pursuant to an agreement
we entered into with employee representatives, we engaged in a sales process for the facility. In March of 2016, we signed an
agreement to transfer ownership of the aftermarket shock absorber manufacturing facility in Gijon, Spain to German private
equity fund Quantum Capital Partners A.G. (QCP). The transfer to QCP was effective March 31, 2016 and under a three year manufacturing agreement, QCP will also continue as a supplier to Tenneco.

On July 22, 2015, we announced our intention to discontinue our Marzocchi motorcycle fork suspension product line and our mountain bike suspension product line, and liquidate our Marzocchi operations. These actions were subject to a consultation process with the employee representatives and in total eliminated approximately 138 jobs. We employed 127 people at the Marzocchi plant in Bologna, Italy and an additional 11 people in our operations in North America and Taiwan. In November 2015, we closed on the sale of certain assets related to our Marzocchi mountain bike suspension product line to the affiliates of Fox Factory Holding Corp.; and in December 2015, we closed on the sale of the Marzocchi motorcycle fork product line to an Italian company, VRM S.p.A. These actions were a part of

our ongoing efforts to optimize our Ride Performance product line globally while continuously improving our operations and increasing profitability. We recorded charges of $29 million in 2015 related to severance and other employee related costs, asset write-downs and other expenses related to the closure.
Under the terms of our amended and restated senior credit agreement that took effect on December 8, 2014, we are allowed to exclude up to $150 million in the aggregate of all costs, expenses, fees, fines, penalties, judgments, legal settlements and other amounts associated with any restructuring, litigation, claim, proceeding or investigation related to or undertaken by us or any of our subsidiaries, together with any related provision for taxes, incurred after December 8, 2014 in the calculation of the financial covenant ratios required under our senior credit facility. As of December 31, 2016, we had excluded $83 million of allowable charges relating to restructuring initiatives against the $150 million available under the terms of the senior credit facility.
Earnings Per Share
We reported net income attributable to Tenneco Inc. of $356 million or $6.31 per diluted common share for 2016. Included in the results for 2016 were positive impacts from a net tax benefit associated with the recognition of a U.S. tax benefit for foreign taxes partially offset by negative impacts from expenses related to our restructuring activities, costs related to our refinancing activities and settlement charges related to pension buyout. The total impact of these items increased

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earnings per diluted share by $0.29. We reported net income attributable to Tenneco Inc. of $241 million or $4.01 per diluted common share for 2015. Included in the results for 2015 were negative impacts from expenses related to our restructuring activities and charges related to pension derisking, which were partially offset by net tax benefits. The total impact of these items decreased earnings per diluted share by $0.76. We reported net income attributable to Tenneco Inc. of $225 million or $3.64 per diluted common share for 2014. Included in the results for 2014 were negative impacts from expenses related to our restructuring activities, a bad debt charge, costs related to our refinancing activities and charges related to pension derisking and postretirement medical true-up, which were partially offset by net tax benefits. The net impact of these items decreased earnings per diluted share by $0.99.

Dividends on Common Stock

On February 1, 2017, Tenneco announced the reinstatement of a quarterly dividend program. 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 initial dividend is payable on March 23, 2017 to shareholders of record as of March 7, 2017. While we currently expect that comparable quarterly cash dividends will continue to be paid in the 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 our debt agreements. We did not pay any dividends in fiscal years 2016, 2015 or 2014.

Cash Flows for 2016 and 2015

	Year Ended December 31,	
	2016	2015
	(Millions)	
Cash provided (used) by:		
Operating activities	$489	$517
Investing activities	(340)	(303)
Financing activities	(91)	(172)

Operating Activities

For 2016, operating activities provided $489 million in cash compared to $517 million cash provided during 2015. The lower cash from operations was primarily due to the timing of revenue growth at the end of the year and the resulting impact on accounts receivable. For 2016, cash used for working capital was $126 million versus $9 million of cash used for working capital in 2015. Receivables were a use of cash of $215 million for 2016 compared to a use of cash of $90 million in 2015. Inventory represented a cash outflow of $57 million for 2016 and a cash outflow of $36 million during 2015. Accounts payable provided $114 million of cash for the year ended December 31, 2016, compared to $90 million of cash provided for the year ended December 31, 2015. Cash taxes were $113 million for 2016 compared to $105 million in 2015, net of a US tax refund of $25 million for overpayment in 2014.

Investing Activities

Cash used for investing activities was $37 million higher in 2016 compared to 2015. Cash payments for plant, property and equipment were $325 million in 2016 versus payments of $286 million in 2015, an increase of $39 million. Cash payments for software-related intangible assets were $20 million in 2016 compared to $23 million in 2015. Change in restricted cash was a use of cash of $1 million in 2016 compared to a source of cash of $2 million in 2015.

Financing Activities

Cash flow from financing activities was an outflow of $91 million for the year ended December 31, 2016 compared to an outflow of $172 million for the year ended December 31, 2015. 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. During 2015, we repurchased 4,228,633 shares of our outstanding common stock for $213 million at an average price of $50.32 per share as part of the previously announced stock buyback plan of up to $350 million. Since announcing our share repurchase program

in 2015, we have repurchased a total of approximately 8.4 million shares for $438 million, representing 14 percent of the shares outstanding at that time. On February 1, 2017, our Board of Directors declared a cash dividend of $0.25, payable on March 23, 2017 to shareholders of record as of March 7, 2017. In addition, 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. In 2016, refinancing activities included the issuance of $500 million of new 5 percent senior secured notes due 2026 to refinance our existing 6 $^{7}/8$ percent senior notes due 2020.

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Borrowings under our revolving credit facility were $300 million at December 31, 2016 and $105 million at December 31, 2015. There was $30 million borrowed under the U.S. accounts receivable securitization programs at each of the period ending December 31, 2016 and December 31, 2015.

Cash Flows for 2015 and 2014

	Year Ended December 31,	
	2015	2014
	(Millions)	
Cash provided (used) by:		
Operating activities	$517	$341
Investing activities	(303)	(339)
Financing activities	(172)	20

Operating Activities

For 2015, operating activities provided $517 million in cash compared to $341 million cash provided during 2014. The higher cash from operations was primarily driven by higher earnings, working capital improvements, lower interest payments and lower tax payments. For 2015, cash used for working capital was $9 million versus $137 million of cash used for working capital in 2014. Receivables were a use of cash of $90 million for 2015 compared to a use of cash of $83 million in 2014. Inventory represented a cash outflow of $36 million for 2015 and a cash outflow of $74 million during 2014. Accounts payable provided $90 million of cash for the year ended December 31, 2015, compared to $94 million of cash provided for the year ended December 31, 2014. Cash taxes were $105 million for 2015, net of a US tax refund of $25 million for overpayment in 2014, compared to $136 million in 2014.

Investing Activities

Cash used for investing activities was $36 million lower in 2015 compared to 2014. Cash payments for plant, property and equipment were $286 million in 2015 versus payments of $328 million in 2014, a decrease of $42 million. Cash payments for software-related intangible assets were $23 million in 2015 compared to $13 million in 2014. Change in restricted cash was a source of cash of $2 million in each 2015 and 2014.

Financing Activities

Cash flow from financing activities was an outflow of $172 million for the year ended December 31, 2015 compared to an inflow of $20 million for the year ended December 31, 2014. During 2015, we repurchased 4,228,633 shares of our outstanding common stock for $213 million at an average price of $50.32 per share as part of the previously announced stock buyback plan of up to $350 million. Additionally, on October 23, 2015, we announced that our Board of Directors has expanded our repurchase program, authorizing the repurchase of an additional $200 million of common stock. During 2014, we completed a previously announced stock buyback plan, repurchasing 400,000 shares of our outstanding common stock for $22 million, at an average price of $56.06 per share.

In 2014, refinancing activities included raising a new senior secured credit facility consisting of a 5-year revolving credit facility and a 5-year Tranche A Term Facility. Proceeds from the new credit facility were used to refinance our existing senior secured credit facility, which included an $850 million revolving credit facility due 2017 and a $213 million Tranche A Term Facility due 2017. In conjunction with this transaction, we also raised $225 million of new 10-year senior unsecured notes priced at 5 3/8 percent to refinance the existing 7 3/4 percent notes due 2018.

Borrowings under our revolving credit facility were $105 million at December 31, 2015 and no borrowings at December 31, 2014. There was $30 million borrowed under the North American accounts receivable securitization programs at December 31, 2015 and no borrowings at December 31, 2014. In 2014, we received $4 million for selling a 45 percent equity interest in Tenneco Fusheng (Chengdu) Automobile Parts Co., Ltd. to a third party partner.

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Outlook
All our forward looking revenue estimates reflect constant currency.
First Quarter 2017
We expect constant currency total revenue growth of seven percent in the first quarter 2017, outpacing forecasted light vehicle industry production growth of three percent. We expect to better the industry with four percent organic growth, driven by incremental content to meet Tier 3 and Euro 6 emissions regulations, the ramp up of recently launched programs and our strong position on light vehicle platforms globally. We also expect a slight increase in commercial truck and off-highway revenues and a solid contribution from the global aftermarket. We anticipate a currency headwind in the first quarter of approximately two percent based on current exchange rates.
Full Year 2017
We expect constant currency total revenue to growth to outpace light vehicle industry production by four percentage points, resulting in five percent growth in 2017 driven by:
•An outstanding position on light vehicle platforms globally;
•Regulatory-driven Clean Air content;
•Increasing demand for advanced suspension systems, and;
•Our global aftermarket leadership.
Our revenue growth estimate assumes light vehicle industry production growth of one percent, global commercial truck production growth of about two percent, and growth in off-highway engine production in regulated regions (North America and Europe) of about two percent.
In 2018 and 2019, we expect continued constant currency revenue growth, outpacing industry production by three to five percentage points each year.
On February 1, 2017, our Board of Directors initiated a quarterly cash dividend of $0.25 with the initial dividend payable on March 23, 2017 to shareholders of record as of March 7, 2017. While the Company currently expects that comparable quarterly cash dividends will continue to be paid in the future, our dividend program and the payment of future cash dividends under the program are subject to continued capital availability and our Board of Directors' continuing determination that the dividend program and the declaration of dividends thereunder are in the best interests of our stockholders and are in compliance with all laws and agreements of Tenneco applicable to the declaration and payment of cash dividends. In addition, 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.
Tenneco's revenue estimates presented in this “Outlook” are based on current and projected customer production schedules as well as aggregate industry production, which includes IHS Automotive January 2017 global light vehicle production forecasts, Power Systems Research (PSR) January 2017 forecast for global commercial truck and buses, PSR off-highway engine production in North America and Europe and Tenneco estimates. Tenneco’s revenue estimates are also based on original equipment manufacturers’ programs that have been formally awarded to us, programs where we are highly confident that we will be awarded business based on informal customer indications consistent with past practices, and our status as supplier for the existing programs and our relationships and experience with our customers. The revenue estimates are also based on anticipated vehicle production levels and pricing, including precious metals pricing and the impact of material cost changes. Unless otherwise indicated, our revenue estimate methodology does not attempt to forecast currency fluctuation, and accordingly reflects constant currency. See “Cautionary Statement for Purposes of the ‘Safe Harbor’ Provisions of the Private Securities Litigation Reform Act of 1995” and Item 1A, “Risk Factors.”
We expect our capital expenditures for 2017 to be between $360 million and $390 million, our 2017 interest expense to be about $70 million, our 2017 cash taxes to be between $125 million and $140 million and our 2017 tax rate to be between 29 percent to 31 percent.

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Liquidity and Capital Resources

Capitalization

	Year Ended December 31,		% Change
	2016	2015	
	(Millions)		
Short-term debt and maturities classified as current	$90	$86	5 %
Long-term debt	1,294	1,124	15
Total debt	1,384	1,210	14
Total redeemable noncontrolling interests	40	41	(2)
Total noncontrolling interests	47	39	21
Tenneco Inc. shareholders' equity	573	425	35
Total equity	620	464	34
Total capitalization	$2,044	$1,715	19 %

General. Short-term debt, which includes maturities classified as current, borrowings by parent company and foreign subsidiaries, and borrowings under our North American accounts receivable securitization program, were $90 million and $86 million as of December 31, 2016 and December 31, 2015, respectively. Borrowings under our revolving credit facilities, which are classified as long-term debt, were $300 million and $105 million at December 31, 2016 and December 31, 2015, respectively.

The 2016 year-to-date increase in Tenneco Inc. shareholders' equity primarily resulted from net income attributable to Tenneco Inc. of $356 million, a $17 million increase in premium on common stock and other capital surplus relating to common stock issued pursuant to benefit plans and a $41 million increase related to pension and postretirement benefits, partially offset by a $41 million decrease caused by the impact of changes in foreign exchange rates on the translation of financial statements of our foreign subsidiaries into U.S. dollars and a $225 million increase in treasury stock as a result of purchases of common stock under our share purchase program.

Overview. Our financing arrangements are primarily provided by a committed senior secured financing arrangement with a syndicate of banks and other financial institutions. The arrangement is secured by substantially all our domestic assets and pledges of up to 66 percent of the stock of certain first-tier foreign subsidiaries, as well as guarantees by our material domestic subsidiaries.

On December 8, 2014, we completed an amendment and restatement of our senior credit facility by increasing the amounts and extending the maturity dates of our revolving credit facility and our Tranche A Term Facility. The amended and restated facility replaces our former $850 million revolving credit facility and $213 million Tranche A Term Facility. The proceeds from this refinancing transaction were used to repay the $213 million Tranche A Term Facility, to fund the fees and expenses associated with the purchase and redemption of our $225 million 7 $^{3}/_{4}$ percent senior notes due in 2018 and for general corporate purposes. As of December 31, 2016, the senior credit facility provides us with a total revolving credit facility size of $1,200 million and a $270 million Tranche A Term Facility, both of which will mature on December 8, 2019. Funds may be borrowed, repaid and re-borrowed under the revolving credit facility without premium or penalty (subject to any customary LIBOR breakage fees). The revolving credit facility is reflected as debt on our balance sheet only if we borrow money under this facility or if we use the facility to make payments for letters of credit. Outstanding letters of credit reduce our availability to borrow revolving loans under the facility. We are required to make quarterly principal payments under the Tranche A Term Facility of $5.625 million beginning March 31, 2017 through December 31, 2017, $7.5 million beginning March 31, 2018 through September 30, 2019 and a final payment of $195 million is due on December 8, 2019. We have excluded the required payments, within the next twelve months, under the Tranche A Term Facility totaling $23 million from current liabilities as of December 31, 2016, because we have the intent and ability to refinance the obligations on a long-term basis by using our revolving credit facility.

On November 20, 2014, we announced a cash tender offer to purchase our outstanding $225 million 7 $^{3}/_{4}$ percent senior notes due in 2018 and a solicitation of consents to certain proposed amendments to the indenture governing these notes. We received tenders and consents representing $181 million aggregate principal amount of the notes and, on December 5, 2014, we purchased the tendered notes at a price of 104.35 percent of the principal amount (which includes a consent payment of three percent of the principal amount), plus accrued and unpaid interest, and amended the related indenture. On December 22, 2014, we redeemed the remaining outstanding $44 million aggregate principal amount of senior notes that were not purchased pursuant to the tender offer at a price of 103.88 percent of the principal amount, plus accrued and unpaid interest. The additional liquidity provided by the new $1,200 million revolving credit facility and the new $300 million Tranche A Term Facility was used in part to fund the fees and expenses of the tender offer and redemption.

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We recorded $13 million of pre-tax charges in December 2014 related to the refinancing of our senior credit facility, the repurchase and redemption of our 7 $^{3}/_{4}$ percent senior notes due in 2018 and the write-off of deferred debt issuance costs relating to those notes.

On June 6, 2016, we announced a cash tender offer to purchase our outstanding $500 million 6^{7}/8 percent senior notes due in 2020. We received tenders representing $325 million aggregate principal amount of the notes and, on June 13, 2016, we purchased the tendered notes at a price of 103.81 percent of the principal amount, plus accrued and unpaid interest. On July 13, 2016, we redeemed the remaining outstanding $175 million aggregate principal amount of the notes that were not purchased pursuant to the tender offer at a price of 103.438 percent of the principal amount, plus accrued and unpaid interest. We used the proceeds of the issuance of our 5 percent senior notes due 2026 to fund the purchase and redemption. The senior credit facility was used to fund the fees and expenses of the tender offer and redemption.

We recorded $16 million and $8 million of pre-tax interest charges in June and July of 2016, respectively, related to the repurchase and redemption of our 6^{7}/8 percent senior notes due in 2020 and the write-off of deferred debt issuance costs relating to those notes.

At December 31, 2016, of the $1,200 million available under the revolving credit facility, we had unused borrowing capacity of $900 million with $300 million in outstanding borrowings and zero in outstanding letters of credit. As of December 31, 2016, our outstanding debt also included (i) $270 million of a term loan which consisted of a $269 million net carrying amount including a $1 million debt issuance cost related to our Tranche A Term Facility which is subject to quarterly principal payments as described above through December 8, 2019, (ii) $225 million of notes which consisted of a $221 million net carrying amount including a $4 million debt issuance cost of 5$^{3}/_{8}$ percent senior notes due December 15, 2024, (iii) $500 million of notes which consisted of a $492 million net carrying amount including a $8 million debt issuance cost of 5 percent senior notes due July 15, 2026, and (iv) $102 million of other debt.

Senior Credit Facility — Interest Rates and Fees. Beginning December 8, 2014, our Tranche A Term Facility and revolving credit facility bear interest at an annual rate equal to, at our option, either (i) London Interbank Offered Rate ("LIBOR") plus a margin of 175 basis points, or (ii) a rate consisting of the greater of (a) the JPMorgan Chase prime rate plus a margin of 75 basis points, (b) the Federal Funds rate plus 50 basis points plus a margin of 75 basis points, and (c) the one month LIBOR plus 100 basis points plus a margin of 75 basis points. The margin we pay on these borrowings will be increased by a total of 25 basis points above the original margin following each fiscal quarter for which our consolidated net leverage ratio is equal to or greater than 2.25 and less than 3.25, and will be increased by a total of 50 basis points above the original margin following each fiscal quarter for which our consolidated net leverage ratio is equal to or greater than 3.25. In addition, the margin we pay on these borrowings will be reduced by a total of 25 basis points below the original margin if our consolidated net leverage ratio is less than 1.25. We also pay a commitment fee equal to 30 basis points that will be reduced to 25 basis points or increased to up to 40 basis points depending on consolidated net leverage ratio changes as set forth in the senior credit facility.

Senior Credit Facility — Other Terms and Conditions. Our senior credit facility requires that we maintain financial ratios equal to or better than the following consolidated net leverage ratio (consolidated indebtedness net of cash divided by consolidated EBITDA, as defined in the senior credit facility agreement), and consolidated interest coverage ratio (consolidated EBITDA divided by consolidated interest expense, as defined in the senior credit facility agreement) at the end of each period indicated. Failure to maintain these ratios will result in a default under our senior credit facility. The financial ratios required under the amended and restated senior credit facility and the actual ratios we calculated for the four quarters of 2016, are as follows (the ratios in the table reflect the revisions made to the financial statements in this Form 10-K/A; these revisions would result in immaterial changes to the actual ratios reported to our lenders in prior periods, with such changes being less than .03 and .23 to each leverage ratio and interest coverage ratio, respectively):

	Quarter Ended			
	December 31,	September 30,	June 30,	March 31,

	2016		2016		2016		2016	
	Req.	Act.	Req.	Act.	Req.	Act.	Req.	Act.
Leverage Ratio (maximum)	3.50	1.47	3.50	1.53	3.50	1.47	3.50	1.55
Interest Coverage Ratio (minimum)	2.75	14.70	2.75	14.14	2.75	13.74	2.75	13.75

The senior credit facility includes a maximum leverage ratio covenant of 3.50 and a minimum interest coverage ratio of 2.75, in each case through December 8, 2019.

The covenants in our senior credit facility agreement generally prohibit us from repaying or refinancing our senior notes. So long as no default existed, we would, however, under our senior credit facility agreement, be permitted to repay or refinance our senior notes (i) with the net cash proceeds of permitted refinancing indebtedness (as defined in the senior credit facility agreement) or with the net cash proceeds of our common stock, in each case issued within 180 days prior to such repayment;

(ii) with the net cash proceeds of the incremental facilities (as defined in the senior credit facility agreement) and certain indebtedness incurred by our foreign subsidiaries; (iii) with the proceeds of the revolving loans (as defined in the senior credit facility agreement); (iv) with the cash generated by our operations; (v) in an amount equal to the net cash proceeds of qualified capital stock (as defined in the senior credit facility agreement) issued by us after December 8, 2014; and (vi) in exchange for permitted refinancing indebtedness or in exchange for shares of our common stock; provided that such purchases are capped as follows (with respect to clauses (iii), (iv) and (v) based on a pro forma consolidated leverage ratio after giving effect to such purchase, cancellation or redemption):

Pro forma Consolidated Leverage Ratio	Aggregate Senior Note Maximum Amount (Millions)
Greater than or equal to 3.0x	$ 20
Greater than or equal to 2.5x	$ 100
Greater than or equal to 2.0x	$ 200
Less than 2.0x	no limit

Although the senior 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 senior 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 senior 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 senior 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 senior credit facility agreement and failure to meet these requirements enables the lenders to require repayment of any outstanding loans.

As of December 31, 2016, we were in compliance with all the financial covenants and operational restrictions of the senior credit facility. Our senior credit facility does not contain any terms that could accelerate payment of the facility or affect pricing under the facility as a result of a credit rating agency downgrade.

Senior Notes. As of December 31, 2016, our outstanding senior notes also included $225 million of $5^3/_8$ percent senior notes due December 15, 2024 which consisted of $221 million net carrying amount including a $4 million debt issuance cost and $500 million of 5 percent senior notes due July 15, 2026 which consisted of $492 million net carrying amount including a $8 million debt issuance cost. Under the indentures governing the notes, we are permitted to redeem some or all of the remaining senior notes at specified prices that decline to par over a specified period, (a) on or after July 15, 2021, in the case of the senior notes due 2026, and (b) on or after December 15, 2019, in the case of the senior notes due 2024. In addition, the notes may also be redeemed in whole or in part at a redemption price generally equal to 100 percent of the principal amount thereof plus a premium based on the present values of the remaining payments due to the note holders. Further, the indentures governing the notes also permit us to redeem up to 35 percent of the senior notes with the proceeds of certain equity offerings, (a) on or before July 15, 2019 at a redemption price equal to 105 percent, in the case of the senior notes due 2026 and (b) on or before December 15, 2017 at a redemption price equal to 105.375 percent, in the case of the senior notes due 2024. If we sell certain of our assets or experience specified kinds of changes in control, we must offer to repurchase the notes due 2026 and 2024 at 101 percent of the principal amount thereof plus accrued and unpaid interest.

Our senior notes due December 15, 2024 and July 15, 2026, respectively, contain covenants that will, among other things, limit our ability to create liens and enter into sale and leaseback transactions. Our senior notes due 2024 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 our operations, including limitations on: (i) incurring additional indebtedness; (ii) 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 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, 2016, we were in compliance with the covenants and restrictions of these indentures.

Accounts Receivable Securitization. We securitize some of our accounts receivable on a limited recourse basis in the U.S. and Europe. As servicer under these accounts receivable securitization programs, we are responsible for performing all

accounts receivable administration functions for these securitized financial assets including collections and processing of customer invoice adjustments. In the U.S., we have an accounts receivable securitization program with three commercial banks comprised of a first priority facility and a second priority facility. We securitize original equipment and aftermarket receivables on a daily basis under the bank program. In March 2015, the U.S. program was amended and extended to April 30, 2017. The first priority facility continues to provide financing of up to $130 million and the second priority facility, which is subordinated to the first priority facility, provides up to an additional $50 million of financing. Both facilities monetize accounts receivable generated in the U.S. that meet certain eligibility requirements. The second priority facility also monetizes certain accounts receivable generated in the U.S. that would otherwise be ineligible under the first priority securitization facility. The amount of outstanding third-party investments in our securitized accounts receivable under the U.S. program was $30 million at both December 31, 2016 and 2015.

Each facility contains customary covenants for financings of this type, including restrictions related to liens, payments, mergers or consolidations and amendments to the agreements underlying the receivables pool. Further, each facility may be terminated upon the occurrence of customary events (with customary grace periods, if applicable), including breaches of covenants, failure to maintain certain financial ratios, inaccuracies of representations and warranties, bankruptcy and insolvency events, certain changes in the rate of default or delinquency of the receivables, a change of control and the entry or other enforcement of material judgments. In addition, each facility contains cross-default provisions, where the facility could be terminated in the event of non-payment of other material indebtedness when due and any other event which permits the acceleration of the maturity of material indebtedness.

We also securitize receivables in our European operations with regional banks in Europe under various separate facilities. The commitments for these arrangements are generally for one year, but some may be cancelled 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 securitized accounts receivable in Europe was $160 million and $174 million at December 31, 2016 and December 31, 2015, respectively.

If we were not able to securitize receivables under either the U.S. or European securitization programs, our borrowings under our revolving credit agreement might increase. These accounts receivable securitization 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.

In our U.S. accounts receivable securitization programs, we transfer a partial interest in a pool of receivables and the interest that we retain is subordinate to the transferred interest. Accordingly, we account for our U.S. securitization program as a secured borrowing. In our European programs, we transfer accounts receivables in their entirety to the acquiring entities and satisfy all of the conditions established under ASC Topic 860, “Transfers and Servicing,” to report the transfer of financial assets in their entirety as a sale. The fair value of assets received as proceeds in exchange for the transfer of accounts receivable under our European securitization programs approximates the fair value of such receivables. We recognized $3 million in interest expense for the year ended 2016 and $2 million in interest expense for each of the years ended 2015 and 2014, relating to our U.S. securitization program. In addition, we recognized a loss of $3 million for the each of the years ended 2016 and 2015 and a $4 million loss for 2014, on the sale of trade accounts receivable in our European accounts receivable securitization programs, representing the discount from book values at which these receivables were sold to our banks. The discount rate varies based on funding costs incurred by our banks, which averaged approximately two percent for all years ended 2016, 2015 and 2014.

Financial Instruments. One of our European subsidiaries receives payment from one of its customers whereby the accounts receivable are satisfied through the early delivery of financial instruments. We may collect these financial instruments before their maturity date by either selling them at a discount or using them to satisfy accounts receivable that have previously been sold to a European bank. Any of these financial instruments which are not sold are classified as other current assets. Such financial instruments held by our European subsidiary totaled less than $1 million at both December 31, 2016 and December 31, 2015.

In certain instances, several of our Chinese subsidiaries receive payment from customers through the receipt of financial instruments on the date the customer payments are due. Several of our Chinese subsidiaries also satisfy vendor payments through the delivery of financial instruments on the date the payments are due. Financial instruments issued to satisfy vendor payables and not redeemed totaled $12 million and $15 million at December 31, 2016 and December 31, 2015, respectively, and were classified as notes payable. Financial instruments received from OE customers and not redeemed totaled $5 million and $8 million at December 31, 2016 and December 31, 2015, respectively. We classify financial instruments received from our customers as other current assets if issued by a financial institution of our customers or as customer notes and accounts if issued by our customer. We classified $5 million and $8 million in other current assets at December 31, 2016 and December 31, 2015, respectively.
The financial instruments received by one of our European subsidiaries and some of our Chinese subsidiaries are drafts drawn that are payable at a future date and, in some cases, are negotiable and/or are guaranteed by banks of the customers. The

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use of these instruments for payment follows local commercial practice. Because certain of such financial instruments are guaranteed by our customers' banks, we believe they represent a lower financial risk than the outstanding accounts receivable that they satisfy which are not guaranteed by a bank.

Supply Chain Financing. Certain of our suppliers participate in supply chain financing programs under which they securitize their accounts receivables from Tenneco. Financial institutions participate in the supply chain financing program on an uncommitted basis and can cease purchasing receivables or drafts from Tenneco's suppliers at any time. If the financial institutions did not continue to purchase receivables or drafts from Tenneco's suppliers under these programs, the participating vendors may have a need to renegotiate their payment terms with Tenneco which in turn would 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 loan 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.

Contractual Obligations.

Our remaining required debt principal amortization and payment obligations under lease and certain other financial commitments as of December 31, 2016 are shown in the following table:

	Payments due in:						
	2017	2018	2019	2020	2021	Beyond 2021	Total
	(Millions)						
Obligations:							
Revolver borrowings	$—	$—	$300	$ —	$ —	$ —	$300
Senior term loans	22	30	218	—	—	—	270
Senior notes	—	—	—	—	—	725	725
Other long term debt (including maturities classified as current)	2	2	3	—	—	—	7
Other subsidiary debt and capital lease obligations	1	2	1	1	1	2	8
Short-term debt	87	—	—	—	—	—	87
Debt and capital lease obligations	112	34	522	1	1	727	1,397
Operating leases	39	25	18	15	12	17	126
Purchase obligations	188	34	—	—	—	—	222
Interest payments	39	57	58	37	37	161	389
Capital commitments	112	—	—	—	—	—	112
Total payments	$490	$150	$598	$ 53	$ 50	$ 905	$2,246

If we do not maintain compliance with the terms of our senior 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 expect 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 3/8 percent and 5 percent, respectively. Interest on our variable rate debt is calculated as LIBOR plus the applicable margin in effect at December 31, 2016 for the Eurodollar and

Term Loan A loan and prime plus the applicable margin in effect on December 31, 2016 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, 2016 to complete the projects authorized at December 31, 2016, in which we have made substantial commitments in connection with purchasing plant, property and equipment for our operations. For 2017, we expect our capital expenditures to be between $360 million and $390 million.

We have included an estimate of the expenditures necessary after December 31, 2016 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 on 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 $42 million to those plans in 2017. Pension and postretirement contributions beyond 2017 will be required but those amounts will vary based upon many factors, including the performance of our pension fund investments during 2017 and future discount rate changes. For additional information relating to the funding of our pension and other postretirement plans, refer to Note 10 of our 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 $18 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 us to make future payments in the event that the third party primary obligor does not make its required payments. We are 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 our senior credit facility and our senior notes on a joint and several basis. The senior credit facility is also secured by first-priority liens on substantially all our domestic assets and pledges of up to 66 percent of the stock of certain first-tier foreign subsidiaries. No assets or capital stock secure our senior notes. You should also read Note 13 of the consolidated financial statements of Tenneco Inc., where we present the Supplemental Guarantor Consolidating Financial Statements.

We have two performance guarantee agreements in the U.K. between Tenneco Management (Europe) Limited ("TMEL") and the two Walker Group Retirement Plans, the Walker Group Employee Benefit Plan and the Walker Group Executive Retirement Benefit Plan (the "Walker Plans"), whereby TMEL will guarantee the payment of all current and future pension contributions in event of a payment default by the sponsoring or participating employers of the Walker Plans. The Walker Plans are comprised of employees from Tenneco Walker (U.K.) Limited and our Futaba-Tenneco U.K. joint venture. Employer contributions are funded by both Tenneco Walker (U.K.) Limited, as the sponsoring employer and Futaba-Tenneco U.K., as a participating employer. The performance guarantee agreements are expected to remain in effect until all pension obligations for the Walker Plans' sponsoring and participating employers have been satisfied. The maximum amount payable for these pension performance guarantees that is not attributable to Tenneco is approximately $7 million as of December 31, 2016 which is determined by taking 105 percent of the liability of the Walker Plans calculated under section 179 of the U.K. Pension Act of 2004 offset by plan assets multiplied by the ownership percentage in Futaba-Tenneco U.K. that is attributable to Futaba Industrial Co. Ltd. We did not record an additional liability for this performance guarantee since Tenneco Walker (U.K.)

Limited, as the sponsoring employer of the Walker Plans, already recognizes 100 percent of the pension obligation calculated based on U.S. GAAP, for all of the Walker Plans' participating employers on its balance sheet, which was $19 million and $11 million at December 31, 2016 and December 31, 2015, respectively. At December 31, 2016, all pension contributions under the Walker Plans were current for all of the Walker Plans' sponsoring and participating employers.

In June 2011, we entered into an indemnity agreement between TMEL and Futaba Industrial Co. Ltd. which requires Futaba to indemnify TMEL for any cost, loss or liability which TMEL may incur under the performance guarantee agreements relating to the Futaba-Tenneco U.K. joint venture. The maximum amount reimbursable by Futaba to TMEL under this indemnity agreement is equal to the amount incurred by TMEL under the performance guarantee agreements multiplied by Futaba's shareholder ownership percentage of the Futaba-Tenneco U.K. joint venture. At December 31, 2016, the maximum amount reimbursable by Futaba to TMEL is approximately $7 million.

We have issued guarantees through letters of credit in connection with some obligations of our affiliates. As of December 31, 2016, we have $31 million in letters of credit to support some of our subsidiaries' insurance arrangements, foreign employee benefit programs, environmental remediation activities and cash management and capital requirements.

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Critical Accounting Policies and Estimates

We prepare our consolidated financial statements in accordance with accounting principles generally accepted in the United States of America. Preparing our consolidated financial statements in accordance with generally accepted accounting principles requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. The following paragraphs include a discussion of some critical areas where estimates are required.

Revenue Recognition

We recognize revenue for sales to our original equipment and aftermarket customers when title and risk of loss passes to the customers under the terms of our arrangements with those customers, which is usually at the time of shipment from our plants or distribution centers. Generally, in connection with the sale of exhaust systems to certain original equipment manufacturers, we purchase catalytic converters and diesel particulate filters or components thereof including precious metals ("substrates") on behalf of our customers which are used in the assembled system. These substrates are included in our inventory and "passed through" to the customer at our cost, plus a small margin, since we take title to the inventory and are responsible for both the delivery and quality of the finished product. Revenues recognized for substrate sales were $2,028 million, $1,888 million and $1,895 million in 2016, 2015 and 2014, respectively. For our aftermarket customers, we provide for promotional incentives and returns at the time of sale. Estimates are based upon the terms of the incentives and historical experience with returns. Certain taxes assessed by governmental authorities on revenue producing transactions, such as value added taxes, are excluded from revenue and recorded on a net basis. Shipping and handling costs billed to customers are included in revenues and the related costs are included in cost of sales in our Statements of Income.

Warranty Reserves

Where we have offered product warranty, we 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. We actively study trends of our warranty claims and take action to improve product quality and minimize warranty claims. 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 impact on our consolidated financial statements.

Engineering, Research and Development

We expense engineering, research, and development costs as they are incurred. Engineering, research, and development expenses were $154 million for 2016, $146 million for 2015 and $169 million for 2014, net of reimbursements from our customers. Of these amounts, $15 million in 2016, $17 million in 2015 and $26 million in 2014 relate to research and development, which includes the research, design, and development of a new unproven product or process. Additionally, $128 million, $111 million and $118 million of engineering, research, and development expense for 2016, 2015 and 2014, respectively, relates to engineering costs we incurred for application of existing products and processes to vehicle platforms. The remainder of the expenses in each year relate to improvements and enhancements to existing products and processes. Further, our customers reimburse us for engineering, research, and development costs on some platforms when we prepare prototypes and incur costs before platform awards. Our engineering, research, and development expense for 2016, 2015 and 2014 has been reduced by $137 million, $145 million and $159 million, respectively, for these reimbursements.

Pre-production Design and Development and Tooling Assets

We expense pre-production design and development costs as incurred unless we have a contractual guarantee for reimbursement from the original equipment customer. Unbilled pre-production design and development costs recorded in prepayments and other and long-term receivables totaled $22 million and $21 million on December 31,

2016 and 2015, respectively. In addition, plant, property and equipment included $62 million and $64 million at December 31, 2016 and 2015, respectively, for original equipment tools and dies that we own, and prepayments and other included $97 million and $107 million at December 31, 2016 and 2015, respectively, for in-process tools and dies that we are building for our original equipment customers.

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.

We evaluate our deferred income taxes 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.

Goodwill, net

We evaluate goodwill for impairment in the fourth quarter of each year, or more frequently if events indicate it is warranted. The goodwill impairment test consists of a two-step process. In step one, we compare the estimated fair value of our reporting units with goodwill to the carrying value of the unit’s assets and liabilities to determine if impairment exists within the recorded balance of goodwill. We estimate the fair value of each reporting unit using the income approach which is based on the present value of estimated future cash flows. The income approach is dependent on a number of factors, including estimates of market trends, forecasted revenues and expenses, capital expenditures, weighted average cost of capital and other variables. A separate discount rate derived by a combination of published sources, internal estimates and weighted based on our debt to equity ratio, was used to calculate the discounted cash flows for each of our reporting units. These estimates are based on assumptions that we believe to be reasonable, but which are inherently uncertain and outside of the control of management. If the carrying value of the reporting unit is higher than its fair value, there is an indication that impairment may exist which requires step two to be performed to measure the amount of the impairment loss. The amount of impairment is determined by comparing the implied fair value of a reporting unit’s goodwill to its carrying value.

At December 31, 2016, accumulated goodwill impairment charges include $306 million related to our North America Ride Performance reporting unit, $32 million related to our Europe, South America & India Ride Performance reporting unit and $11 million related to our Asia Pacific Ride Performance reporting unit.

In the fourth quarter of 2016, 2015 and 2014, as a result of our annual goodwill impairment testing, the estimated fair value of each of our reporting units substantially exceeded the carrying value of their assets and liabilities as of the testing date.

Pension and Other Postretirement Benefits

We have various defined benefit pension plans that cover some of our employees. We also have postretirement health care and life insurance plans that cover some of our domestic employees. Our pension and postretirement health care and life insurance expenses and valuations are dependent on assumptions used by our actuaries in calculating those amounts. These assumptions include discount rates, health care cost trend rates, long-term return on plan assets, retirement rates, mortality rates and other factors. Health care cost trend rate assumptions are developed based on historical cost data and an assessment of likely long-term trends. Retirement rates are based primarily on actual plan

experience while mortality rates are based upon the general population experience which is not expected to differ materially from our experience.

Our approach to establishing the discount rate assumption for both our domestic and foreign plans is generally based on the yield on high-quality corporate fixed-income investments. At the end of each year, the discount rate is determined using the results of bond yield curve models based on a portfolio of high quality bonds matching the notional cash inflows with the expected benefit payments for each significant benefit plan. Based on this approach, we lowered the weighted average discount rate for all our pension plans to 3.3 percent in 2016 from 3.9 percent in 2015. The discount rate for postretirement benefits was lowered to 4.2 percent in 2016 from 4.3 percent in 2015.

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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. 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 6.1 percent in 2016 from 6.6 percent in 2015.

Except in the U.K., our pension plans generally do not require employee contributions. Our policy is to fund our pension plans in accordance with applicable U.S. and foreign government regulations and to make additional payments as funds are available to achieve full funding of the accumulated benefit obligation. At December 31, 2016, all legal funding requirements had been met.

Refer to Note 10 of our consolidated financial statements for more information regarding our pension and other postretirement employee benefit costs and assumptions.

New Accounting Pronouncements

Note 1 in our notes to the consolidated financial statements of Tenneco Inc. located in Item 8 — Financial Statements and Supplemental Data is incorporated herein by reference.

Derivative Financial Instruments

Foreign Currency Exchange Rate Risk

We use derivative financial instruments, principally foreign currency forward purchase and sale contracts with terms of less than one year, to hedge our exposure to changes in foreign currency exchange rates. Our primary exposure to changes in foreign currency rates results from intercompany loans made between affiliates to minimize the need for borrowings from third parties. Additionally, 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. We manage counter-party credit risk by entering into derivative financial instruments with major financial institutions that can be expected to fully perform under the terms of such agreements. We do not enter into derivative financial instruments for speculative purposes.

In managing our foreign currency exposures, we identify and aggregate existing offsetting positions and then hedge residual exposures through third-party derivative contracts. The fair value of our foreign currency forward contracts was a net liability position of less than $1 million at December 31, 2016 and is based on an internally developed model which incorporates observable inputs including quoted spot rates, forward exchange rates and discounted future expected cash flows utilizing market interest rates with similar quality and maturity characteristics. The following table summarizes by major currency the notional amounts for our foreign currency forward purchase and sale contracts as of December 31, 2016. All contracts in the following table mature in 2017.

		Notional Amount in Foreign Currency (Millions)
British pounds	—Purchase	9
Canadian dollars	—Sell	(2)
European euro	—Purchase	24
	—Sell	(3)
Japanese yen	—Purchase	388
	—Sell	(60)
South African rand	—Purchase	131
	—Sell	(17)
U.S. dollars	—Purchase	5
	—Sell	(45)

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, 2016, we had $740 million in long-term debt obligations that have fixed interest rates. Of that amount, $500 million is fixed through July 2026, $225 million is fixed through December 2024 and the remainder is fixed from 2017 through 2025. We also have $573 million in long-term debt obligations that are subject to variable interest rates. 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.

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We estimate that the fair value of our long-term debt at December 31, 2016 was about 100 percent of its book value. A 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.

Environmental Matters, Legal Proceedings and Product Warranties

Note 12 to the consolidated financial statements of Tenneco Inc. located in Part II Item 8 — Financial Statements and Supplemental Data is incorporated herein by reference.

We expect to incur legal and related costs of $5 million or $6 million in 2017 pertaining to the ongoing antitrust investigation. Such costs may not be evenly distributed throughout the year.

Tenneco 401(k) Retirement Savings 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”). Under the plan, subject to limitations in the Internal Revenue Code, participants may elect to defer up to 75 percent of their salary through contributions to the plan, which are invested in selected mutual funds or used to buy our common stock. We match 100 percent of an employee's contributions up to three percent of the employee's salary and 50 percent of an employee's contributions that are between three percent and five percent of the employee's salary. In connection with freezing the defined benefit pension plans for nearly all U.S. based salaried and non-union hourly employees effective December 31, 2006, and the related replacement of those defined benefit plans with defined contribution plans, we are making additional contributions to the Employee Stock Ownership Plans. We recorded expense for these contributions of approximately $28 million, $27 million and $25 million in 2016, 2015, and 2014, respectively. Matching contributions vest immediately. Defined benefit replacement contributions fully vest on the employee’s third anniversary of employment.

Change in Reportable Segments

On February 7, 2017, the Company announced that we will be making a change in our reportable segments. Our Clean Air and Ride Performance product lines in India, which have been reported as part of the Europe, South America and India segments, will now be reported with their respective product lines in the Asia Pacific segments, effective with the first quarter of 2017. Such changes will bring the high growth markets in both India and China under the Asia Pacific segments. The change in reportable segments comes as a result of the change to the chief operating decision maker, who will assess business performance and allocation of resources through this structure.

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The following table summarizes annual data for 2016, 2015 and 2014 for the go-forward segment reporting:

	Clean Air Division			Ride Performance Division					
	North America	Europe & South America	Asia Pacific	North America	Europe & South America	Asia Pacific	Other	Reclass & Elims	Total
	(Millions)								
At December 31, 2016, and for the Year Ended									
Revenues from external customers	$3,003	$ 1,939	$1,127	$1,234	$ 909	$ 387	$ —	$ —	$8,599
Intersegment revenues	13	92	3	9	27	48	—	(192)	—
EBIT, Earnings (loss) before interest expense, income taxes, and noncontrolling interests	220	98	150	157	16	63	(188)	—	516
Total assets	1,356	697	683	723	488	352	—	47	$4,346
At December 31, 2015, and for the Year Ended									
Revenues from external customers	$2,823	$ 1,792	$1,080	$1,313	$ 846	$ 327	$ —	$ —	$8,181
Intersegment revenues	16	100	—	10	30	46	—	(202)	—
EBIT, Earnings (loss) before interest expense, income taxes, and noncontrolling interests	244	49	114	155	(11)	44	(87)	—	508
Total assets	1,210	680	628	692	424	304	—	32	3,970
At December 31, 2014, and for the Year Ended									
Revenues from external customers	$2,776	$ 1,930	$1,066	$1,351	$ 938	$ 320	$ —	$ —	$8,381
Intersegment revenues	25	114	—	10	41	43	—	(233)	—
EBIT, Earnings (loss) before interest expense, income taxes, and noncontrolling interests	237	57	101	143	37	38	(124)	—	489
Total assets	1,156	756	624	659	438	294	—	69	3,996

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

The section entitled “Derivative Financial Instruments” in Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” is incorporated herein by reference.

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ITEM 8.FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA.

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AND CONSOLIDATED SUBSIDIARIES

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MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING (restated)

Management of Tenneco Inc. is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a-15(e) and Rule 15d-15(e) under the Securities Exchange Act of 1934, as amended). 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, 2016. 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 this assessment, our management identified control deficiencies as of December 31, 2016 which constituted a material weakness.

A material weakness (as defined in Rule 12b-2 under the Exchange Act) is a deficiency, or combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement in our annual or interim financial statements will not be prevented or detected on a timely basis.

During the quarter ended June 30, 2017, the Company identified deficiencies that, when aggregated together, resulted in a material weakness in the Company's internal control over financial reporting in China. Specifically, the Company did not have people with appropriate authority and experience in key positions in China to ensure adherence to Company policies and US GAAP. Additionally, we did not have adequate international oversight to prevent the intentional mischaracterization of the nature of accounting transactions related to payments received from suppliers by certain purchasing and accounting personnel at the Company's Chinese subsidiaries.

The material weakness described above resulted in immaterial errors impacting previously issued consolidated financial statements for the years ended December 31, 2016, 2015 and 2014, and each interim and year-to-date period in those respective years. We evaluated these errors and concluded that they did not, individually or in the aggregate, result in a material misstatement of our previously issued consolidated financial statements and that such financial statements may continue to be relied upon. However, the identified misstatements resulting from the intentional mischaracterizations discussed above would be material if corrected as an out-of-period adjustment. As a result, the Company has amended its Annual Report on Form 10-K for the year ended December 31, 2016 and its Quarterly Report on Form 10-Q for the quarter ended March 31, 2017 to correct the immaterial errors to the consolidated financial statements, as described in more detail in Notes 16 and 14 to the consolidated financial statements included in those reports, respectively.

Additionally, this material weakness could result in the misstatement of the relevant account balances or disclosures that would result in a material misstatement to the annual or interim consolidated financial statements that would not be prevented or detected.

In Management's Report on Internal Control over Financial Reporting included in our original Annual Report on Form 10-K for the year ended December 31, 2016, our management previously concluded that we maintained effective internal control over financial reporting as of December 31, 2016, filed on February 24, 2017. Management subsequently concluded that the material weakness described above existed as of December 31, 2016. As a result, we have concluded that we did not maintain effective internal control over financial reporting as of December 31, 2016, based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") in Internal Control-Integrated Framework (2013). Accordingly, management has restated its report on internal control over financial reporting.

Our internal control over financial reporting as of December 31, 2016 has been audited by PricewaterhouseCoopers LLP, our independent registered public accounting firm, as stated in their report, which is included herein.

September 8, 2017

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Shareholders of Tenneco Inc.

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of income, comprehensive income, changes in shareholders' equity, and cash flows present fairly, in all material respects, the financial position of Tenneco, Inc. and its subsidiaries as of December 31, 2016 and 2015 and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2016 in conformity with accounting principles generally accepted in the United States of America. In addition, in our opinion, the financial statement schedule listed in the index under Item 15 presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements. Management and we previously concluded that the Company maintained effective internal control over financial reporting as of December 31, 2016. However, management has subsequently determined that a material weakness in internal control over financial reporting related to the accounting for payments received from suppliers by certain purchasing and accounting personnel at the Company's Chinese subsidiaries existed as of that date. Accordingly, management's report has been restated and our present opinion on internal control over financial reporting, as presented herein, is different from that expressed in our previous report. In our opinion, the Company did not maintain, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) because a material weakness in internal control over financial reporting related to the accounting for payments received from suppliers by certain purchasing and accounting personnel at the Company's Chinese subsidiaries existed as of that date. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the annual or interim financial statements will not be prevented or detected on a timely basis. The material weakness referred to above is described in the accompanying Management's Report on Internal Control over Financial Reporting. We considered this material weakness in determining the nature, timing, and extent of audit tests applied in our audit of the 2016 consolidated financial statements, and our opinion regarding the effectiveness of the Company's internal control over financial reporting does not affect our opinion on those consolidated financial statements. The Company's management is responsible for these financial statements and financial statement schedule, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in management's report referred to above. Our responsibility is to express opinions on these financial statements, on the financial statement schedule, and on the Company's internal control over financial reporting based on our integrated audits (which were integrated audits in 2016 and 2015). We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. 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.

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
February 24, 2017, except for the effects of the revision discussed in Note 16 to the consolidated financial statements and the matter discussed in the penultimate paragraph of Management's Report on Internal Control over Financial Reporting, as to which the date is September 8, 2017

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TENNECO INC.
CONSOLIDATED STATEMENTS OF INCOME

	Year Ended December 31,		
	2016	2015	2014
	(Millions Except Share and Per Share Amounts)		
Revenues			
Net sales and operating revenues	$8,599	$ 8,181	$ 8,381
Costs and expenses			
Cost of sales (exclusive of depreciation and amortization shown below)	7,123	6,828	6,989
Engineering, research, and development	154	146	169
Selling, general, and administrative	589	491	519
Depreciation and amortization of other intangibles	212	203	208
	8,078	7,668	7,885
Other income (expense)			
Loss on sale of receivables	(5)	(4)	(4)
Other expense	—	(1)	(3)
	(5)	(5)	(7)
Earnings before interest expense, income taxes, and noncontrolling interests	516	508	489
Interest expense	92	67	91
Earnings before income taxes and noncontrolling interests	424	441	398
Income tax expense	—	146	131
Net income	424	295	267
Less: Net income attributable to noncontrolling interests	68	54	42
Net income attributable to Tenneco Inc.	$356	$ 241	$ 225
Earnings per share			
Weighted average shares of common stock outstanding —			
Basic	55,939,135	59,678,309	60,734,022
Diluted	56,407,436	60,193,150	61,782,508
Basic earnings per share of common stock	$6.36	$ 4.05	$ 3.70
Diluted earnings per share of common stock	$6.31	$ 4.01	$ 3.64

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

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TENNECO INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended December 31, 2016					
	Tenneco Inc.		Noncontrolling interests		Total	
	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)
	(Millions)					
Net Income		$ 356		$ 68		$ 424
Accumulated Other Comprehensive Income (Loss)						
Cumulative Translation Adjustment						
Balance January 1	$(297)		$(1)		$(298)	
Translation of foreign currency statements, net of tax	(41)	(41)	(4)	(4)	(45)	(45)
Balance December 31	(338)		(5)		(343)	
Adjustment to the Liability for Pension and Postretirement Benefits						
Balance January 1	(368)		—		(368)	
Adjustment to the Liability for Pension and Postretirement benefits, net of tax	41	41	—	—	41	41
Balance December 31	(327)		—		(327)	
Balance December 31	$(665)		$(5)		$(670)	
Other comprehensive loss		—		(4)		(4)
Comprehensive Income		$ 356		$ 64		$ 420

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

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TENNECO INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended December 31, 2015					
	Tenneco Inc.		Noncontrolling interests		Total	
	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)
	(Millions)					
Net Income		$ 241		$ 54		$ 295
Accumulated Other Comprehensive Income (Loss)						
Cumulative Translation Adjustment						
Balance January 1	$(166)		$ 3		$(163)	
Translation of foreign currency statements, net of tax	(131)	(131)	(4)	(4)	(135)	(135)
Balance December 31	(297)		(1)		(298)	
Adjustment to the Liability for Pension and Postretirement Benefits						
Balance January 1	(379)		—		(379)	
Adjustment to the Liability for Pension and Postretirement benefits, net of tax	11	11	—	—	11	11
Balance December 31	(368)		—		(368)	
Balance December 31	$(665)		$ (1)		$(666)	
Other comprehensive loss		(120)		(4)		(124)
Comprehensive Income		$ 121		$ 50		$ 171

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

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TENNECO INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended December 31, 2014					
	Tenneco Inc.		Noncontrolling interests		Total	
	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)	Accumulated Other Comprehensive Income (Loss)	Comprehensive Income (Loss)
	(Millions)					
Net Income		$ 225		$ 42		$ 267
Accumulated Other Comprehensive Income (Loss)						
Cumulative Translation Adjustment						
Balance January 1	$(61)		$ 5		$(56)	
Translation of foreign currency statements, net of tax	(105)	(105)	(2)	(2)	(107)	(107)
Balance December 31	(166)		3		(163)	
Adjustment to the Liability for Pension and Postretirement Benefits						
Balance January 1	(299)		—		(299)	
Adjustment to the Liability for Pension and Postretirement benefits, net of tax	(80)	(80)	—	—	(80)	(80)
Balance December 31	(379)		—		(379)	
Balance December 31	$(545)		$ 3		$(542)	
Other comprehensive loss		(185)		(2)		(187)
Comprehensive Income		$ 40		$ 40		$ 80

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

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TENNECO INC.
CONSOLIDATED BALANCE SHEETS

	December 31,	
	2016	2015
	(Millions)	
ASSETS		
Current assets:		
Cash and cash equivalents	$347	$287
Restricted cash	2	1
Receivables —		
Customer notes and accounts, net	1,272	1,102
Other	22	10
Inventories	730	682
Prepayments and other	229	229
Total current assets	2,602	2,311
Other assets:		
Long-term receivables, net	9	13
Goodwill	57	60
Intangibles, net	19	22
Deferred income taxes	199	221
Other	103	100
	387	416
Plant, property, and equipment, at cost	3,548	3,418
Less — Accumulated depreciation and amortization	(2,191)	(2,175)
	1,357	1,243
Total Assets	$4,346	$3,970
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Short-term debt (including current maturities of long-term debt)	$90	$86
Accounts payable	1,501	1,376
Accrued taxes	39	37
Accrued interest	15	4
Accrued liabilities	285	250
Other	43	41
Total current liabilities	1,973	1,794
Long-term debt	1,294	1,124
Deferred income taxes	7	7
Postretirement benefits	273	318
Deferred credits and other liabilities	139	222
Commitments and contingencies		
Total liabilities	3,686	3,465
Redeemable noncontrolling interests	40	41
Tenneco Inc. Shareholders' equity:		
Common stock	1	1
Premium on common stock and other capital surplus	3,098	3,081
Accumulated other comprehensive loss	(665)	(665)
Retained earnings (accumulated deficit)	(1,100)	(1,456)

	1,334	961
Less — Shares held as treasury stock, at cost	761	536
Total Tenneco Inc. shareholders' equity	573	425
Noncontrolling interests	47	39
Total equity	620	464
Total liabilities, redeemable noncontrolling interests and equity	$4,346	$3,970

The accompanying notes to consolidated financial statements are an integral part of these balance sheets.

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TENNECO INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31,		
	2016	2015	2014
	(Millions)		
Operating Activities			
Net income	$ 424	$ 295	$ 267
Adjustments to reconcile net income to cash provided by operating activities —			
Depreciation and amortization of other intangibles	212	203	208
Deferred income taxes	(80)	(2)	(1)
Stock-based compensation	14	15	13
Loss on sale of assets	4	4	6
Changes in components of working capital —			
(Increase) decrease in receivables	(215)	(90)	(83)
(Increase) decrease in inventories	(57)	(36)	(74)
(Increase) decrease in prepayments and other current assets	(8)	37	(81)
Increase (decrease) in payables	114	90	94
Increase (decrease) in accrued taxes	2	(1)	—
Increase (decrease) in accrued interest	12	1	(6)
Increase (decrease) in other current liabilities	26	(10)	13
Change in long-term assets	6	3	12
Change in long-term liabilities	33	8	(10)
Other	2	—	(17)
Net cash provided by operating activities	489	517	341
Investing Activities			
Proceeds from sale of assets	6	4	3
Cash payments for plant, property, and equipment	(325)	(286)	(328)
Cash payments for software related intangible assets	(20)	(23)	(13)
Cash payments for net assets purchased	—	—	(3)
Change in restricted cash	(1)	2	2
Net cash used by investing activities	(340)	(303)	(339)
Financing Activities			
Retirement of long-term debt	(531)	(37)	(462)
Issuance of long-term debt	509	1	570
Debt issuance costs of long-term debt	(9)	(1)	(12)
Purchase of common stock under the share repurchase program	(225)	(213)	(22)
Issuance of common stock	18	6	19
Tax impact from stock-based compensation	(10)	6	26
Increase (decrease) in bank overdrafts	10	(22)	6
Net increase (decrease) in revolver borrowings and short-term debt excluding current maturities of long-term debt and short-term borrowings secured by accounts receivable	202	102	(70)
Net increase (decrease) in short-term borrowings secured by accounts receivable	—	30	(10)
Capital contribution from noncontrolling interest partner	—	—	5
Distribution to noncontrolling interest partners	(55)	(44)	(30)
Net cash provided (used) by financing activities	(91)	(172)	20
Effect of foreign exchange rate changes on cash and cash equivalents	2	(37)	(15)

Increase in cash and cash equivalents	60	5	7
Cash and cash equivalents, January 1	287	282	275
Cash and cash equivalents, December 31 (Note)	$ 347	$ 287	$ 282

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Supplemental Cash Flow Information			
Cash paid during the year for interest	$76	$68	$93
Cash paid during the year for income taxes (net of refunds)	113	105	136
Non-cash Investing and Financing Activities			
Period end balance of trade payables for plant, property, and equipment	$68	$50	$41

Note: Cash and cash equivalents include highly liquid investments with a maturity of three months or less at the date of purchase.

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

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TENNECO INC.
CONSOLIDATED STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY

	Year Ended December 31,					
	2016		2015		2014	
	Shares	Amount	Shares	Amount	Shares	Amount
	(Millions Except Share Amounts)					
Common Stock						
Balance January 1	65,067,132	$ 1	64,454,248	$ 1	63,714,728	$ 1
Issued pursuant to benefit plans	292,514	—	335,766	—	62,334	—
Stock options exercised	532,284	—	277,118	—	677,186	—
Balance December 31	65,891,930	1	65,067,132	1	64,454,248	1
Premium on Common Stock and Other Capital Surplus						
Balance January 1		3,081		3,059		3,014
Premium on common stock issued pursuant to benefit plans		17		22		45
Balance December 31		3,098		3,081		3,059
Accumulated Other Comprehensive Loss						
Balance January 1		(665)		(545)		(360)
Other comprehensive loss		—		(120)		(185)
Balance December 31		(665)		(665)		(545)
Retained Earnings (Accumulated Deficit)						
Balance January 1		(1,456)		(1,697)		(1,922)
Net income attributable to Tenneco Inc.		356		241		225
Balance December 31		(1,100)		(1,456)		(1,697)
Less — Common Stock Held as Treasury Stock, at Cost						
Balance January 1	7,473,325	536	3,244,692	323	2,844,692	301
Purchase of common stock through stock repurchase program	4,182,613	225	4,228,633	213	400,000	22
Balance December 31	11,655,938	761	7,473,325	536	3,244,692	323
Total Tenneco Inc. shareholders' equity		$ 573		$ 425		$ 495
Noncontrolling interests:						
Balance January 1		39		40		39
Net income		32		22		20
Other comprehensive loss		(2)		(3)		(1)
Dividends declared		(22)		(20)		(18)
Balance December 31		$ 47		$ 39		$ 40
Total equity		$ 620		$ 464		$ 535

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

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TENNECO INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1.Summary of Accounting Policies

Consolidation and Presentation

Our consolidated financial statements include all majority-owned subsidiaries. We carry investments in 20 percent to 50 percent owned companies in which the Company does not have a controlling interest, as equity method investments, at cost plus equity in undistributed earnings since the date of acquisition and cumulative translation adjustments. We have eliminated intercompany transactions. We have evaluated all subsequent events through the date our financial statements were issued.

Revision of Previously Issued Financial Statements

For the periods from April 1, 2013 through March 31, 2017, we identified approximately $34 million in lump sum payments from our suppliers that were incorrectly recorded upon receipt as a reduction to cost of sales. The errors resulted from the intentional mischaracterization by certain purchasing and accounting personnel at the Company's China subsidiaries of the nature of the accounting transactions related to the payments received from suppliers. These payments should have been deferred and amortized over the life of the underlying supplier agreements. The deferred amount related to these payments was $23 million and $16 million at December 31, 2016 and 2015, respectively, and recorded within deferred credit and other liabilities. In addition, we identified an unrelated error of approximately $7 million of substrate liabilities that should have been accrued during the periods from January 1, 2016 through March 31, 2017, understating cost of sales in each of these periods. With this revision, we are including previously known adjustments impacting revenues and cost of sales for the periods from January 1, 2012 to September 30, 2015, to reflect a correction from gross revenue reporting to net revenue reporting for certain transactions where it was determined that we earned a fee as an agent. These previously known adjustments reduced both revenue and cost of sales by $28 million and $39 million for years ended December 31, 2015 and 2014, respectively. We evaluated the impact of these items on prior periods under the guidance of SEC Staff Accounting Bulletin (SAB) No. 99, "Materiality" and determined that the amounts were not material to previously issued financial statements. As a result, we have revised and will revise for annual and interim periods in future filings, for certain amounts in the consolidated financial statements in order to correct these errors. See Note 16 in our notes to consolidated financial statements located in Part II Item 8 of this Form 10-K/A.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. These estimates include among others, allowances for doubtful receivables, promotional and product returns, income taxes, pension and postretirement benefit plans, and contingencies. These items are covered in more detail elsewhere in Note 1, Note 7, Note 10, and Note 12 of the consolidated financial statements of Tenneco Inc. Actual results could differ from those estimates.

Redeemable Noncontrolling Interests

We have noncontrolling interests in five joint ventures with redemption features that could require us to purchase the noncontrolling interests at fair value in the event of a change in control of Tenneco Inc. or certain of our subsidiaries. We do not believe that it is probable that the redemption features in any of these joint venture agreements will be triggered. However, the redemption of these shares is not solely within our control. Accordingly, the related noncontrolling interests are presented as "Redeemable noncontrolling interests" in the temporary equity section of our consolidated balance sheets.

In May 2014, we sold a 45 percent equity interest in Tenneco Fusheng (Chengdu) Automobile Parts Co., Ltd., to a third party for $4 million. As a result of the sale, our equity ownership of Tenneco Fusheng (Chengdu) Automobile Parts Co., Ltd. changed to 55 percent from 100 percent.

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TENNECO INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The following is a rollforward of activity in our redeemable noncontrolling interests for the years ending December 31, 2016, 2015 and 2014, respectively:

	2016	2015	2014
	(Millions)		
Balance January 1	$41	$34	$20
Net income attributable to redeemable noncontrolling interests	36	32	22
Sale of 45 percent equity interest from Tenneco Inc	—	—	4
Capital Contributions	—	—	1
Other comprehensive loss	(2)	(1)	—
Dividends declared	(35)	(24)	(13)
Balance December 31	$40	$41	$34

Inventories
At December 31, 2016 and 2015, inventory by major classification was as follows:

	2016	2015
	(Millions)	
Finished goods	$284	$257
Work in process	245	233
Raw materials	137	135
Materials and supplies	64	57
	$730	$682

Our inventories are stated at the lower of cost or market 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.
Goodwill and Intangibles, net
We evaluate goodwill for impairment in the fourth quarter of each year, or more frequently if events indicate it is warranted. The goodwill impairment test consists of a two-step process. In step one, we compare the estimated fair value of our reporting units with goodwill to the carrying value of the unit’s assets and liabilities to determine if impairment exists within the recorded balance of goodwill. We estimate the fair value of each reporting unit using the income approach which is based on the present value of estimated future cash flows. The income approach is dependent on a number of factors, including estimates of market trends, forecasted revenues and expenses, capital expenditures, weighted average cost of capital and other variables. A separate discount rate derived by a combination of published sources, internal estimates and weighted based on our debt to equity ratio, was used to calculate the discounted cash flows for each of our reporting units. These estimates are based on assumptions that we believe to be reasonable, but which are inherently uncertain and outside of the control of management. If the carrying value of the reporting unit is higher than its fair value, there is an indication that impairment may exist which requires step two to be performed to measure the amount of the impairment loss. The amount of impairment is determined by comparing the implied fair value of a reporting unit’s goodwill to its carrying value.
At December 31, 2016, accumulated goodwill impairment charges include $306 million related to our North America Ride Performance reporting unit, $32 million related to our Europe, South America & India Ride Performance reporting unit and $11 million related to our Asia Pacific Ride Performance reporting unit.
In the fourth quarter of 2016, 2015 and 2014, as a result of our annual goodwill impairment testing, the estimated fair value of each of our reporting units exceeded the carrying value of their assets and liabilities as of the testing date.

The changes in the net carrying amount of goodwill for the years ended December 31, 2016, 2015 and 2014 were as follows:

	Clean Air Division			Ride Performance Division			
	North America	Europe, South America & India	Asia Pacific	North America	Europe, South America & India	Asia Pacific	Total
(Millions)							
Balance at December 31, 2014	$14	$ 12	$ —	$10	$ 29	$ —	$65
Translation Adjustment	—	(1)	—	—	(4)	—	(5)
Balance at December 31, 2015	14	11	—	10	25	—	60
Translation Adjustment	—	—	—	—	(3)	—	(3)
Balance at December 31, 2016	14	11	—	10	22	—	57

We have capitalized certain intangible assets, primarily technology rights, trademarks and patents, based on their estimated fair value at the date we acquired them. We amortize our finite useful life intangible assets on a straight-line basis over periods ranging from 3 to 50 years. Amortization of intangibles amounted to $3 million in 2016, $5 million in 2015, and $4 million in 2014, and are included in the statements of income caption "Depreciation and amortization of intangibles." The carrying amount and accumulated amortization of our finite useful life intangible assets were as follows:

	December 31, 2016		December 31, 2015	
	Gross Carrying Value	Accumulated Amortization	Gross Carrying Value	Accumulated Amortization
	(Millions)		(Millions)	
Customer contract	$ 8	$ (5)	$ 8	$ (4)
Patents	1	(1)	2	(2)
Technology rights	29	(21)	29	(19)
Other	9	(1)	10	(2)
Total	$ 47	$ (28)	$ 49	$ (27)

Estimated amortization of intangible assets over the next five years is expected to be $5 million in 2017, $4 million in 2018, $4 million in 2019, $3 million in 2020 and $2 million in 2021.

Plant, Property, and Equipment, at Cost

At December 31, 2016 and 2015, plant, property, and equipment, at cost, by major category were as follows:

	2016	2015
	(Millions)	
Land, buildings, and improvements	$568	$561
Machinery and equipment	2,638	2,569
Other, including construction in progress	342	288
	$3,548	$3,418

We depreciate these properties excluding land on a straight-line basis over the estimated useful lives of the assets. Useful lives range from 10 to 50 years for buildings and improvements and from 3 to 25 years for machinery and equipment.

Notes and Accounts Receivable and Allowance for Doubtful Accounts

Receivables consist of amounts billed and currently due from customers and unbilled pre-production design and development costs. Short and long-term accounts receivable outstanding were $1,293 million and $1,126 million at

December 31, 2016 and 2015, respectively. The allowance for doubtful accounts on short-term and long-term accounts receivable was $16 million at both December 31, 2016 and 2015. Short and long-term notes receivable outstanding were $4 million and $5 million at December 31, 2016 and 2015, respectively. The allowance for doubtful accounts on short-term and long-term notes receivable was zero at both December 31, 2016 and 2015.

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TENNECO INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Pre-production Design and Development and Tooling Assets
We expense pre-production design and development costs as incurred unless we have a contractual guarantee for reimbursement from the original equipment customer. Unbilled pre-production design and development costs recorded in prepayments and other and long-term receivables were $22 million and $21 million at December 31, 2016 and 2015, respectively. In addition, plant, property and equipment included $62 million and $64 million at December 31, 2016 and 2015, respectively, for original equipment tools and dies that we own, and prepayments and other included $97 million and $107 million at December 31, 2016 and 2015, respectively, for in-process tools and dies that we are building for our original equipment customers.
Internal Use Software Assets
We capitalize certain costs related to the purchase and development of software that we use in our business operations. We amortize the costs attributable to these software systems over their estimated useful lives, ranging from 3 to 12 years, based on various factors such as the effects of obsolescence, technology, and other economic factors. Capitalized software development costs, net of amortization, were $66 million and $58 million at December 31, 2016 and 2015, respectively, and are recorded in other long-term assets. Amortization of software development costs was approximately $12 million for the year ended December 31, 2016, $13 million for the year ended December 31, 2015 and $15 million for the year ended December 31, 2014, and is included in the statements of income (loss) caption "Depreciation and amortization of intangibles." 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 statements of cash flows.
Accounts Payable
Accounts payable included $99 million and $93 million at December 31, 2016 and December 31, 2015, respectively, for accrued compensation and $27 million and $17 million at December 31, 2016 and December 31, 2015, respectively, for bank overdrafts at our European subsidiaries.
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.
We evaluate our deferred income taxes 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 have been established in certain foreign jurisdictions 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 have considered the following possible sources of taxable income when assessing the realization of our deferred tax assets:
- 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 generated by taxable losses in 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.

Revenue Recognition

We recognize revenue for sales to our original equipment and aftermarket customers when title and risk of loss passes to the customers under the terms of our arrangements with those customers, which is usually at the time of shipment from our plants or distribution centers. Generally, in connection with the sale of exhaust systems to certain original equipment

manufacturers, we purchase catalytic converters and diesel particulate filters or components thereof including precious metals (“substrates”) on behalf of our customers which are used in the assembled system. These substrates are included in our inventory and “passed through” to the customer at our cost, plus a small margin, since we take title to the inventory and are responsible for both the delivery and quality of the finished product. Revenues recognized for substrate sales were $2,028 million, $1,916 million and $1,934 million in 2016, 2015 and 2014, respectively. For our aftermarket customers, we provide for promotional incentives and returns at the time of sale. Estimates are based upon the terms of the incentives and historical experience with returns. Certain taxes assessed by governmental authorities on revenue producing transactions, such as value added taxes, are excluded from revenue and recorded on a net basis. Shipping and handling costs billed to customers are included in revenues and the related costs are included in cost of sales in our consolidated statements of income (loss).

Warranty Reserves

Where we have offered product warranty, we 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. We actively study trends of our warranty claims and take action to improve product quality and minimize warranty claims. 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 impact on our consolidated financial statements.

Earnings Per Share

We compute 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 we adjust 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, we adjust 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. See Note 2 to the consolidated financial statements of Tenneco Inc.

Engineering, Research and Development

We expense engineering, research, and development costs as they are incurred. Engineering, research, and development expenses were $154 million for 2016, $146 million for 2015, and $169 million for 2014, net of reimbursements from our customers. Our customers reimburse us for engineering, research, and development costs on some platforms when we prepare prototypes and incur costs before platform awards. Our engineering, research, and development expense for 2016, 2015 and 2014 has been reduced by $137 million, $145 million and $159 million, respectively, for these reimbursements.

Advertising and Promotion Expenses

We expense advertising and promotion expenses as they are incurred. Advertising and promotion expenses were $40 million, $54 million, and $57 million for the years ended December 31, 2016, 2015, and 2014, respectively.

Foreign Currency

We translate the consolidated financial statements of foreign subsidiaries into U.S. dollars using the exchange rate at each balance sheet date for assets and liabilities and a weighted-average exchange rate for revenues and expenses in each period. We record translation adjustments for those subsidiaries whose local currency is their functional currency as a component of accumulated other comprehensive income (loss) in shareholders’ equity. We recognize transaction gains and losses arising from fluctuations in currency exchange rates on transactions denominated in currencies other than the functional currency in earnings as incurred, except for those intercompany balances which are designated as long-term investments. Our results include foreign currency transaction gains of $1 million in 2016 and losses of $6 million in 2015 and $1 million in 2014. The amounts are recorded in cost of sales.

We use derivative financial instruments, principally foreign currency forward purchase and sales contracts with terms of less than one year, to hedge our exposure to changes in foreign currency exchange rates. Our primary exposure to changes in foreign currency rates results from intercompany loans made between affiliates to minimize the need for borrowings from third parties. Additionally, 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. We manage counter-party credit risk by entering into derivative financial instruments with major financial institutions that can be expected to fully perform under the terms of such agreements. We do not enter into derivative financial instruments for speculative purposes. In managing our foreign currency exposures, we identify and aggregate existing offsetting positions and then hedge residual exposures through third-party derivative contracts. The fair value of our foreign currency forward contracts was a net liability

position of less than $1 million at December 31, 2016 and a net asset position of $1 million at December 31, 2015 and is based on an internally developed model which incorporates observable inputs including quoted spot rates, forward exchange rates and discounted future expected cash flows utilizing market interest rates with similar quality and maturity characteristics. We record the change in fair value of these foreign exchange forward contracts as part of currency gains (losses) within cost of sales in the consolidated statements of income (loss). The fair value of foreign exchange forward contracts are recorded in prepayments and other current assets or other current liabilities in the consolidated balance sheet.

New Accounting Pronouncements

In November 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standard Update 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. For public business entities, the standard is effective for financial statements issued for annual periods beginning after December 15, 2017, and interim periods within those annual periods. The adoption of this guidance is not expected to have a material impact on the Company's consolidated financial statements.

In October 2016, the FASB issued Accounting Standard Update 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. For public business entities, the standard is effective for financial statements issued for annual periods beginning after December 15, 2017, and interim periods within those annual periods. The adoption of this guidance is not expected to have a material impact on the Company's consolidated financial statements.

In March 2016, the FASB issued Accounting Standard Update 2016-09, Compensation - Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting, as part of its initiative to reduce complexity in accounting standards. The areas for simplification in this update involve several aspects of the accounting for employee share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. For public business entities, the standard is effective for financial statements issued for annual periods beginning after December 15, 2016, and interim periods within those annual periods. The adoption of this guidance is not expected to have a material impact on the Company's consolidated financial statements.

In February 2016, the FASB issued Accounting Standard Update 2016-02, Leases (Topic 842). The amendments in this update create Topic 842, Leases, and supersede the leases requirements in Topic 840, Leases. Topic 842 specifies the accounting for 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. We will adopt this amendment on January 1, 2019. We are currently evaluating the potential impact of this new guidance on the Company's consolidated financial statements.

In May 2015, the FASB issued Accounting Standard Update (ASU) No. 2015-07, Disclosures for Investments in Certain Entities that Calculate Net Asset Value per Share (or Its Equivalent). ASU No. 2015-07 removes the requirement to categorize within the fair value hierarchy all investments for which fair value is measured using the net asset value per share practical expedient. Such investments should be disclosed separate from the fair value hierarchy. For public business entities, the standard is effective for financial statements issued for fiscal years beginning after December 15, 2015, and interim periods within those fiscal years. The adoption of this guidance does not have an impact on the Company's consolidated financial statements but will impact pension asset disclosure.

In May 2014, the FASB issued an amendment on revenue recognition. The amendment in this update creates Topic 606, Revenue from Contracts with Customers, and supersedes the revenue recognition requirements in Topic 605,

Revenue Recognition, including most industry-specific revenue recognition guidance throughout the Industry Topics of the Codification. In addition, the amendment supersedes the cost guidance in Subtopic 605-35, Revenue Recognition-Construction-Type and Production-Type Contracts, and creates new Subtopic 340-40, Other Assets and Deferred Costs-Contracts with Customers. The core principle of Topic 606 is that an entity recognizes revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The FASB approved a one-year deferral of the effective date from January 1, 2017 to January 1, 2018, while allowing for early adoption as of January 1, 2017 for public entities. We will adopt this amendment on January1, 2018.

The guidance permits the use of either the retrospective or modified retrospective (cumulative effect) transition method and we have not yet selected which transition method we will apply.

We have established a cross-functional coordinated team to implement the guidance related to the recognition of revenue from contracts with customers. We are in the process of assessing our customer contracts, identifying contractual provisions

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that may result in a change in the timing or the amount of revenue recognized in comparison with current guidance, as well as assessing the enhanced disclosure requirements of the new guidance. Under current guidance we generally recognize revenue when products are shipped and risk of loss has transferred to the customer. Under the proposed requirements, the customized nature of some of our products combined with contractual provisions that provide us with an enforceable right to payment, may require us to recognize revenue prior to the product being shipped to the customer. We are also assessing pricing provisions contained in certain of our customer contracts. Pricing provisions contained in some of our customer contracts represent variable consideration or may provide the customer with a material right, potentially resulting in a different allocation of the transaction price than under current guidance. In addition, we are evaluating how the new guidance may impact our accounting for contractually guaranteed reimbursements related to customer tooling, engineering services and pre-production costs. Under the current applicable guidance, these customer reimbursements are recorded as cost recovery offsets; whereas under the new standard these guaranteed recoveries may represent consideration from contracts with customers and be recorded as revenues. We continue to evaluate the impact this guidance will have on our financial statements.

Restricted Net Assets

In certain countries where we operate, transfers of funds out of such countries by way of dividends, loans or advances are subject to certain central bank restrictions which require approval from the central bank authorities prior to transferring funds out of these countries. The countries in which we operate that have such restrictions include China, South Africa, and Thailand. The net asset balance of our subsidiaries in the countries in which we operate that have such restrictions was $323 million and $248 million as of December 31, 2016 and 2015, respectively. These central banking restrictions do not have a significant effect on our ability to manage liquidity on a global basis.

2.Earnings Per Share

Earnings per share of common stock outstanding were computed as follows:

	Year Ended December 31,		
	2016	2015	2014
	(Millions Except Share and Per Share Amounts)		
Basic earnings per share —			
Net income attributable to Tenneco Inc.	$356	$ 241	$ 225
Average shares of common stock outstanding	55,939,135	59,578,309	60,734,022
Earnings per average share of common stock	$6.36	$ 4.05	$ 3.70
Diluted earnings per share —			
Net income attributable to Tenneco Inc.	$356	$ 241	$ 225
Average shares of common stock outstanding	55,939,135	59,578,309	60,734,022
Effect of dilutive securities:			
Restricted stock	175,519	96,168	130,732
Stock options	292,784	418,673	917,754
Average shares of common stock outstanding including dilutive securities	56,407,438	60,093,150	61,782,508
Earnings per average share of common stock	$6.31	$ 4.01	$ 3.64

Options to purchase 134,361, 175,216, and 1,357 shares of common stock were outstanding as of December 31, 2016, 2015 and 2014, respectively, but not included in the computation of diluted earnings per share, because the options were anti-dilutive.

3.Acquisitions and divestitures

In May 2014, we sold a 45 percent equity interest in Tenneco Fusheng (Chengdu) Automobile Parts Co., Ltd., to a third party for $4 million. As a result of the sale, our equity ownership of Tenneco Fusheng (Chengdu) Automobile Parts Co., Ltd. changed to 55 percent from 100 percent. The net impact to equity from the sale was less than $1

million.

In November 2015, we closed on the sale of certain assets related to our Marzocchi mountain bike suspension product line to affiliates of Fox Factory Holding Corp.; and in December 2015, we closed on the sale of the Marzocchi motorcycle fork product line to an Italian company, VRM S.p.A. We recorded charges of $29 million in 2015 related to severance and other employee related costs, asset write-downs and other expenses related to the closure.

In March 2016, we completed the disposition of the Gijon, Spain plant and signed an agreement to transfer ownership of the manufacturing facility in Gijon to German private equity fund Quantum Capital Partners A.G. (QCP). The transfer to QCP

was effective March 31, 2016 and under a three year manufacturing agreement, QCP will also continue as a supplier to Tenneco.

4.Restructuring and Other Charges

Over the past several years, we have adopted plans to restructure portions of our operations. These plans were approved by our Board of Directors and were designed to reduce operational and administrative overhead costs throughout the business. In 2014, we incurred $49 million in restructuring and related costs including non-cash charges of $5 million, primarily related to European cost reduction efforts, headcount reductions in Australia and South America, the sale of a closed facility in Cozad, Nebraska and costs related to organizational change, of which $28 million was recorded in cost of sales, $9 million in SG&A, $7 million in engineering expense, $4 million in other expense and $1 million in depreciation and amortization. In 2015, we incurred $63 million in restructuring and related costs including asset write-downs of $10 million, primarily related to European cost reduction efforts, exiting the Marzocchi suspension business, headcount reductions in Australia and South America, and the closure of a JIT plant in Australia, of which $46 million was recorded in cost of sales, $11 million in SG&A, $1 million in engineering expense, $4 million in depreciation and amortization expense and $1 million in other expense. In 2016, we incurred $36 million in restructuring and related costs including asset write-downs of $6 million, primarily related to manufacturing footprint improvements in North America Ride Performance, headcount reduction and cost improvement initiatives in Europe and China Clean Air, South America and Australia, of which $17 million was recorded in cost of sales, $12 million in SG&A, $1 million in engineering, $2 million in other expense and $4 million in depreciation and amortization expense.

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Amounts related to activities that are part of our restructuring plans are as follows:

	December 31, 2015 Restructuring Reserve (Millions)	2016 Expenses	2016 Cash Payments	Impact of Exchange Rates	December 31, 2016 Restructuring Reserve
Employee Severance, Termination Benefits and Other Related Costs	$30	30	(45)	—	$ 15

On January 31, 2013, we announced our intent to reduce structural costs in Europe by approximately $60 million annually. During the first quarter of 2016, we reached an annualized run rate on this cost reduction initiative of $49 million. With the disposition of the Gijon plant, which was completed at the end of the first quarter of 2016, the annualized rate essentially reached our target of $55 million, at the current exchange rates at that time. In 2014, we incurred $49 million in restructuring and related costs, of which $31 million was related to this initiative including $3 million for non-cash asset write downs. In 2015, we incurred $63 million in restructuring and related costs, of which $22 million was related to this initiative. In 2016, we incurred $36 million in restructuring and related costs, of which $20 million was related to this initiative and certain ongoing matters. For example, we closed a plant in Gijon Spain in 2013, but subsequently re-opened it in July 2014 with about half of its prior workforce after the employees' works council successfully filed suit challenging the closure decision. Pursuant to an agreement we entered into with employee representatives, we engaged in a sales process for the facility. In March of 2016, we signed an agreement to transfer ownership of the aftermarket shock absorber manufacturing facility in Gijon, Spain to German private equity fund Quantum Capital Partners A.G. (QCP). The transfer to QCP was effective March 31, 2016 and under a three year manufacturing agreement, QCP will also continue as a supplier to Tenneco.

On July 22, 2015, we announced our intention to discontinue our Marzocchi motorcycle fork suspension product line and our mountain bike suspension product line, and liquidate our Marzocchi operations. These actions were subject to a consultation process with the employee representatives and in total eliminated approximately 138 jobs. We employed 127 people at the Marzocchi plant in Bologna, Italy and an additional 11 people in our operations in North America and Taiwan. In November 2015, we closed on the sale of certain assets related to our Marzocchi mountain bike suspension product line to the affiliates of Fox Factory Holding Corp.; and in December 2015, we closed on the sale of the Marzocchi motorcycle fork product line to an Italian company, VRM S.p.A. These actions were a part of our ongoing efforts to optimize our Ride Performance product line globally while continuously improving our operations and increasing profitability. We recorded charges of $29 million in 2015 related to severance and other employee related costs, asset write-downs and other expenses related to the closure.

Under the terms of our amended and restated senior credit agreement that took effect on December 8, 2014, we are allowed to exclude up to $150 million in the aggregate of all costs, expenses, fees, fines, penalties, judgments, legal settlements and other amounts associated with any restructuring, litigation, claim, proceeding or investigation related to or undertaken by us or any of our subsidiaries, together with any related provision for taxes, incurred after December 8, 2014 in the calculation of the financial covenant ratios required under our senior credit facility. As of December 31, 2016, we had excluded $83 million of allowable charges relating to restructuring initiatives against the $150 million available under the terms of the senior credit facility.

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5.Long-Term Debt, Short-Term Debt, and Financing Arrangements
Long-Term Debt
A summary of our long-term debt obligations at December 31, 2016 and 2015, is set forth in the following table:

	2016	2015
	(Millions)	
Tenneco Inc. —		
Revolver borrowings due 2019, average effective interest rate 2.3% in 2016 and 2.0% in 2015	$300	$105
Senior Tranche A Term Loan due 2017 through 2020, average effective interest rate 2.2% in 2016 and 1.9% in 2015	270	285
5 3/8% Senior Notes due 2024	225	225
5% Senior Notes due 2026	500	—
6 7/8% Senior Notes due 2020	—	500
Other subsidiaries —		
Other Long Term Debt due in 2019, average interest rate 1.7% in 2016 and 6.55% in 2016	7	15
Notes due 2017 through 2027, average effective interest rate 0.2% in 2016 and 0.1% in 2015	8	7
	1,310	1,137
Less — maturities classified as current	3	1
Total long-term debt	$1,307	$1,136

The aggregate maturities applicable to the long-term debt outstanding at December 31, 2016, are $25 million, $34 million, $522 million, $1 million and $1 million for 2017, 2018, 2019, 2020 and 2021, respectively.
We have excluded the required payments, within the next twelve months, under the Tranche A Term Facility totaling $23 million from current liabilities as of December 31, 2016, because we have the intent and ability to refinance the obligations on a long-term basis by using our revolving credit facility.
Short-Term Debt
Our short-term debt includes the current portion of long-term obligations and borrowings by parent company and foreign subsidiaries. Information regarding our short-term debt as of and for the years ended December 31, 2016 and 2015 is as follows:

	2016	2015
	(Millions)	
Maturities classified as current	$3	$1
Short-term borrowings	87	85
Total short-term debt	$90	$86

	Notes Payable(a)					
	2016			2015		
	(Dollars in Millions)					
Outstanding borrowings at end of year	$	87		$	85	
Weighted average interest rate on outstanding borrowings at end of year(b)	2.8		%	3.2		%
Maximum month-end outstanding borrowings during	$	193		$	178	

year						
Average month-end outstanding borrowings during year	$	177		$	118	
Weighted average interest rate on average month-end outstanding borrowings during year(b)	2.4		%	3.0		%

(a) Includes borrowings under both committed credit facilities and uncommitted lines of credit and similar arrangements.

(b) This calculation does not include the commitment fees to be paid on the unused revolving credit facility balances which are recorded as interest expense for accounting purposes.

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Financing Arrangements

	Committed Credit Facilities(a) as of December 31, 2016				
	Term	Commitments	Borrowings	Letters of Credit(b)	Available
	(Millions)				
Tenneco Inc. revolving credit agreement	2019	$ 1,200	$ 300	$ —	$ 900
Tenneco Inc. tranche A term facility	2019	270	270	—	—
Subsidiaries' credit agreements	2017-2027	128	89	—	39
		$ 1,598	$ 659	$ —	$ 939

(a) We generally are 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.

Overview. Our financing arrangements are primarily provided by a committed senior secured financing arrangement with a syndicate of banks and other financial institutions. The arrangement is secured by substantially all our domestic assets and pledges of up to 66 percent of the stock of certain first-tier foreign subsidiaries, as well as guarantees by our material domestic subsidiaries.

On December 8, 2014, we completed an amendment and restatement of our senior credit facility by increasing the amounts and extending the maturity dates of our revolving credit facility and our Tranche A Term Facility. The amended and restated facility replaces our former $850 million revolving credit facility and $213 million Tranche A Term Facility. The proceeds from this refinancing transaction were used to repay the $213 million Tranche A Term Facility, to fund the fees and expenses associated with the purchase and redemption of our $225 million 7 $^{3}/_{4}$ percent senior notes due in 2018 and for general corporate purposes. As of December 31, 2016, the senior credit facility provides us with a total revolving credit facility size of $1,200 million and a $270 million Tranche A Term Facility, both of which will mature on December 8, 2019. Funds may be borrowed, repaid and re-borrowed under the revolving credit facility without premium or penalty (subject to any customary LIBOR breakage fees). The revolving credit facility is reflected as debt on our balance sheet only if we borrow money under this facility or if we use the facility to make payments for letters of credit. Outstanding letters of credit reduce our availability to borrow revolving loans under the facility. We are required to make quarterly principal payments under the Tranche A Term Facility of $5.625 million beginning March 31, 2017 through December 31, 2017, $7.5 million beginning March 31, 2018 through September 30, 2019 and a final payment of $195 million is due on December 8, 2019. We have excluded the required payments, within the next twelve months, under the Tranche A Term Facility totaling $23 million from current liabilities as of December 31, 2016, because we have the intent and ability to refinance the obligations on a long-term basis by using our revolving credit facility.

On November 20, 2014, we announced a cash tender offer to purchase our outstanding $225 million 7 $^{3}/_{4}$ percent senior notes due in 2018 and a solicitation of consents to certain proposed amendments to the indenture governing these notes. We received tenders and consents representing $181 million aggregate principal amount of the notes and, on December 5, 2014, we purchased the tendered notes at a price of 104.35 percent of the principal amount (which includes a consent payment of three percent of the principal amount), plus accrued and unpaid interest, and amended the related indenture. On December 22, 2014, we redeemed the remaining outstanding $44 million aggregate principal amount of senior notes that were not purchased pursuant to the tender offer at a price of 103.88 percent of the principal amount, plus accrued and unpaid interest. The additional liquidity provided by the new $1,200 million revolving credit facility and the new $300 million Tranche A Term Facility was used in part to fund the fees and expenses of the tender offer and redemption.

We recorded $13 million of pre-tax interest charges in December 2014 related to the refinancing of our senior credit facility, the repurchase and redemption of our 7 $^{3}/_{4}$ percent senior notes due in 2018 and the write-off of deferred debt issuance costs relating to those notes.

On June 6, 2016, we announced a cash tender offer to purchase our outstanding $500 million $6^{7}/8$ percent senior notes due in 2020. We received tenders representing $325 million aggregate principal amount of the notes and, on June 13,

2016, we purchased the tendered notes at a price of 103.81 percent of the principal amount, plus accrued and unpaid interest. On July 13, 2016, we redeemed the remaining outstanding $175 million aggregate principal amount of the notes that were not purchased pursuant to the tender offer at a price of 103.438 percent of the principal amount, plus accrued and unpaid interest. We used the proceeds of the issuance of our 5 percent senior notes due 2026 to fund the purchase and redemption. The senior credit facility was used to fund the fees and expenses of the tender offer and redemption.

We recorded $16 million and $8 million of pre-tax interest charges in June and July of 2016, respectively, related to the repurchase and redemption of our 6^{7}/8 percent senior notes due in 2020 and the write-off of deferred debt issuance costs relating to those notes.

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At December 31, 2016, of the $1,200 million available under the revolving credit facility, we had unused borrowing capacity of $900 million with $300 million in outstanding borrowings and zero in outstanding letters of credit. As of December 31, 2016, our outstanding debt also included (i) $270 million of a term loan which consisted of a $269 million net carrying amount including a $1 million debt issuance cost related to our Tranche A Term Facility which is subject to quarterly principal payments as described above through December 8, 2019, (ii) $225 million of notes which consisted of a $221 million net carrying amount including a $4 million debt issuance cost of $5^{3}/8$ percent senior notes due December 15, 2024, (iii) $500 million of notes which consisted of a $492 million net carrying amount including a $8 million debt issuance cost of 5 percent senior notes due July 15, 2026, and (iv) $102 million of other debt.

Senior Credit Facility — Interest Rates and Fees. Beginning December 8, 2014, our Tranche A Term Facility and revolving credit facility bear interest at an annual rate equal to, at our option, either (i) London Interbank Offered Rate ("LIBOR") plus a margin of 175 basis points, or (ii) a rate consisting of the greater of (a) the JPMorgan Chase prime rate plus a margin of 75 basis points, (b) the Federal Funds rate plus 50 basis points plus a margin of 75 basis points, and (c) one month LIBOR plus 100 basis points plus a margin of 75 basis points. The margin we pay on these borrowings will be increased by a total of 25 basis points above the original margin following each fiscal quarter for which our consolidated net leverage ratio is equal to or greater than 2.25 and less than 3.25, and will be increased by a total of 50 basis points above the original margin following each fiscal quarter for which our consolidated net leverage ratio is equal to or greater than 3.25. In addition, the margin we pay on these borrowings will be reduced by a total of 25 basis points below the original margin if our consolidated net leverage ratio is less than 1.25. We also pay a commitment fee equal to 30 basis points that will be reduced to 25 basis points or increased to up to 40 basis points depending on consolidated net leverage ratio changes as set forth in the senior credit facility.

Senior Credit Facility — Other Terms and Conditions. Our senior credit facility requires that we maintain financial ratios equal to or better than the following consolidated net leverage ratio (consolidated indebtedness net of cash divided by consolidated EBITDA, as defined in the senior credit facility agreement), and consolidated interest coverage ratio (consolidated EBITDA divided by consolidated interest expense, as defined in the senior credit facility agreement) at the end of each period indicated. Failure to maintain these ratios will result in a default under our senior credit facility. The financial ratios required under the amended and restated senior credit facility and the actual ratios we calculated for the four quarters of 2016, are as follows (the ratios in the table reflect the revisions made to the financial statements in this Form 10-K/A; these revisions would result in immaterial changes to the actual ratios reported to our lenders in prior periods, with such changes being less than .03 and .23 to each leverage ratio and interest coverage ratio, respectively):

	Quarter Ended							
	December 31, 2016		September 30, 2016		June 30, 2016		March 31, 2016	
	Req.	Act.	Req.	Act.	Req.	Act.	Req.	Act.
Leverage Ratio (maximum)	3.50	1.47	3.50	1.53	3.50	1.47	3.50	1.55
Interest Coverage Ratio (minimum)	2.75	14.70	2.75	14.14	2.75	13.74	2.75	13.75

The senior credit facility includes a maximum leverage ratio covenant of 3.50 and a minimum interest coverage ratio of 2.75 through December 8, 2019.

The covenants in our senior credit facility agreement generally prohibit us from repaying or refinancing our senior notes. So long as no default existed, we would, however, under our senior credit facility agreement, be permitted to repay or refinance our senior notes (i) with the net cash proceeds of permitted refinancing indebtedness (as defined in the senior credit facility agreement) or with the net cash proceeds of our common stock in each case issued within 180 days prior to such repayment; (ii) with the net cash proceeds of the incremental facilities (as defined in the senior credit facility agreement) and certain indebtedness incurred by our foreign subsidiaries; (iii) with the proceeds of the

revolving loans (as defined in the senior credit facility agreement); (iv) with the cash generated by our operations; (v) in an amount equal to the net cash proceeds of qualified capital stock (as defined in the senior credit facility agreement) issued by us after December 8, 2014; and (vi) in exchange for permitted refinancing indebtedness or in exchange for shares of our common stock; provided that such purchases are capped as follows (with respect to clauses (iii), (iv) and (v) based on a pro forma consolidated leverage ratio after giving effect to such purchase, cancellation or redemption):

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Pro forma Consolidated Leverage Ratio	Aggregate Senior Note Maximum Amount (Millions)
Greater than or equal to 3.0x	$ 20
Greater than or equal to 2.5x	$ 100
Greater than or equal to 2.0x	$ 200
Less than 2.0x	no limit

Although the senior 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 senior 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 senior 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 senior 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 senior credit facility agreement and failure to meet these requirements enables the lenders to require repayment of any outstanding loans.

As of December 31, 2016, we were in compliance with all the financial covenants and operational restrictions of the senior credit facility. Our senior credit facility does not contain any terms that could accelerate payment of the facility or affect pricing under the facility as a result of a credit rating agency downgrade.

Senior Notes. As of December 31, 2016, our outstanding senior notes included $225 million of 5 $^{3}/_{8}$ percent senior notes due December 15, 2024 which consisted of $221 million net carrying amount including a $4 million debt issuance cost and $500 million of 5 percent senior notes due July 15, 2026 which consisted of $492 million net carrying amount including a $8 million debt issuance cost. Under the indentures governing the notes, we are permitted to redeem some or all of the remaining senior notes at specified prices that decline to par over a specified period, (a) on or after July 15, 2021, in the case of the senior notes due 2026 and (b) on or after December 15, 2019, in the case of the senior notes due 2024. In addition, the notes may also be redeemed at a price generally equal to 100 percent of the principal amount thereof plus a premium based on the present values of the remaining payments due to the note holders. Further, the indentures governing the notes also permit us to redeem up to 35 percent with the proceeds of certain equity offerings (a) on or before July 15, 2019 at a redemption price equal to 105 percent, in the case of the senior notes due 2026 and (b) on or before December 15, 2017 at a redemption price equal to 105.375 percent in the case of the senior notes due 2024. If we sell certain of our assets or experience specified kinds of changes in control, we must offer to repurchase the notes due 2024 and 2026 at 101 percent of the principal amount thereof plus accrued and unpaid interest.

Our senior notes due December 15, 2024 and July 15, 2026, respectively, contain covenants that will, among other things, limit our ability to create liens and enter into sale and leaseback transactions. Our senior notes due 2024 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 our operations, including limitations on: (i) incurring additional indebtedness; (ii) 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 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, 2016, we

were in compliance with the covenants and restrictions of these indentures.

Accounts Receivable Securitization. We securitize some of our accounts receivable on a limited recourse basis in the U.S. and Europe. As servicer under these accounts receivable securitization programs, we are responsible for performing all accounts receivable administration functions for these securitized financial assets including collections and processing of customer invoice adjustments. In the U.S., we have an accounts receivable securitization program with three commercial banks comprised of a first priority facility and a second priority facility. We securitize original equipment and aftermarket receivables on a daily basis under the bank program. In March 2015, the U.S. program was amended and extended to April 30, 2017. The first priority facility provides financing of up to $130 million and the second priority facility, which is subordinated to the first priority facility, provides up to an additional $50 million of financing. Both facilities monetize accounts receivable generated in the U.S. that meet certain eligibility requirements. The second priority facility also monetizes certain accounts receivable

generated in the U.S. that would otherwise be ineligible under the first priority securitization facility. The amount of outstanding third-party investments in our securitized accounts receivable under the U.S. program was $30 million at December 31, 2016 and zero at December 31, 2015.

Each facility contains customary covenants for financings of this type, including restrictions related to liens, payments, mergers or consolidations and amendments to the agreements underlying the receivables pool. Further, each facility may be terminated upon the occurrence of customary events (with customary grace periods, if applicable), including breaches of covenants, failure to maintain certain financial ratios, inaccuracies of representations and warranties, bankruptcy and insolvency events, certain changes in the rate of default or delinquency of the receivables, a change of control and the entry or other enforcement of material judgments. In addition, each facility contains cross-default provisions, where the facility could be terminated in the event of non-payment of other material indebtedness when due and any other event which permits the acceleration of the maturity of material indebtedness.

We also securitize receivables in our European operations with regional banks in Europe. The arrangements to securitize receivables in Europe are provided under six separate facilities provided by various financial institutions in each of the foreign jurisdictions. The commitments for these arrangements are generally for one year, but some may be cancelled 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 securitized accounts receivable in Europe was $160 million and $174 million at December 31, 2016 and December 31, 2015, respectively.

If we were not able to securitize receivables under either the U.S or European securitization programs, our borrowings under our revolving credit agreement might increase. These accounts receivable securitization 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.

In our U.S. accounts receivable securitization programs, we transfer a partial interest in a pool of receivables and the interest that we retain is subordinate to the transferred interest. Accordingly, we account for our U.S. securitization program as a secured borrowing. In our European programs, we transfer accounts receivables in their entirety to the acquiring entities and satisfy all of the conditions established under ASC Topic 860, “Transfers and Servicing,” to report the transfer of financial assets in their entirety as a sale. The fair value of assets received as proceeds in exchange for the transfer of accounts receivable under our European securitization programs approximates the fair value of such receivables. We recognized $3 million in interest expense for the year ended 2016 and $2 million in interest expense for each of the years ended 2015 and 2014 relating to our U.S. securitization program. In addition, we recognized a loss of $3 million for each of the years ended 2016 and 2015 and a $4 million loss for 2014, on the sale of trade accounts receivable in our European accounts receivable securitization programs, representing the discount from book values at which these receivables were sold to our banks. The discount rate varies based on funding costs incurred by our banks, which averaged approximately two percent for all years ended 2016, 2015 and 2014.

6.Financial Instruments

The carrying and estimated fair values of our financial instruments by class at December 31, 2016 and 2015 were as follows:

	December 31, 2016		December 31, 2015	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
	(Millions)			
Long-term debt (including current maturities)	$1,297	$1,311	$1,125	$1,160
Instruments with off-balance sheet risk:				

Foreign exchange forward contracts:				
Asset derivative contracts	—	—	1	1

Asset and Liability Instruments — The fair value of cash and cash equivalents, short and long-term receivables, accounts payable, and short-term debt was considered to be the same as or was not determined to be materially different from the carrying amount.

Long-term Debt — The fair value of our public fixed rate senior notes is based on quoted market prices. The fair value of our private borrowings under our senior credit facility and other long-term debt instruments is based on the market value of debt with similar maturities, interest rates and risk characteristics. The fair value of our level 1 debt, as classified in the fair value hierarchy, was $725 million and $748 million at December 31, 2016 and December 31, 2015, respectively. We have classified the $571 million and $390 million as level 2 in the fair value hierarchy at December 31, 2016 and December 31,

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2015, respectively, since we utilize valuation inputs that are observable both directly and indirectly. We classified the remaining $15 million and $22 million, consisting of foreign subsidiary debt, as level 3 in the fair value hierarchy at December 31, 2016, and December 31, 2015, respectively.
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 our own assumptions.
Foreign exchange forward contracts — We use derivative financial instruments, principally foreign currency forward purchase and sales contracts with terms of less than one year, to hedge our exposure to changes in foreign currency exchange rates. Our primary exposure to changes in foreign currency rates results from intercompany loans made between affiliates to minimize the need for borrowings from third parties. Additionally, 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. We manage counter-party credit risk by entering into derivative financial instruments with major financial institutions that can be expected to fully perform under the terms of such agreements. We do not enter into derivative financial instruments for speculative purposes. The fair value of our foreign currency forward contracts is based on an internally developed model which incorporates observable inputs including quoted spot rates, forward exchange rates and discounted future expected cash flows utilizing market interest rates with similar quality and maturity characteristics. We record the change in fair value of these foreign exchange forward contracts as part of currency gains (losses) within cost of sales in the consolidated statements of income. The fair value of foreign exchange forward contracts are recorded in prepayments and other current assets or other current liabilities in the consolidated balance sheet. The fair value of our foreign currency forward contracts was a net liability position of less than $1 million at December 31, 2016 and a net asset position of $1 million at December 31, 2015.
The following table summarizes by major currency the notional amounts for foreign currency forward purchase and sale contracts as of December 31, 2016 (all of which mature in 2017):

		Notional Amount in Foreign Currency (Millions)
British pounds	—Purchase	9
Canadian dollars	—Sell	(2)
European euro	—Purchase	21
	—Sell	(3)
Japanese yen	—Purchase	388
	—Sell	(60)
South African rand	—Purchase	131
	—Sell	(17)
U.S. dollars	—Purchase	5
	—Sell	(45)

Guarantees — 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 our senior credit facility and our senior notes on a joint and several basis. The arrangement for the senior credit facility is also secured by first-priority liens on substantially all our domestic assets and pledges of up to 66 percent of the stock of certain first-tier foreign subsidiaries. No assets or capital stock secure our senior notes. For additional information, refer to Note 13 of the consolidated financial

statements of Tenneco Inc., where we present the Supplemental Guarantor Condensed Consolidating Financial Statements.

We have two performance guarantee agreements in the U.K. between Tenneco Management (Europe) Limited ("TMEL") and the two Walker Group Retirement Plans, the Walker Group Employee Benefit Plan and the Walker Group Executive Retirement Benefit Plan (the "Walker Plans"), whereby TMEL will guarantee the payment of all current and future pension contributions in event of a payment default by the sponsoring or participating employers of the Walker Plans. The Walker Plans are comprised of employees from Tenneco Walker (U.K.) Limited and our Futaba-Tenneco U.K. joint venture. Employer contributions are funded by both Tenneco Walker (U.K.) Limited, as the sponsoring employer and Futaba-Tenneco U.K., as a participating employer. The performance guarantee agreements are expected to remain in effect until all pension obligations for

the Walker Plans' sponsoring and participating employers have been satisfied. The maximum amount payable for these pension performance guarantees that is not attributable to Tenneco is approximately $7 million as of December 31, 2016 which is determined by taking 105 percent of the liability of the Walker Plans calculated under section 179 of the U.K. Pension Act of 2004 offset by plan assets multiplied by the ownership percentage in Futaba-Tenneco U.K. that is attributable to Futaba Industrial Co. Ltd. We did not record an additional liability for this performance guarantee since Tenneco Walker (U.K.) Limited, as the sponsoring employer of the Walker Plans, already recognizes 100 percent of the pension obligation calculated based on U.S. GAAP, for all of the Walker Plans' participating employers on its balance sheet, which was $19 million and $11 million at December 31, 2016 and December 31, 2015, respectively. At December 31, 2016, all pension contributions were current for all of the Walker Plans' sponsoring and participating employers.

In June 2011, we entered into an indemnity agreement between TMEL and Futaba Industrial Co. Ltd. which requires Futaba to indemnify TMEL for any cost, loss or liability which TMEL may incur under the performance guarantee agreements relating to the Futaba-Tenneco U.K. joint venture. The maximum amount reimbursable by Futaba to TMEL under this indemnity agreement is equal to the amount incurred by TMEL under the performance guarantee agreements multiplied by Futaba's shareholder ownership percentage of the Futaba-Tenneco U.K. joint venture. At December 31, 2016, the maximum amount reimbursable by Futaba to TMEL is approximately $7 million.

We have issued guarantees through letters of credit in connection with some obligations of our affiliates. As of December 31, 2016, we have guaranteed $31 million in letters of credit to support some of our subsidiaries' insurance arrangements, foreign employee benefit programs, environmental remediation activities and cash management and capital requirements.

Financial Instruments — One of our European subsidiaries receives payment from one of its customers whereby the accounts receivable are satisfied through the delivery of negotiable financial instruments. We may collect these financial instruments before their maturity date by either selling them at a discount or using them to satisfy accounts receivable that have previously been sold to a European bank. Any of these financial instruments which are not sold are classified as other current assets. Such financial instruments held by our European subsidiary totaled less than $1 million at both December 31, 2016 and December 31, 2015.

In certain instances, several of our Chinese subsidiaries receive payment from customers through the receipt of financial instruments on the date the customer payments are due. Several of our Chinese subsidiaries also satisfy vendor payments through the delivery of financial instruments on the date the payments are due. Financial instruments issued to satisfy vendor payables and not redeemed totaled $12 million and $15 million at December 31, 2016 and December 31, 2015, respectively, and were classified as notes payable. Financial instruments received from OE customers and not redeemed totaled $5 million and $8 million at December 31, 2016 and December 31, 2015, respectively. We classify financial instruments received from our customers as other current assets if issued by a financial institution of our customers or as customer notes and accounts, net if issued by our customer. We classified $5 million and $8 million in other current assets at December 31, 2016 and December 31, 2015, respectively.

The financial instruments received by one of our European subsidiaries and some of our Chinese subsidiaries are drafts drawn that are payable at a future date and, in some cases, are negotiable and/or are guaranteed by the banks of the customers. The use of these instruments for payment follows local commercial practice. Because certain of such financial instruments are guaranteed by our customers' banks, we believe they represent a lower financial risk than the outstanding accounts receivable that they satisfy which are not guaranteed by a bank.

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

Restricted Cash - Some of our Chinese subsidiaries that issue their own financial instruments to pay vendors are required to maintain a cash balance if they exceed credit limits with the financial institution that guarantees the financial instruments. A restricted cash balance was required at those Chinese subsidiaries for $2 million and $1 million at December 31, 2016 and December 31, 2015, respectively.

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7.Income Taxes

The domestic and foreign components of our income before income taxes and noncontrolling interests are as follows:

	Year Ended December 31,		
	2016	2015	2014
	(Millions)		
U.S. income before income taxes	$63	$198	$130
Foreign income before income taxes	361	243	268
Income before income taxes and noncontrolling interests	$424	$441	$398

Following is a comparative analysis of the components of income tax expense:

	Year Ended December 31,		
	2016	2015	2014
	(Millions)		
Current —			
U.S. federal	$ (9)	$ 64	$ 38
State and local	4	5	3
Foreign	85	83	92
	80	152	133
Deferred —			
U.S. federal	(91)	(1)	2
State and local	(1)	1	7
Foreign	12	(6)	(11)
	(80)	(6)	(2)
Income tax expense	$ —	$ 146	$ 131

Following is a reconciliation of income taxes computed at the statutory U.S. federal income tax rate (35 percent for all years presented) to the income tax expense reflected in the statements of income:

	Year Ended December 31,		
	2016	2015	2014
	(Millions)		
Income tax expense computed at the statutory U.S. federal income tax rate	$ 148	$ 154	$ 139
Increases (reductions) in income tax expense resulting from:			
Foreign income taxed at different rates	(42)	(14)	(20)
Taxes on repatriation of dividends	(105)	9	4
Remeasurement of estimated tax on unremitted earnings	—	(4)	—
State and local taxes on income, net of U.S. federal income tax benefit	3	11	8
Changes in valuation allowance for tax loss carryforwards and credits	18	13	12
Foreign tax holidays	—	(7)	(6)
Investment and R&D tax credits	(6)	(26)	(10)
Foreign earnings subject to U.S. federal income tax	4	3	7
Adjustment of prior years taxes	—	2	(2)
Tax contingencies	(7)	4	—
Other	(13)	1	(1)
Income tax expense	$ —	$ 146	$ 131

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The components of our net deferred tax assets were as follows:

	Year Ended December 31,	
	2016	2015
	(Millions)	
Deferred tax assets —		
Tax loss carryforwards:		
State	$ 13	$ 14
Foreign	92	72
Tax credits	83	89
Postretirement benefits other than pensions	55	54
Pensions	48	50
Bad debts	3	2
Sales allowances	7	8
Payroll accruals	39	34
Other accruals	50	58
Valuation allowance	(145)	(127)
Total deferred tax assets	245	254
Deferred tax liabilities —		
Tax over book depreciation	53	40
Total deferred tax liabilities	53	40
Net deferred tax assets	$ 192	$ 214

State tax loss carryforwards have been presented net of uncertain tax positions that if realized, would reduce tax loss carryforwards in both 2016 and 2015 by $3 million. Additionally, foreign tax loss carryforwards, have been presented net of uncertain tax positions that if realized, would reduce tax loss carryforwards in 2016 and 2015 by $7 million and $13 million, respectively.

Following is a reconciliation of deferred taxes to the deferred taxes shown in the balance sheet:

	Year Ended December 31,	
	2016	2015
	(Millions)	
Balance Sheet:		
Non-current portion — deferred tax asset	$ 199	$ 221
Non-current portion — deferred tax liability	(7)	(7)
Net deferred tax assets	$ 192	$ 214

As a result of the valuation allowances recorded for $145 million and $127 million at December 31, 2016 and 2015, respectively, we have potential tax assets that were not recognized on our balance sheet. 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 that are available to reduce future tax liabilities.

We reported income tax expense of less than $1 million, $146 million and $131 million in the years ended 2016, 2015 and 2014, respectively. The tax expense recorded in 2016 includes a net tax benefit of $110 million primarily relating to the recognition of a U.S. tax benefit for foreign taxes. In 2016, we completed our detailed analysis of our ability to recognize and utilize foreign tax credits within the carryforward period. As a result, we amended our 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 us in the U.S. Income tax expense also decreased in 2016 as a result of the mix of earnings in our various tax jurisdictions. The tax expense recorded in 2015 includes a net tax benefit of $15 million primarily relating to prior year U.S. research and development tax credits, changes to uncertain tax positions, and prior

year income tax adjustments. The tax expense recorded in 2014 includes a net tax benefit of $11 million for prior year tax adjustments primarily relating to changes to uncertain tax positions and prior year income tax estimates.

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We fully utilized our federal net operating loss ("NOL") prior to 2014 as a result of amending our U.S. federal tax returns for years 2006 to 2012 to claim foreign tax credits in lieu of deducting foreign taxes paid. The state NOLs expire in various tax years through 2031.

We do not provide for U.S. income taxes on unremitted earnings of foreign subsidiaries, except for the earnings of certain of our China operations, as our present intention is to reinvest the unremitted earnings in our foreign operations. Unremitted earnings of foreign subsidiaries were approximately $795 million at December 31, 2016. We 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 $159 million. The estimated U.S. and foreign income taxes on unremitted earnings may be impacted in the future if we are unable to claim a U.S. foreign tax credit.

U.S. GAAP provides that 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 our uncertain tax positions is as follows:

	2016	2015	2014
	(Millions)		
Uncertain tax positions —			
Balance January 1	$123	$114	$115
Gross increases in tax positions in current period	6	7	8
Gross increases in tax positions in prior period	2	14	5
Gross decreases in tax positions in prior period	(5)	(4)	(5)
Gross decreases — settlements	—	(1)	(2)
Gross decreases — statute of limitations expired	(15)	(7)	(7)
Balance December 31	$111	$123	$114

Included in the balance of uncertain tax positions were $108 million in 2016, $110 million in 2015, $101 million in 2014, of tax benefits, that if recognized, would affect the effective tax rate. We recognize accrued interest and penalties related to unrecognized tax benefits as income tax expense. Penalties of less than $1 million were accrued in 2016, 2015 and 2014. Additionally, we accrued interest expense related to uncertain tax positions of less than $1 million in 2016, interest income of less than $1 million in 2015, and interest expense of $1 million in 2014. Our liability for penalties was $1 million at December 31, 2016, $2 million at December 31, 2015 and $3 million at December 31, 2014, respectively, and our liability for interest was $6 million at December 31, 2016, 2015 and 2014.

Our uncertain tax position at December 31, 2016 and 2015 included exposures relating to the disallowance of deductions, global transfer pricing and various other issues. We believe it is reasonably possible that a decrease of up to $17 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.

We are subject to taxation in the U.S. and various state and foreign jurisdictions. As of December 31, 2016, our tax years open to examination in primary jurisdictions are as follows:

	Open To Tax Year
United States	2006
China	2006
Spain	2004
Canada	2013
Brazil	2011
Mexico	2011
Belgium	2014
Germany	2014
United Kingdom	2014

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8.Common Stock

We have authorized 135 million shares ($0.01 par value) of common stock, of which 65,891,930 shares and 65,067,132 shares were issued at December 31, 2016 and 2015, respectively. We held 11,655,938 and 7,473,325 shares of treasury stock at December 31, 2016 and 2015, respectively.

Equity Plans — In December 1996, we adopted the 1996 Stock Ownership Plan, which permitted the granting of a variety of awards, including common stock, restricted stock, performance units, stock equivalent units, stock appreciation rights (“SARs”) and stock options to our directors, officers, employees and consultants. The 1996 plan, which terminated as to new awards on December 31, 2001, was renamed the “Stock Ownership Plan.” In December 1999, we adopted the Supplemental Stock Ownership Plan, which permitted the granting of a variety of similar awards to our directors, officers, employees and consultants. We were authorized to deliver up to about 1.1 million treasury shares of common stock under the Supplemental Stock Ownership Plan, which also terminated as to new awards on December 31, 2001. In March 2002, we adopted the 2002 Long-Term Incentive Plan which permitted the granting of a variety of similar awards to our officers, directors, employees and consultants. Up to 4 million shares of our common stock were authorized for delivery under the 2002 Long-Term Incentive Plan. In March 2006, we adopted the 2006 Long-Term Incentive Plan which replaced the 2002 Long-Term Incentive Plan and permits the granting of a variety of similar awards to directors, officers, employees and consultants. On May 13, 2009, our stockholders approved an amendment to the Tenneco Inc. 2006 Long-Term Incentive Plan to increase the shares of common stock available thereunder by 2.3 million. Each share underlying an award generally counts as one share against the total plan availability under the 2009 amendment, each share underlying a full value award (e.g. restricted stock), however, counts as 1.25 shares against the total plan availability. On May 15, 2013 our stockholders approved another amendment to the Tenneco Inc. 2006 Long-Term Incentive Plan to increase the shares of common stock available thereunder by 3.5 million. As part of this amendment, each share underlying a full value award subsequently issued counts as 1.49 shares against total plan availability. As of December 31, 2016, up to 2,541,470 shares of our common stock remain authorized for delivery under the 2006 Long-Term Incentive Plan. Our nonqualified stock options have seven to 20 year terms and vest equally over a three-year service period from the date of the grant.

We have granted restricted common stock and stock options to our directors and certain key employees and restricted stock units, payable in cash, to certain key employees. These awards generally require, among other things, that the award holder remain in service to our company during the restriction period, which is currently three years, with a portion of the award vesting equally each year. We have also granted stock equivalent units and long-term performance units to certain key employees that are payable in cash. At December 31, 2016, the long-term performance units outstanding included a three-year grant for 2014-2016 payable in the first quarter of 2017, a three-year grant for 2015-2017 payable in the first quarter of 2018 and a three-year grant for 2016-2018 payable in the first quarter of 2019. Payment is based on the attainment of specified performance goals. Grant value is based on stock price, cumulative EBITDA and free cash flow metrics. In addition, we have granted SARs to certain key employees in our Asian and Indian operations that are payable in cash after a three-year service period. The grant value is indexed to the stock price.

Accounting Methods — We have recorded compensation expense (net of taxes) of $1 million, $2 million, and $3 million in the years ended December 31, 2016, 2015 and 2014, respectively, related to nonqualified stock options as part of our selling, general and administrative expense. This resulted in a $0.01 decrease in basic and diluted earnings per share in 2016, a $0.03 decrease in basic and diluted earnings per share in 2015, and a $0.06 decrease in basic and diluted earnings per share in 2014.

For employees eligible to retire at the grant date, we immediately expense stock options and restricted stock. If employees become eligible to retire during the vesting period, we immediately recognize any remaining expense associated with their stock options and restricted stock.

As of December 31, 2016, there was less than $1 million of unrecognized compensation costs related to our stock options awards that we expect to recognize over a weighted average period of 0.1 years.

Compensation expense for restricted stock, restricted stock units, long-term performance units and SARs (net of taxes) was $18 million, $12 million, and $13 million for each of the years ended 2016, 2015 and 2014, respectively, and was recorded in selling, general, and administrative expense on the consolidated statements of income.
Cash received from stock option exercises was $16 million in 2016, $4 million in 2015, and $10 million in 2014. Stock option exercises generated an excess tax benefit of $1 million in 2016, $6 million in 2015 and $12 million in 2014.
Assumptions — We calculated the fair values of stock option awards using the Black-Scholes option pricing model with the weighted average assumptions listed below. The fair value of share-based awards is determined at the time the awards are granted which is generally in January of each year, and requires judgment in estimating employee and market behavior. There were no stock options granted in 2016 or 2015.

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	2016	2015	2014
Stock Options Granted:			
Weighted average grant date fair value, per share	$—	$ —	$26.46
Weighted average assumptions used:			
Expected volatility	—%	—%	52.8 %
Expected lives	0.0	0.0	5.0
Risk-free interest rates	—%	—%	1.7 %
Dividends yields	—%	—%	— %

Expected volatility is calculated based on current implied volatility and historical realized volatility for the Company. Expected lives of options are based upon the historical and expected time to post-vesting forfeiture and exercise. We believe this method is the best estimate of the future exercise patterns currently available.
The risk-free interest rates are based upon the Constant Maturity Rates provided by the U.S. Treasury. For our valuations, we used the continuous rate with a term equal to the expected life of the options.
Stock Options — The following table reflects the status and activity for all options to purchase common stock for the period indicated:

	Year Ended December 31, 2016			
	Shares Under Option	Weighted Avg. Exercise Prices	Weighted Avg. Remaining Life in Years	Aggregate Intrinsic Value (Millions)
Outstanding Stock Options:				
Outstanding, January 1, 2016	1,144,719	$ 34.69	3.6	$ 19
Exercised	(19,192)	9.31		1
Outstanding, March 31, 2016	1,125,527	$ 35.12	3.5	$ 12
Forfeited	(788)	51.88		
Exercised	(183,774)	23.07		5
Outstanding, June 30, 2016	940,965	$ 37.46	3.1	$ 14
Forfeited	(3,183)	56.23		
Exercised	(178,455)	30.17		4
Outstanding, September 30, 2016	759,327	$ 39.13	2.8	$ 12
Canceled	(4,499)	24.07		
Exercised	(148,303)	42.01		
Outstanding, December 31, 2016	606,525	$ 38.54	2.6	$ 12

Of the outstanding 606,525 options, 560,238 are currently exercisable and have an intrinsic value of $12 million, a weighted average exercise price of $37.01 and a weighted average remaining life of 2.6 years.
The weighted average grant-date fair value of options granted during the year 2014 was $26.48. There were no stock options granted in 2016 or 2015. The total intrinsic value of options exercised during the years ended December 31, 2016, 2015, and 2014 was $11 million, $10 million and $30 million, respectively. The total fair value of shares vested was $4 million in 2016 and $6 million in both 2015 and 2014, respectively.

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Restricted Stock — The following table reflects the status for all nonvested restricted shares for the period indicated:

	Year Ended December 31, 2016	
	Shares	Weighted Avg. Grant Date Fair Value
Nonvested Restricted Shares		
Nonvested balance at January 1, 2016	496,842	$ 51.65
Granted	347,398	35.98
Vested	(156,109)	46.50
Nonvested balance at March 31, 2016	688,131	$ 44.90
Vested	(20,221)	42.32
Forfeited	(32,192)	53.91
Nonvested balance at June 30, 2016	635,718	$ 44.42
Granted	3,368	55.02
Vested	(23,705)	37.37
Forfeited	(3,485)	53.34
Nonvested balance at September 30, 2016	611,896	$ 44.70
Granted	3,038	55.45
Vested	(1,999)	52.75
Forfeited	(21,519)	47.46
Nonvested balance at December 31, 2016	591,416	$ 44.63

The fair value of restricted stock grants is equal to the average market price of our stock at the date of grant. As of December 31, 2016, approximately $13 million of total unrecognized compensation costs related to restricted stock awards is expected to be recognized over a weighted-average period of approximately 1.9 years.
The weighted average grant-date fair value of restricted stock granted during the years 2016, 2015 and 2014 was $36.36, $52.85, and $55.26, respectively. The total fair value of restricted shares vested was $9 million in 2016, $7 million in 2015 and $8 million in 2014.
Share Repurchase Program — In January 2014, our Board of Directors approved a share repurchase program, authorizing our company to repurchase up to 400,000 shares of our outstanding common stock over a 12 month period. This share repurchase program was intended to offset dilution from shares of restricted stock and stock options issued in 2014 to employees. We purchased 400,000 shares through open market purchases, which were funded through cash from operations, at a total cost of $22 million, at an average price of $56.06 per share. These repurchased shares are held as part of our treasury stock which increased to 3,244,692 shares at December 31, 2014 from 2,844,692 shares at December 31, 2013.
In January 2015, our Board of Directors approved a share repurchase program, authorizing our company to repurchase up to $350 million of our outstanding common stock over a three-year period. In October 2015, our Board of Directors expanded this share repurchase program, authorizing the repurchase of an additional $200 million of the Company’s outstanding common stock. We purchased 4,228,633 shares in 2015 through open market purchases, which were funded through cash from operations, at a total cost of $213 million, at an average price of $50.32 per share. These repurchased shares are held as part of our treasury stock which increased to 7,473,325 at December 31, 2015 from 3,244,692 at December 31, 2014. 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 which increased to 11,655,938 at December 31, 2016 from 7,473,325 at December 31, 2015.
In February 2017, our Board of Directors authorized the repurchase of up to $400 million of the Company's outstanding common stock over the next three years. This includes $112 million remaining amount authorized under

earlier repurchase programs. The company anticipates acquiring the shares through open market or privately negotiated transactions, which will be funded through cash from operations. The repurchase program does not obligate the Company to repurchase shares within any specific time or situations, and opportunities in higher priority areas could affect the cadence of this program.

Dividends —On February 1, 2017, our Board of Directors declared a quarterly cash dividend of $0.25, payable on March 23, 2017 to shareholders of record as of March 7, 2017.

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Long-Term Performance Units, Restricted Stock Units and SARs — Long-term performance units, restricted stock units, and SARs are paid in cash and recognized as a liability based upon their fair value. As of December 31, 2016, $22 million of total unrecognized compensation costs is expected to be recognized over a weighted-average period of approximately 1.8 years.

9.Preferred Stock
We had 50 million shares of preferred stock ($0.01 par value) authorized at December 31, 2016 and 2015, respectively. No shares of preferred stock were outstanding at those dates.

10.Pension Plans, Postretirement and Other Employee Benefits
Pension benefits are based on years of service and, for most salaried employees, on average compensation. Our funding policy is to contribute to the plans amounts necessary to satisfy the funding requirement of applicable federal or foreign laws and regulations. Of our $710 million benefit obligation at December 31, 2016, approximately $641 million required funding under applicable federal and foreign laws. The balance of our benefit obligation, $69 million, did not require funding under applicable federal or foreign laws and regulations. At December 31, 2016, we had approximately $561 million in assets to fund that obligation. Pension plan assets were invested in the following classes of securities:

	Percentage of Fair Market Value			
	December 31, 2016		December 31, 2015	
	US	Foreign	US	Foreign
Equity Securities	70%	61 %	51%	61 %
Debt Securities	30%	34 %	49%	30 %
Real Estate	—	2 %	—	2 %
Other	—	3 %	—%	7 %

The assets of some of our 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 of the trusts. The investments for all our pension plans are recorded at estimated fair value, in compliance with the accounting guidance on fair value measurement.
The following table presents our plan assets using the fair value hierarchy as of December 31, 2016 and 2015, respectively. The fair value hierarchy has three levels based on the methods used to determine the fair value. Level 1 assets refer to those asset values based on quoted market prices in active markets for identical assets at the measurement date. Level 2 assets refer to assets with values determined using significant other observable inputs, and Level 3 assets include values determined with non-observable inputs.

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TENNECO INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

	Fair Value Level as of December 31, 2016							
	US				Foreign			
Asset Category	Level 1	Level 2	Level 3	Assets Measurement at NAV	Level 1	Level 2	Level 3	Assets Measurement at NAV
	(Millions)							
Equity securities:								
U.S. large cap	$22	$ —	$ —	$ 77	$2	$ 30	$ —	$ 26
U.S. mid cap	—	—	—	—	1	2	—	—
U.S. small cap	—	—	—	15	—	—	—	—
Non-U.S. large cap	—	—	—	—	7	67	—	46
Non-U.S. mid cap	—	—	—	15	—	15	—	8
Non-U.S. small cap	—	—	—	—	—	10	—	1
Emerging markets	—	—	—	5	2	3	—	1
Debt securities:								
U.S. treasuries/government bonds	—	—						