PPG INDUSTRIES INC
Form 10-K
February 18, 2016

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

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

For the fiscal year ended December 31, 2015	Commission File Number 1-1687
PPG INDUSTRIES, INC.	
(Exact name of registrant as specified in its charter)	
Pennsylvania	25-0730780
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
One PPG Place, Pittsburgh, Pennsylvania	15272
(Address of principal executive offices)	(Zip code)
Registrant's telephone number, including area code:	412-434-3131

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 $1.66⅔	New York Stock Exchange
0.875% Notes due 2022	New York Stock Exchange
1.400% Notes due 2027	New York Stock Exchange

Securities Registered Pursuant to Section 12(g) of the Act: None

Indicate by check mark if the Registrant is a well-known seasoned issuer as defined in Rule 405 of the Securities Act. YES x 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 x
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, and (2) has been subject to such filing requirements for the past 90 days. YES x NO ¨
Indicate by checkmark whether the registrant has submitted electronically and posted on its corporate web site, if any, every Interactive Date File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). YES x NO ¨
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ¨
Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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. (Check one):

Large accelerated filer x	Accelerated filer ¨
Non-accelerated filer ¨	Smaller reporting company ¨

(Do not check if a smaller
reporting company)

Indicate by check mark whether the Registrant is a shell company (as defined by Rule 12b-2 of the Act). YES o NO x

The aggregate market value of common stock held by non-affiliates as of June 30, 2015, was $30,935 million.
As of January 31, 2015, 266,765,632 shares of the Registrant’s common stock, with a par value of 1.66^2/_3$ per share, were outstanding. As of that date, the aggregate market value of common stock held by non-affiliates was $25,278 million.

DOCUMENTS INCORPORATED BY REFERENCE

Document	Incorporated By Reference In Part No.
Portions of PPG Industries, Inc. Proxy Statement for its 2016 Annual Meeting of Shareholders	III

PPG INDUSTRIES, INC.
AND CONSOLIDATED SUBSIDIARIES

As used in this report, the terms “PPG,” “Company,” “Registrant,” “we,” “us” and “our” refer to PPG Industries, Inc., and its subsidiaries, taken as a whole, unless the context indicates otherwise.

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Note on Incorporation by Reference
Throughout this report, various information and data are incorporated by reference from the Company’s 2015 Annual Report (hereinafter referred to as “the Annual Report”). Any reference in this report to disclosures in the Annual Report shall constitute incorporation by reference only of that specific information and data into this Form 10-K.

Part I

Item 1. Business

PPG Industries, Inc., manufactures and distributes a broad range of coatings, specialty materials and glass products. PPG was incorporated in Pennsylvania in 1883.

PPG's vision is to be the world's leading coatings company by consistently delivering high-quality, innovative and sustainable solutions that customers trust to protect and beautify their products and surroundings.

PPG's business is comprised of three reportable business segments: Performance Coatings, Industrial Coatings and Glass.

Performance Coatings and Industrial Coatings

PPG is a major global supplier of coatings. The Performance Coatings and Industrial Coatings reportable segments supply coatings and specialty materials for customers in a wide array of end-use markets, including industrial equipment, appliances and packaging; factory-finished aluminum extrusions and steel and aluminum coils; marine and aircraft equipment; automotive original equipment ("automotive OEM"); and other industrial and consumer products. In addition to supplying coatings to the automotive OEM market, PPG supplies refinishes to the automotive aftermarket. PPG also serves commercial and residential new build and maintenance markets by supplying coatings to painting and maintenance contractors and directly to consumers for decoration and maintenance. The coatings industry is highly competitive and consists of several large firms with global presence and many smaller firms serving local or regional markets. PPG competes in its primary markets with the world's largest coatings companies, most of which have global operations, and many smaller regional coatings companies.

Performance Coatings

The Performance Coatings reportable segment is comprised of the refinish, aerospace, protective and marine, architectural – Americas and Asia Pacific and architectural – EMEA coatings businesses.

The refinish coatings business supplies coatings products for automotive and commercial transport/fleet repair and refurbishing, light industrial coatings and specialty coatings for signs. These products are sold primarily through independent distributors.

The aerospace coatings business supplies coatings, sealants and transparencies for commercial, military, regional jet and general aviation aircraft, and transparent armor for specialty applications and provides chemical management services for the aerospace industry. PPG supplies products to aircraft manufacturers and maintenance and aftermarket customers around the world both on a direct basis and through a company-owned distribution network.

The protective and marine coatings business supplies coatings and finishes for the protection of metals and structures to metal fabricators, heavy duty maintenance contractors and manufacturers of ships, bridges and rail cars. These products are sold through company-owned architectural coatings stores, independent distributors and directly to customers.

The architectural coatings-Americas and Asia Pacific business primarily produces coatings used by painting and maintenance contractors and by consumers for decoration and maintenance of residential and commercial building structures. These coatings are sold under a number of brands, including PPG®, GLIDDEN®, COMEX®, OLYMPIC®, DULUX® (in Canada), SIKKENS®, PPG PITTSBURGH PAINTS®, MULCO®, FLOOD®, LIQUID NAILS®, SICO®, CIL®, RENNER®, TAUBMANS®, WHITE KNIGHT®, BRISTOL®, , and HOMAX®. Architectural coatings – Americas and Asia Pacific products are also sold through a combination of company-owned stores, home centers and other regional or national consumer retail outlets, paint dealers, concessionaires and independent distributors and directly to customers. At the end of 2015, the architectural coatings-Americas and Asia Pacific business operated about 920 company-owned stores in North America, about 40 company-owned stores in Australia and about 100 company-owned stores in Central America. In 2015, PPG acquired approximately 60 company-owned stores throughout Central America with its acquisition of Consorcio Latinoamericano. In addition, PPG sells coatings and related products through more than 4,000 stores that are independently owned and operated by more than 700 concessionaires, primarily in Mexico.

The architectural coatings – EMEA business supplies a variety of coatings and purchased sundries to painting contractors and consumers in Europe, the Middle East and Africa. The coatings are sold under a number of brands, including SIGMA®, HISTOR®, SEIGNEURIE®, GUITTET®, PEINTURES GAUTHIER®, RIPOLIN®, JOHNSTONE'S®, LEYLAND®, PRIMALEX®, DEKORAL®, TRILAK®, PROMINENT PAINTS®, GORI®, and BONDEX®. Architectural coatings – EMEA products are sold through a combination of about 685 company-owned stores, regional home centers, paint dealers, and independent distributors and directly to customers.

Price, product performance, technology, quality, distribution, brand recognition and technical and customer service are major competitive factors in the performance coatings businesses.

The major global competitors of the Performance Coatings reportable segment are Akzo Nobel N.V., Axalta Coating Systems Ltd., BASF Corporation, Hempel A/S, the Jotun Group, Masco Corporation, the Sherwin-Williams Company, Valspar Corporation, Benjamin Moore, Materis Paints and RPM International Inc. The average number of persons employed by the Performance Coatings reportable segment during 2015 was about 28,600.

Industrial Coatings

The Industrial Coatings reportable segment is comprised of the automotive OEM, industrial coatings, packaging coatings, and specialty coatings and materials businesses. Industrial, automotive OEM, packaging coatings, and specialty coatings and materials products are formulated specifically for the customers' needs and application methods. The industrial and automotive OEM coatings businesses sell directly to a variety of manufacturing companies. PPG also supplies adhesives and sealants for the automotive industry and metal pretreatments and related chemicals for industrial and

automotive applications. PPG has established alliances with Kansai Paints to serve certain automotive OEMs and Asian Paints Ltd. to serve certain aftermarket customers and automotive OEMs. PPG owns a 60% interest in PPG Kansai Automotive Finishes to serve Japanese-based automotive OEM customers in North America and Europe. The packaging coatings business supplies coatings to the manufacturers of aerosol, food, and metal beverage containers.
The primary specialty coatings and materials products are amorphous precipitated silicas for tire, battery separator and other end-use markets; TESLIN® substrate used in such applications as radio frequency identification (RFID) tags and labels, e-passports, drivers' licenses and identification cards; Organic Light Emitting Diode (OLED) materials for use in displays and lighting; optical lens materials and photochromic dyes for optical lenses and color-change products. Product quality and performance, distribution and technical service are the most critical competitive factors to the specialty coatings and materials business.

Price, product performance, technology, cost effectiveness, quality and technical and customer service are major competitive factors in the industrial, automotive OEM and packaging coatings businesses.

The major global competitors of the Industrial Coatings reportable segment are Akzo Nobel N.V., Axalta Coating Systems Ltd., BASF Corporation, Valspar Corporation, and Nippon Paint. The average number of persons employed by the Industrial Coatings reportable segment during 2015 was about 11,900.

Glass

The Glass reportable segment is comprised of the flat glass and fiber glass businesses. PPG is a producer of flat glass in North America and a producer of fiber glass in North America and Europe, as well as Asia through our partnership with Nan Ya Plastics Corp primarily to serve the electronics industry. PPG's major markets are commercial and residential construction and the wind energy, energy infrastructure, transportation and electronics industries. Most glass products are sold directly to manufacturing companies. PPG manufactures flat glass by the float process and fiber glass by the continuous-strand process.

Price, quality, technology and customer service are the key competitive factors in the glass businesses. The Company competes with several major producers of flat glass, including Asahi Glass Company, Cardinal Glass Industries, Guardian Industries and NSG Pilkington, and many major producers of fiber glass throughout the world, including Owens Corning, Jushi Group, Johns Manville Corporation, CPIC Fiberglass and Taishan Fiberglass. The average number of persons employed by the Glass reportable segment during 2015 was about 2,900.

Strategic Acquisitions

During 2015, the Performance Coatings and Industrial Coatings segments made several strategic acquisitions, as follows:

Performance Coatings

On October 1, 2015, PPG acquired a majority interest in the automotive and aerospace sealants and adhesives business of Le Joint Français SNC ("LJF"), a France-based specialty sealants and adhesives manufacturer serving the aerospace, automotive and insulating glass industries. The new joint venture between PPG and LJF is Sealants Europe SAS. This acquisition brings new approvals and technology variants to PPG that will support geographic expansion and aid growth in existing PPG markets. LJF has been a long-time licensee of PPG Aerospace sealant technology. PPG reports the sales and income from operations for LJF as part of the aerospace coatings business.

On July 1, 2015, PPG acquired Cuming Microwave Corporation based in Avon, Massachusetts, and its wholly-owned subsidiary Cuming-Lehman Chambers, Inc., based in Chambersburg, Pennsylvania. The acquisition enhances PPG's portfolio of aerospace coatings with specialty coatings and materials that absorb microwaves and radio waves such as radar. The products are used for military aircraft and also have applications in electronics, telecommunications, medical and automotive end-uses. PPG reports the sales and income from operations for Cuming Microwave Corporation as part of the aerospace coatings business.

On June 2, 2015, PPG acquired Consorcio Latinoamericano, which operates a network of 57 paint stores in Central America. With this acquisition, PPG now operates 101 company-owned stores across Belize, El Salvador, Guatemala, Honduras, Costa Rica, Nicaragua and Panama. PPG has branded stores in Panama with the Glidden brand, which is well recognized in the region, and plans to offer products from its protective and marine coatings business in stores throughout Central America. Consorcio Latinoamericano operated as a concessionaire network for PPG-Comex, the Company's architectural paint and coatings business in Mexico and Central America. PPG reports the sales and income from operations for Consorcio Latinoamericano as part of the architectural coatings - Americas and Asia Pacific business.

Industrial Coatings

On September 30, 2015, PPG completed the acquisition of the remaining interest in Chemfil Canada Limited, a joint venture of PPG and Madinal Enterprises. The acquisition enhances PPG’s pretreatment presence and capabilities in Canada. Chemfil Canada produces pretreatment produces and general industrial chemicals for automotive OEMs and industrial customers in Canada. PPG reports the sales and income from operations for Chemfil Canada as part of the automotive OEM business.

On September 1, 2015, PPG completed the acquisition of I.V.C. Industrial Coatings, Inc. (“IVC”), a U.S.-based specialty powder and liquid coatings company. IVC’s industry-leading coatings are used on a wide variety of products such as metal office furniture, material handling and storage products, automotive parts, motorcycles, industrial containers, small appliances and electronics such as printers, servers and audio-visual equipment. The addition of IVC's high-quality products and industry expertise will further enhance PPG's ability to deliver a robust portfolio of industry-leading industrial coatings solutions. PPG reports the sales and income from operations for IVC as part of the industrial coatings business.

On April 1, 2015, PPG completed the acquisition of Revocoat S.A.S from the Axson Group. Revocoat, headquartered in France, is a world leader in automotive adhesives and sealants and offers a range of automotive assembly products such as complementary epoxy-based products, polyurethanes and water-based emulsions. Revocoat employs more than 500 people and operates eight manufacturing facilities and one research and development center. PPG reports the sales and income from operations for Revocoat as part of the automotive OEM business.

Raw Materials and Energy

The effective management of raw materials and energy is important to PPG's continued success. The Company's most significant raw materials are epoxy and other resins, titanium dioxide and other pigments, and solvents in the coatings segments; sand and soda ash for the specialty coatings and materials business; and sand, clay and soda ash in the Glass segment. Coatings raw materials, which include both organic, primarily petroleum based, materials and inorganic materials, including titanium dioxide, comprise between 70% and 80% of cost of goods sold, excluding depreciation and amortization, in most coatings formulations and represent PPG's single largest production cost component.

Energy is a significant production cost in the Glass segment, and our primary energy source is natural gas. Natural gas is expected to remain a competitive fuel source when compared to alternatives, especially on a global basis. We will continue to use competitive sourcing and consumption reduction initiatives to manage natural gas costs.

Most of the raw materials and energy used in production are purchased from outside sources, and the Company has made, and plans to continue to make, supply arrangements to meet the planned operating requirements for the future. Supply of critical raw materials and energy is managed by establishing contracts, multiple sources, and identifying alternative materials or technology whenever possible. Our products use both petroleum-derived and bio-based materials as part of a product renewal strategy. While prices for these raw materials typically fluctuate with energy prices, such fluctuations are impacted by the fact that the manufacture of our raw materials is several steps downstream from crude oil and natural gas.

The Company is continuing its aggressive sourcing initiatives to broaden our supply of high quality raw materials. These initiatives include qualifying multiple and local sources of supply, including suppliers from Asia and other lower cost regions of the world and a reduction in the amount of titanium dioxide used in our product formulations. Our global efforts to reduce titanium dioxide consumption have been successful to date and are expected to continue.

Titanium dioxide is a raw material widely used in the paint and coatings industry as a pigment to provide hiding, durability and whiteness characteristics. PPG purchases both sulfate-grade and chloride-grade titanium dioxide from suppliers for use in coatings formulations. The Company has undertaken a strategic initiative to secure and enhance PPG's supply of titanium dioxide, as well as to minimize PPG's use of this raw material. PPG possesses intellectual property and expertise in the production and finishing of titanium dioxide pigment. PPG intends to continue to leverage this technology and intends to develop innovative supply solutions through technical collaborations, joint ventures and licensing arrangements with other interested parties.

PPG signed a license agreement with Henan Billions Chemicals Co., Ltd. ("Billions"), under which PPG has licensed certain chloride-based titanium dioxide technologies for use at Billions' titanium dioxide refinement facilities in China. In addition, PPG has signed a long-term purchase agreement for titanium dioxide with Billions. In the fourth quarter of 2015, PPG began using chloride-grade titanium dioxide produced in commercial quantities by Billions using PPG's licensed chloride-based technology. PPG is using the chloride-grade titanium dioxide to produce standard grades of coatings products. Billions may also elect to sell its chloride-based titanium dioxide to third parties.

We are subject to existing and evolving standards relating to the registration of chemicals which could potentially impact the availability and viability of some of the raw materials we use in our production processes. Our ongoing global product stewardship efforts are directed at maintaining our compliance with these standards.

Changes to chemical registration regulations have been proposed or implemented in the EU and many other countries, including China, Canada, the United States, and Korea. Because implementation of many of these programs has not

been finalized, the financial impact cannot be estimated at this time. We anticipate that the number of chemical registration regulations will continue to increase globally, and we have implemented programs to track and comply with these regulations.
Given the recent volatility in certain energy-based input costs and foreign currencies, the Company is not able to predict with certainty the 2016 full year impact of related changes in raw material pricing. Also, given the distribution nature of many of our businesses, logistics and distribution costs are sizable, as are wages and benefits to a lesser degree. In aggregate, raw material feedstock prices in 2015 were lower, including oil-related products. Since oil is traded in U.S. dollars globally, the strengthening of the dollar against a wide variety of foreign currencies muted some of the oil-related benefits in certain regions, and in certain cases resulted in inflationary raw material prices.

Research and Development

Technology innovation has been a hallmark of PPG's success throughout its history. Research and development costs, including depreciation of research facilities, were $505 million, $509 million and $479 million during 2015, 2014 and 2013, respectively. These costs totaled approximately 3% of annual sales in 2015, 2014 and 2013, respectively. We have obtained government funding for a small portion of the Company's research efforts, and we will continue to pursue government funding where appropriate.

PPG owns and operates several facilities to conduct research and development relating to new and improved products and processes. In addition to the Company's centralized principal research and development centers (See Item 2 of this Form 10-K), operating segments manage their development through centers of excellence. As part of our ongoing efforts to manage our formulations and raw material costs effectively, we operate a global competitive sourcing laboratory in China. Because of the Company's broad array of products and customers, PPG is not materially dependent upon any single technology platform.

The Company seeks to optimize its investment in research and development to create new products to drive profitable growth. We align our product development with the macro trends in the end-use markets we serve and leverage core technology platforms to develop products for unmet market needs. Our history of successful technology introductions is based on a commitment to an efficient and effective innovation process and disciplined portfolio management.

Patents

PPG considers patent protection to be important; however, the Company's reportable business segments are not materially dependent upon any single patent or group of related patents. PPG earned $39 million in 2015, $50 million in 2014 and $48 million in 2013 from royalties and the sale of technical know-how.

Backlog

In general, PPG does not manufacture its products against a backlog of orders. Production and inventory levels are geared primarily to projections of future demand and the level of incoming orders.

Global Operations

PPG has a significant investment in non-U.S. operations. This broad geographic footprint serves to lessen the significance of economic impacts occurring in any one region on PPG's total net sales and income from continuing operations. As a result of our expansion outside the U.S., we are subject to certain inherent risks, including economic and political conditions in international markets and fluctuations in foreign currency exchange rates.

Our net sales in the developed and emerging regions of the world for the years ended December 31st are summarized below:

($ in millions)	Net Sales		
	2015	2014	2013
United States, Canada, Western Europe	$10,708	$11,139	$10,311
Latin America, Central and Eastern Europe, Middle East, Africa, Asia Pacific	4,622	4,221	3,954
Total	$15,330	$15,360	$14,265

Refer to Note 19, "Reportable Business Segment Information" under Item 8 of this Form 10-K for geographic information related to PPG's property, plant and equipment, and for additional geographic information pertaining to sales.

Seasonality

PPG's income from continuing operations has typically been greater in the second and third quarters and cash flow from operations has been greatest in the fourth quarter due to end-use market seasonality, primarily in PPG's architectural coatings businesses. Demand for PPG's architectural coatings products is typically strongest in the second and third quarters due to higher home improvement, maintenance and construction activity during the spring and summer months in the U.S., Canada and Europe. The Latin America paint season is strongest in the fourth quarter. These higher activity levels result in higher outstanding receivables that are collected in the fourth quarter generating higher fourth quarter cash flow.

Employee Relations

The average number of persons employed worldwide by PPG during 2015 was about 46,600. The Company has numerous collective bargaining agreements throughout the world. We observe local customs, legislation and practice in labor relations when negotiating collective bargaining agreements. There were no significant work stoppages in 2015. While we have experienced occasional work stoppages as a result of the collective bargaining process and may experience some work stoppages in the future, we believe that we will be able to negotiate all labor agreements on satisfactory terms. To date, these work stoppages have not had a significant impact on PPG’s operating results. Overall, the Company believes it has good relationships with its employees.

Environmental Matters

PPG is subject to existing and evolving standards relating to protection of the environment. PPG is negotiating with various government agencies concerning 126 current and former manufacturing sites and offsite waste disposal locations, including 24 sites on the National Priority List. While PPG is not generally a major contributor of wastes to these offsite waste disposal locations, each potentially responsible party may face governmental agency assertions of joint and several liability. Generally, however, a final allocation of costs is made based on relative contributions of wastes to the site. There is a wide range of cost estimates for cleanup of these sites, due largely to uncertainties as to the nature and extent of their condition and the methods that may have to be employed for their remediation. The Company has established reserves for onsite and offsite remediation of those sites where it is probable that a liability has been incurred and the amount of loss can be reasonably estimated.

The Company’s experience to date regarding environmental matters leads it to believe that it will have continuing expenditures for compliance with provisions regulating the protection of the environment and for present and future remediation efforts at waste and plant sites. Management anticipates that such expenditures will occur over an extended period of time.

In addition to the $233 million currently reserved for environmental remediation efforts, we may be subject to loss contingencies related to environmental matters estimated to be approximately $75 million to $200 million. These reasonably possible unreserved losses relate to environmental matters at a number of sites. The loss contingencies related to these sites include significant unresolved issues such as the nature and extent of contamination at these sites and the methods that may have to be employed to remediate them.

Capital expenditures for environmental control projects were $15 million, $14 million and $22 million in 2015, 2014, and 2013, respectively. It is expected that expenditures for such projects in 2016 will be in the range of $25 million to $35 million. Although future capital expenditures are difficult to estimate accurately because of constantly changing regulatory standards and policies, it can be anticipated that environmental control standards will become increasingly stringent and the cost of compliance will increase.

In management’s opinion, the Company operates in an environmentally sound manner, is well positioned, relative to environmental matters, within the industries in which it operates and the outcome of these environmental contingencies will not have a material adverse effect on PPG’s financial position or liquidity; however, any such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized.

See Note 13, “Commitments and Contingent Liabilities,” under Item 8 of this Form 10-K for additional information related to environmental matters and our accrued liability for estimated environmental remediation costs.

Public and governmental concerns related to climate change continue to grow, leading to efforts to limit the greenhouse gas (“GHG”) emissions believed to be responsible. While PPG has operations in many countries, a substantial portion of PPG’s GHG emissions are generated by locations in the U.S., where considerable legislative and regulatory activity has been taking place. PPG has, and will continue to, annually report our global GHG emissions to the voluntary Carbon Disclosure project.

Since PPG’s GHG emissions arise principally from combustion of fossil fuels, PPG has for some time recognized the desirability of reducing energy consumption and GHG generation. For the three year period ended December 31, 2015, energy consumption was reduced by 23% and GHG emission generation was reduced by 18%.

PPG participates in both the U.S. Department of Energy, BETTER BUILDINGS®, BETTER PLANTS® program, formerly the SAVE ENERGY NOW® Leadership program, and the Environmental Protection Agency ENERGY STAR® Industrial Partnership program, both reinforcing the company’s voluntary efforts to significantly reduce its industrial energy intensity. These programs include developing and implementing energy management processes and setting energy savings targets while providing a suite of educational, training, and technical

resources to help meet those targets. Recognizing the continuing importance of this matter, PPG has a senior management group with a mandate to guide the Company’s progress in this area.

PPG’s public disclosure on energy security and climate change can be viewed in our Sustainability Report at sustainability.ppg.com or at the Carbon Disclosure Project www.cdproject.net.

Available Information

The Company’s website address is www.ppg.com. The Company posts, and shareholders may access without charge, the Company’s recent filings and any amendments thereto of its annual reports on Form 10-K, quarterly reports on Form 10-Q and its proxy statements as soon as reasonably practicable after such reports are filed with the Securities and Exchange Commission (“SEC”). The Company also posts all financial press releases, including earnings releases, to its website. All other reports filed or furnished to the SEC, including reports on Form 8-K, are available via direct link on PPG’s website to the SEC’s website, www.sec.gov. Reference to the Company’s and the SEC’s websites herein does not incorporate by reference any information contained on those websites and such information should not be considered part of this Form 10-K.

Item 1A. Risk Factors

As a global manufacturer of coatings, specialty materials and glass products, we operate in a business environment that includes risks. These risks are not unlike the risks we have faced in the recent past nor are they unlike risks faced by our competitors. Each of the risks described in this section could adversely affect our operating results, financial position and liquidity. While the factors listed here are considered to be the more significant factors, no such list should be considered to be a complete statement of all potential risks and uncertainties. Unlisted factors may present significant additional obstacles which may adversely affect our businesses and our results of operations.

Increases in prices and declines in the availability of raw materials could negatively impact our financial results.

Our financial results are significantly affected by the cost of raw materials. Coatings raw materials, which include both organic, primarily petroleum based, materials and inorganic materials, including titanium dioxide, comprise between 70% and 80% of cost of goods, exclusive of depreciation and amortization, sold in most coatings formulations and represent PPG’s single largest production cost component.

While not our customary practice, we also import raw materials and intermediates, particularly for use at our manufacturing facilities in the emerging regions of the world. In most cases, those imports are priced in the currency of the supplier and, therefore, if that currency strengthens against the currency of our manufacturing facility, our margins may be lower.

Most of our raw materials are purchased from outside sources, and the Company has made, and plans to continue to make, supply arrangements to meet the planned operating requirements for the future. Adequate supply of critical raw materials is managed by establishing contracts, procuring from multiple sources, and identifying alternative materials or technology whenever possible. The Company is continuing its aggressive sourcing initiatives to effectively broaden our supply of high quality raw materials. These initiatives include qualifying multiple and local sources of supply, including suppliers from Asia and other lower cost regions of the world and a reduction in the amount of titanium dioxide and other raw materials used in our product formulations. Our products use both petroleum-derived and bio-based materials as part of a product renewal strategy.

An inability to obtain critical raw materials would adversely impact our ability to produce products. Increases in the cost of raw materials may have an adverse effect on our income from continuing operations or cash flow in the event we are unable to offset these higher costs in a timely manner.

The pace of economic growth and level of uncertainty could have a negative impact on our results of operations and cash flows.

During 2015, overall economic conditions remained mixed among the major global economies. PPG provides products and services to a variety of end-use markets in many geographies. This broad end-use market exposure and expanded geographic presence lessens the significance of any individual decrease in activity levels; nonetheless, lower demand levels may result in lower sales, which would result in reduced income from continuing operations and cash flows.

Refer to Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” of this Form 10-K for discussion of the economic conditions in 2015 and our outlook on certain economic conditions in 2016.

We are subject to existing and evolving standards relating to the protection of the environment.

Environmental laws and regulations control, among other things, the discharge of pollutants into the air and water, the handling, use, treatment, storage and clean-up of hazardous and non-hazardous waste, the investigation and remediation of soil and groundwater affected by hazardous substances, and regulate various health and safety matters. The environmental laws and regulations we are subject to impose liability for the costs of, and damages resulting from, cleaning up current sites, past spills, disposals and other releases of hazardous substances. Violations of these laws and regulations can also result in fines and penalties. Future environmental laws and regulations may require substantial capital expenditures or may require or cause us to modify or curtail our operations, which may have a material adverse impact on our business, financial condition and results of operations.

As described in Note 13, “Commitments and Contingent Liabilities,” under Item 8 of this Form 10-K, we are currently undertaking environmental remediation activities at a number of our current and former facilities and properties, the cost of which is substantial. In addition to the amounts currently reserved, we may be subject to loss contingencies related to environmental matters estimated to be as much as $75 million to $200 million. Such unreserved losses are reasonably possible but are not currently considered to be probable of occurrence.

We are involved in a number of lawsuits and claims, and we may be involved in future lawsuits and claims, in which substantial monetary damages are sought.

PPG is involved in a number of lawsuits and claims, both actual and potential, in which substantial monetary damages are sought. Those lawsuits and claims relate to contract, patent, environmental, product liability, antitrust, employment and other matters arising out of the conduct of PPG’s current and past business activities. Any such claims, whether with or without merit, could be time consuming, expensive to defend and could divert management’s attention and resources. We maintain insurance against some, but not all, of these potential claims, and the levels of insurance we do maintain may not be adequate to fully cover any and all losses. We believe that, in the aggregate, the outcome of all current lawsuits and claims involving PPG, including asbestos-related claims in the event the settlement described in Note 13, “Commitments and Contingent Liabilities” under Item 8 of this Form 10-K does not become effective, will not have a material effect on PPG’s consolidated financial position or liquidity; however, such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized. Nonetheless, the results of any future litigation or claims are inherently unpredictable, but such outcomes could have a material adverse effect on our results of operations, cash flow or financial condition.

Fluctuations in foreign currency exchange rates could affect our financial results.

We earn revenues, pay expenses, own assets and incur liabilities in countries using currencies other than the U.S. dollar. Because our consolidated financial statements are presented in U.S. dollars, we must translate revenues and expenses into U.S. dollars at the average exchange rate during each reporting period, as well as assets and liabilities into U.S. dollars at exchange rates in effect at the end of each reporting period. Therefore, increases or decreases in the value of the U.S. dollar against other currencies will affect our net revenues, operating income and the value of balance sheet items denominated in foreign currencies. We use derivative financial instruments to reduce our net exposure to currency exchange rate fluctuations related to foreign currency transactions. However, fluctuations in foreign currency exchange rates, particularly the strengthening of the U.S. dollar against major currencies, could materially affect our financial results expressed in U.S. dollars. In 2015, this strengthening had an unfavorable impact on full year net sales and income before income taxes from the translation of these foreign earnings into U.S. dollars of approximately $1.1 billion and $120 million, respectively.

For many years, we have been a defendant in lawsuits involving claims alleging personal injury from exposure to asbestos.

Most of our potential exposure relates to allegations by plaintiffs that PPG should be liable for injuries involving asbestos containing thermal insulation products manufactured by Pittsburgh Corning Corporation ("PC"). PPG is a 50% shareholder of PC. We have entered into a settlement arrangement with several parties concerning these asbestos claims as discussed in Note 13, "Commitments and Contingent Liabilities," under Item 8 of this Form 10-K. The arrangement remains subject to court proceedings and the satisfaction of certain closing conditions. We are working with the court and the parties to finalize the arrangement in the first half of the 2016. If the arrangement is not finalized, the outcome could be material to the results of operations of any particular period.

We are subject to a variety of complex U.S. and non-U.S. laws and regulations which could increase our compliance costs.

We are subject to a wide variety of complex U.S. and non-U.S. laws and regulations, and legal compliance risks, including securities laws, tax laws, environmental laws, employment and pension-related laws, competition laws, U.S. and foreign export and trading laws, and laws governing improper business practices, including bribery. We are affected by new laws and regulations and changes to existing laws and regulations, including interpretations by courts and regulators. These laws and regulations effectively expand our compliance obligations and potential enforcement actions by governmental authorities or litigation related to them.

New laws and regulations or changes in existing laws or regulations or their interpretation could increase our compliance costs. For example, regulations concerning the composition, use and transport of chemical products continue to evolve. Developments concerning these regulations could potentially impact the availability or viability of some of the raw materials we use in our product formulations and/or our ability to supply certain products to some customers or markets. Import/export regulations also continue to evolve and could result in increased compliance costs, slower product movements or additional complexity in our supply chains.

Our international operations expose us to additional risks and uncertainties that could affect our financial results.

PPG has a significant investment in global operations. This broad geographic footprint serves to lessen the significance of economic impacts occurring in any one region. Notwithstanding the benefits of geographic diversification, our ability to achieve and maintain profitable growth in international markets is subject to risks related to the differing legal, political, social and regulatory requirements and economic conditions of many countries. As a result of our operations outside the U.S., we are subject to certain inherent risks, including political and economic uncertainty, inflation rates, exchange rates, trade protection measures, local labor conditions and laws, restrictions on foreign investments and repatriation of earnings, and weak intellectual property protection. Our percentage of sales generated in 2015 by products sold outside the U.S. was approximately 58%.

Changes in the tax regimes and related government policies and regulations in the countries in which we operate could adversely affect our results and our effective tax rate.

As a multinational corporation, we are subject to various taxes in both the U.S. and non-U.S. jurisdictions. Due to economic and political conditions, tax rates in these various jurisdictions may be subject to significant change. Our future effective income tax rate could be affected by changes in the mix of earnings in countries with differing statutory tax rates, changes in the valuation of deferred tax assets or changes in tax laws or their interpretation. Recent developments, including the European Commission's investigations on illegal state aid as well as the Organisation for Economic Co-operation and Development project on Base Erosion and Profit Shifting may

result in changes to long-standing tax principles, which could adversely affect our effective tax rate or result in higher cash tax liabilities. If our effective income tax rate was to increase, our cash flows, financial condition and results of operations would be adversely affected.

Although we believe that our tax filing positions are appropriate, the final determination of tax audits or tax disputes may be different from what is reflected in our historical income tax provisions and accruals. If future audits find that additional taxes are due, we may be subject to incremental tax liabilities, possibly including interest and penalties, which could have a material adverse effect on our cash flows, financial condition and results of operations.

Business disruptions could have a negative impact on our results of operations and financial condition.

Unexpected events, including supply disruptions, temporary plant and/or power outages, work stoppages, natural disasters and severe weather events, computer system disruptions, fires, war or terrorist activities, could increase the cost of doing business or otherwise harm the operations of PPG, our customers and our suppliers. It is not possible for us to predict the occurrence or consequence of any such events. However, such events could reduce our ability to supply products, reduce demand for our products or make it difficult or impossible for us to receive raw materials from suppliers or to deliver products to customers.

Failure to successfully integrate acquired businesses into our existing operations could adversely affect our financial results.

Part of the Company’s strategy is growth through acquisitions, and we will likely acquire additional businesses and enter into additional joint ventures in the future. Growth through acquisitions and the formation of joint ventures involve risks, including:

- difficulties in assimilating acquired companies and products into our existing business;
- delays in realizing the benefits from the acquired companies or products;
- diversion of our management’s time and attention from other business concerns;
- difficulties due to lack of or limited prior experience in any new markets we may enter;
- unforeseen claims and liabilities, including unexpected environmental exposures or product liability;
- unexpected losses of customers or suppliers of the acquired or existing business;
- difficulty in conforming the acquired business’ standards, processes, procedures and controls to those of our operations; and
- difficulties in retaining key employees of the acquired businesses.

Our failure to address these risks or other problems encountered in connection with our past or future acquisitions and joint ventures could cause us to fail to realize the anticipated benefits of such acquisitions or joint ventures and could adversely affect our results of operations, cash flow or financial condition.

Our ability to understand our customers’ specific preferences and requirements, and to innovate, develop, produce and market products that meet customer demand is critical to our business results.

Our business relies on continued global demand for our brands and products. To achieve business goals, we must develop and sell products that appeal to customers. This is dependent on a number of factors, including our ability to produce products that meet the quality, performance and price expectations of our customers and our ability to develop effective sales, advertising and marketing programs. Future growth will depend on our ability to continue to innovate our existing products and to develop and introduce new products. If we fail to keep pace with product innovation on a competitive basis or to predict market demands for our products, our business, financial condition and results of operations could be adversely affected.

The industries in which we operate are highly competitive.

With each of our businesses, an increase in competition may cause us to lose market share, lose a large regional or global customer, or compel us to reduce prices to remain competitive, which could result in reduced margins for our products. Competitive pressures may not only reduce our margins but may also impact our revenues and our growth which could adversely affect our results of operations.

The security of our information technology systems could be compromised, which could adversely affect our ability to operate.

Increased global information technology security requirements, threats and sophisticated and targeted computer crime pose a risk to the security of our systems, networks and the confidentiality, availability and integrity of our data. Despite our efforts to protect sensitive information and confidential and personal data, our facilities and systems may be vulnerable to security breaches. This could lead to negative publicity, theft, modification or destruction of proprietary information or key information, manufacture of defective products, production downtimes and operational disruptions, which could adversely affect our reputation, competitiveness and results of operations.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The Company’s corporate headquarters is located in Pittsburgh, Pa. The Company’s manufacturing facilities, sales offices, research and development centers and distribution centers are located throughout the world. As of February 18, 2016, the Company operated 156 manufacturing facilities in 42 countries, and the principal manufacturing and distribution facilities were as follows:

Performance Coatings:	Amsterdam, Netherlands; Birstall, United Kingdom; Budapest, Hungary; Clayton, Australia; Delaware, Ohio; Dover, Del.; Gonfreville, France; Huntsville, Ala.; Huron, Ohio; Kunshan, China; Little Rock, Ark.; Milan, Italy; Mojave, Calif.; Moreuil, France; Shildon, United Kingdom; Sylmar, Calif.; Soborg, Denmark; Stowmarket, United Kingdom; Wroclaw, Poland; about 920 company-owned stores in North America; about 685 company-owned stores in the EMEA region, including 212 stores in France and 192 stores in the United Kingdom; about 100 company-owned stores in Latin America and about 40 company-owned stores in Australia.
Industrial Coatings:	Barberton, Ohio; Busan, South Korea; Cieszyn, Poland; Cleveland, Ohio; Lake Charles, La.; Oak Creek, Wis.; Quattordio, Italy; San Juan del Rio, Mexico; Sumaré, Brazil; Tianjin, China, and Zhangjiagang, China
Glass:	Carlisle, Pa.; Hoogezand, Netherlands; Wigan, United Kingdom; Shelby, N.C. and Wichita Falls, Texas

Including the principal manufacturing facilities noted above, the Company has manufacturing facilities in the following geographic areas:

United States:	42 manufacturing facilities in 19 states.
Other Americas:	23 manufacturing facilities in 5 countries.
EMEA:	64 manufacturing facilities in 27 countries.
Asia:	27 manufacturing facilities in 9 countries.

The Company’s principal research and development centers are located in Allison Park, Pa.; Cheswick, Pa.; Monroeville, Pa.; Shelby, N.C.; Burbank, Calif. and Tepexpan, Mexico.

The Company’s headquarters, certain distribution centers and substantially all company-owned paint stores are located in facilities that are leased while the Company’s other facilities are generally owned. Our facilities are considered to be suitable and adequate for the purposes for which they are intended and overall have sufficient capacity to conduct business in the upcoming year.

Item 3. Legal Proceedings

PPG is involved in a number of lawsuits and claims, both actual and potential, including some that it has asserted against others, in which substantial monetary damages are sought. These lawsuits and claims may relate to contract, patent, environmental, product liability, antitrust, employment and other matters arising out of the conduct of PPG’s current and past business activities. To the extent that these lawsuits and claims involve personal injury and property damage, PPG believes it has adequate insurance; however, certain of PPG’s insurers are contesting coverage with respect to some of these claims, and other insurers, as they had prior to the asbestos settlement described below, may contest coverage with respect to some of the asbestos claims if the settlement is not implemented. PPG’s lawsuits and claims against others include claims against insurers and other third parties with respect to actual and

contingent losses related to environmental, asbestos and other matters.
The results of any future litigation and claims are inherently unpredictable. However, management believes that, in the aggregate, the outcome of all lawsuits and claims involving PPG, including asbestos-related claims in the event the settlement does not become effective, will not have a material effect on PPG's consolidated financial position or liquidity; however, such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized.
For many years, PPG has been a defendant in lawsuits involving claims alleging personal injury from exposure to asbestos. For a description of asbestos litigation affecting the Company and the terms and status of the proposed asbestos settlement arrangement, see Note 13, "Commitments and Contingent Liabilities" under Item 8 of this Form 10-K.
In the past, the Company and others have been named as defendants in several cases in various jurisdictions claiming damages related to exposure to lead and remediation of lead-based coatings applications. PPG has been dismissed as a defendant from most of these lawsuits and has never been found liable in any of these cases.
In December 2011, the United States Environmental Protection Agency ("EPA") issued a Finding of Violation alleging that PPG's Delaware, Ohio facility violated certain leak detection and repair requirements of the federal Clean Air Act. PPG and the EPA are engaged in discussions in an effort to try to resolve this matter with a negotiated consent decree. As part of these settlement discussions, the EPA is currently seeking a civil penalty from PPG of approximately $397,000. Final resolution of these matters is subject to further negotiation between PPG and the EPA. However, it is likely that the final penalty will exceed $100,000.
In July 2013, the EPA issued to PPG a Notice of Violation ("NOV") alleging that the Company's Barberton, Ohio facility violated certain air emission regulatory requirements of the federal Clean Air Act. In February 2015, the EPA issued a second NOV to the Company alleging that the Company's Barberton facility had failed to submit certain information requested by the EPA and that the facility exceeded certain air emission limits contained in the facility's air emission permit. PPG and the EPA are engaged in discussions in an effort to try to resolve this matter with a negotiated consent decree. As part of these settlement discussions, the EPA is currently seeking a civil penalty from PPG of approximately $137,500. Final resolution of these matters is subject to further negotiation between PPG and the EPA. However, it is likely that the final penalty will exceed $100,000.

Executive Officers of the Company
Set forth below is information related to the Company's executive officers as of February 18, 2016.

Name	Age	Title
Charles E. Bunch[a]	66	Executive Chairman since September 2015
Michael H. McGarry [b]	57	President and Chief Executive Officer since September 2015
Viktoras R. Sekmakas [c]	55	Executive Vice President since September 2012
Frank S. Sklarsky [d]	59	Executive Vice President and Chief Financial Officer since August 2013
Glenn E. Bost II [e]	64	Senior Vice President and General Counsel since July 2010
Cynthia A. Niekamp [f]	56	Senior Vice President, Automotive Coatings since August 2010

(a) Mr. Bunch served as Chairman and Chief Executive Officer from July 2005 until September 2015.

(b) Mr. McGarry served as President and Chief Operating Officer from March 2015 until September 2015; Chief Operating Officer from August 2014 until March 2015; Executive Vice President from September 2012 through July 2014; and Senior Vice President, Commodity Chemicals from July 2008 until August 2012.

(c) Mr. Sekmakas served as Senior Vice President, Industrial Coatings and President, Europe from September 2011 until August 2012; Senior Vice President, Industrial Coatings and President, Asia Pacific Coatings from August 2010 until September 2011; Vice President Industrial Coatings and President, Asia Pacific Coatings from March 2010 until August 2010; and President PPG Asia Pacific from July 2008 until March 2010.

(d) Mr. Sklarsky was appointed Executive Vice President, Finance, in April 2013 when he joined PPG. Prior to joining PPG, Mr. Sklarsky was Executive Vice President and Chief Financial Officer of Tyco International, Ltd. from December 2010 until September 2012 and was Executive Vice President and Chief Financial Officer of Eastman

Kodak Company from November 2006 until December 2010.

(e) Mr. Bost served as Vice President and Associate General Counsel from July 2006 through June 2010.

(f) Ms. Niekamp was appointed Vice President, Automotive Coatings in January 2009 when she joined PPG from BorgWarner, Inc. Ms. Niekamp will retire from PPG on April 1, 2016.

Item 4. Mine Safety Disclosures

Not Applicable.

Part II

Item 5. Market for the Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

The information required by Item 5 regarding market information, including stock exchange listings and quarterly stock market prices, dividends and holders of common stock is included in Exhibit 13.1 filed with this Form 10-K and is incorporated herein by reference. This information is also included in the PPG Shareholder Information on page 5 of the Annual Report to shareholders.

Directors who are not also officers of the Company receive common stock equivalents pursuant to the PPG Industries, Inc., Deferred Compensation Plan for Directors (“PPG Deferred Compensation Plan for Directors”). Common stock equivalents are hypothetical shares of common stock having a value on any given date equal to the value of a share of common stock. Common stock equivalents earn dividend equivalents that are converted into additional common stock equivalents but carry no voting rights or other rights afforded to a holder of common stock. The common stock equivalents credited to directors under this plan are exempt from registration under Section 4(a)(2) of the Securities Act of 1933 as private offerings made only to directors of the Company in accordance with the provisions of the plan. Under the PPG Deferred Compensation Plan for Directors, each director may elect to defer the receipt of all or any portion of the compensation paid to such director for serving as a PPG director. All deferred payments are held in the form of common stock equivalents. Payments out of the deferred accounts are made in the form of common stock of the Company (and cash as to any fractional common stock equivalent). The directors, as a group, were credited with 15,445; 25,724; and 33,540 common stock equivalents in 2015, 2014 and 2013, respectively, under this plan. The values of the common stock equivalents, when credited, ranged from $90.13 to $98.73 in 2015, $95.59 to $109.91 in 2014, and $69.28 to $91.96 in 2013.

Issuer Purchases of Equity Securities

Month	Total Number of Shares Purchased	Avg. Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Programs [1]	Max. Number of Shares That May Yet Be Purchased Under the Programs
October 2015				
Repurchase program	467,076	$102.94	467,076	10,759,915
November 2015				
Repurchase program	930,165	$103.36	930,165	9,700,096
December 2015				
Repurchase program	1,048,194	$100.90	1,048,194	9,309,064
Total quarter ended December 31, 2015				
Repurchase program	2,445,435	$102.23	2,445,435	9,309,064

[1] In April 2014, PPG’s board of directors authorized a $2 billion repurchase program. The remaining shares that may yet to be purchased under the $2 billion repurchase program have been calculated based upon PPG’s closing stock price on the last business day of the respective month. These repurchase programs have no expiration date.

No shares were withheld in satisfaction of the exercise price and/or tax withholding obligation by holders of employee stock options who exercised options granted under the Company’s equity compensation plans in the fourth quarter of 2015.

Item 6. Selected Financial Data

The information required by Item 6 regarding the selected financial data for the five years ended December 31, 2015 is included in Exhibit 13.2 filed with this Form 10-K and is incorporated herein by reference. This information is also reported in the Five-Year Digest on page 84 of the Annual Report to shareholders.

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations

Executive Overview

Below are our key financial results for the fiscal year ended December 31, 2015:

- Net sales were $15.3 billion, consistent with the prior year, primarily due to unfavorable foreign currency translation (7%) offset by sales from acquired businesses (6%) and higher volumes (1%).
- Cost of sales, exclusive of depreciation and amortization decreased 2% to $8.6 billion.
- Selling, general and administrative expenses decreased 2% to $3.7 billion.
- In April 2015, PPG approved a business restructuring program and recorded a $140 million charge. Partial year savings in 2015 totaled approximately $20 million.
- Income before income taxes was $1.9 billion.
- The effective tax rate for 2015 was 24.2%.
- Net income from continuing operations was $1.4 billion and earnings per diluted share was $5.14.
- Operating cash flow was $1.8 billion.
- Capital expenditures, including acquisitions (net of cash acquired), was $796 million.
- In April 2015, the Company raised the per-share dividend by 7%. In 2015, the Company paid $383 million in dividends and also repurchased approximately $750 million of its outstanding common stock.

Performance Overview

Net Sales

($ in millions, except percentages)	December 31, 2015	2014	2013	Percent Change 2015 vs. 2014	2014 vs. 2013
The Americas					
United States	$6,389	$6,323	$5,712	1.0 %	10.7 %
Other Americas	2,237	1,718	1,445	30.2 %	18.9 %
Europe, Middle East and Africa (EMEA)	4,270	4,802	4,650	(11.1)%	3.3 %
Asia Pacific	2,434	2,517	2,458	(3.3)%	2.4 %
Total	$15,330	$15,360	$14,265	(0.2)%	7.7 %

2015 vs. 2014

Net sales decreased $30 million due to the following:

- Unfavorable foreign currency translation (7%)

Partially offset by:

- Net sales from acquired businesses (6%)
- Higher sales volumes (1%)

Foreign currency translation unfavorably impacted net sales by $1.1 billion as the U.S. dollar strengthened against most foreign currencies versus the prior year.

Acquired businesses added $941 million of sales in 2015, primarily Consorcio Comex S.A. de C.V. (“Comex”), supplemented by several other smaller acquisitions made in 2014 and 2015. In November 2015, Comex reached its one year anniversary and its net sales and income are reported as organic growth subsequent to its anniversary date.

Sales volume growth occurred primarily in the emerging regions and EMEA, while North America sales volumes declined less than 1%.

2014 vs. 2013

Net Sales increased $1.1 billion (8%) due to the following:

- Sales from acquired businesses (4%)
- Higher sales volumes (3%)
- Higher selling prices (1%)

Sales volume growth was fairly consistent across all regions, advancing 3.5% overall.

The sales volume growth was led by a 4.3% improvement in the U.S. and Canada. Asia-Pacific sales volumes also grew 3.9% and Latin America sales volumes grew 3.5% year-over-year. Sales for EMEA grew 2.4%, with growth primarily occurring in the first half of the year.

Acquired businesses added about $600 million of sales in 2014, primarily due to the first quarter 2014 sales of the North American architectural coatings business acquired in April 2013, as well as two months of Comex sales.

Cost of Sales, exclusive of depreciation and amortization

($ in millions, except percentages)	December 31, 2015	2014	2013	Percent Change 2015 vs. 2014	2014 vs. 2013
Cost of sales, exclusive of depreciation and amortization	$8,591	$8,791	$8,314	(2.3)%	5.7 %
Cost of sales as a percentage of net sales	56.0 %	57.2 %	58.3 %	(1.2)%	(1.1)%

2015 vs. 2014

Cost of sales, exclusive of depreciation and amortization, decreased $200 million (2%) due to the following:

- Foreign currency translation
- Lower manufacturing costs

Partially offset by:

- Cost of sales from acquired businesses
- Higher sales volumes

2014 vs. 2013

Cost of sales, exclusive of depreciation and amortization, increased $477 million (6%) due to the following:

- Higher sales volumes
- Cost of sales from acquired businesses

Partially offset by:

- Lower manufacturing costs
- Foreign currency translation

Selling, general and administrative expenses

($ in millions, except percentages)	December 31, 2015	2014	2013	Percent Change 2015 vs. 2014	2014 vs. 2013
Selling, general and administrative expenses	$3,679	$3,758	$3,486	(2.1)%	7.8%
Selling, general and administrative expenses as a percentage of net sales	24.0%	24.5%	24.4%	(0.5)%	0.1%

2015 vs. 2014

Selling, general and administrative expenses decreased $79 million (2%) primarily due to:

- Foreign currency translation

Partially offset by:

- Selling, general and administrative expenses from acquired businesses
- Overhead cost inflation

2014 vs. 2013

Selling, general and administrative expenses increased $272 million (8%) due to the following:

- Selling, general and administrative expenses from acquired businesses
- Overhead cost inflation

Other costs and income

	December 31,			Percent Change	
($ in millions, except percentages)	2015	2014	2013	2015 vs. 2014	2014 vs. 2013
Interest expense, net of Interest income	$86	$137	$153	(37.2)%	(10.5)%
Business restructuring	$140	$—	$98	NA	(100.0)%
Debt refinancing charge	$—	$317	$—	(100.0)%	NA
Other charges	$104	$221	$189	(52.9)%	16.9%
Other income	$(145)	$(260)	$(127)	(44.2)%	104.7%

Interest expense, net of Interest income

Interest expense, net of Interest income decreased $51 million in 2015 versus the prior year largely as a result of a debt refinancing undertaken in the fourth quarter of 2014.

Business restructuring

In 2015, PPG approved a business restructuring program which includes actions necessary to achieve cost synergies related to recent acquisitions. In addition, the program aims to further align employee levels and production capacity in certain businesses and regions based on current product demand, as well as reductions in various global administrative functions. A pre-tax restructuring charge of $140 million was recorded, of which about 85% represents employee severance and other cash charges. PPG expects these restructuring actions will result in full year, pre-tax savings of approximately $105 million by year 2017, including 2015 partial year savings of approximately $20 million. Refer to Note 7, "Business Restructuring" in Item 8 of this Form 10-K for additional information.

In 2013, the Company recorded a pre-tax restructuring charge of $98 million related to a restructuring plan focused on achieving cost synergies through improved productivity and efficiencies. All actions associated with the 2013 restructuring program are completed.

Debt refinancing

In 2014, the Company recorded a pre-tax charge of $317 million representing costs related to a debt refinancing undertaken to lower the Company's future interest costs. The charge consists of an aggregate make-whole cash premium of $179 million for the redemption of public notes, an aggregate cash premium of $43 million for debt redeemed through a tender offer, a realization of net unamortized losses of $89 million on interest rate swaps and forward starting swaps, and a balance of unamortized fees and discounts of $6 million related to the debt redeemed. Refer to Note 8, "Borrowings and Lines of Credit" in Item 8 of this Form 10-K for additional information.

Other charges

The Company recorded pre-tax environmental charges for the environmental remediation at a former chromium manufacturing plant and associated sites in New Jersey of $136 million and $89 million in 2014 and 2013, respectively.

Other Charges in 2015 and 2013 were lower than 2014 due to the timing and amount of these pre-tax environmental charges.

Other income

In 2014, PPG recorded a $22 million pre-tax gain on the divestiture of a flat glass production facility and a $94 million pre-tax gain on PPG's share of the gain recognized from the sale of an equity affiliate's business.

Other Income in 2015 and 2013 was lower than 2014 due to the absence of these benefits. Further, in 2015 Other Income was reduced by an equity affiliate debt refinancing transaction charge of $11 million.

Effective tax rate and earnings per share

	December 31,			Percent Change	
($ in millions, except percentages)	2015	2014	2013	2015 vs. 2014	2014 vs. 2013
Income tax expense	$456	$259	$253	76.1%	2.4%
Effective tax rate	24.2%	18.3%	20.6%	5.9%	(2.3)%
Adjusted effective tax rate, ongoing operations*	24.5%	23.9%	23.1%	0.6%	0.8%
	$5.14	$4.05	$3.27	26.9%	23.9%

Earnings per diluted share, continuing operations					
Adjusted earnings per diluted share*	$5.69	$4.88	$3.83	16.6 %	27.4 %

*See the Regulation G Reconciliation.

The effective tax rate for the year-ended December 31, 2015 was affected by a shift in PPG's global mix of earnings toward jurisdictions with higher statutory tax rates, due in part to recent acquisitions, including Comex.

Earnings per diluted share for the year ended December 31, 2015 grew consecutively from 2014 and 2013. The Company benefited from the 11.5 million shares of stock repurchased in 2013, the 7.6 million shares of stock repurchased during 2014 and the 7.0 million shares repurchased in 2015.

In addition, about 21.6 million shares were added to treasury stock as a result of the January 2013 exchange transaction that was part of the separation of PPG’s former commodity chemicals business.

On April 16, 2015, the PPG Board of Directors approved a 2-for-1 split of the Company’s common stock for all shareholders. The record date for the split was the close of business on May 11, 2015, and the additional shares were distributed on June 12, 2015. Each shareholder as of the date of record received one additional share of common stock for each share held. Historical per share and share data (except for shares on the balance sheet) in this Form 10-K give retroactive effect to the stock split. These reclassifications had no impact on our previously reported net income, total assets, cash flows or shareholders’ equity.

Regulation G Reconciliation - Results from Operations
PPG Industries believes investors' understanding of the company's operating performance is enhanced by the disclosure of net income, earnings per diluted share and the effective tax rate adjusted for nonrecurring charges. PPG's management considers this information useful in providing insight into the company's ongoing operating performance because it excludes the impact of items that cannot reasonably be expected to recur on a quarterly basis. Net income and earnings per diluted share adjusted for these items are not recognized financial measures determined in accordance with U.S. generally accepted accounting principles (GAAP) and should not be considered a substitute for net income or earnings per diluted share or other financial measures as computed in accordance with U.S. GAAP. In addition, adjusted net income, earnings per diluted share and the effective tax rate may not be comparable to similarly titled measures as reported by other companies.

Income before income taxes is reconciled to adjusted income before income taxes, the effective tax rate from continuing operations is reconciled to the adjusted effective tax rate from continuing operations and net income (attributable to PPG) and earnings per share – assuming dilution (attributable to PPG) are reconciled to adjusted net income (attributable to PPG) and adjusted earnings per share – assuming dilution below:

Year-ended December 31, 2015

($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$1,882	$456	24.2 %	$1,405	$5.14
Includes:					
Charge related to business restructuring	140	34	24.3 %	106	0.39
Charges related to transaction-related costs(1)	48	16	33.3 %	32	0.11
Legacy pension settlement loss	7	2	28.6 %	5	0.02
Charge related to equity affiliate debt refinancing	11	4	36.4 %	7	0.03
Adjusted, continuing operations, excluding certain charges	$2,088	$512	24.5 %	$1,555	$5.69

Year-ended December 31, 2014

($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to PPG)	Earnings per diluted share
As reported, continuing operations	$1,416	$259	18.3 %	$1,133	$4.05
Includes:					
Charge related to debt refinancing	317	117	36.9 %	200	0.72
Charges related to environmental remediation	138	52	37.7 %	86	0.30
Charges related to transaction-related costs(1)	62	20	32.3 %	42	0.16
Gain on asset dispositions	(116)	(43)	37.1 %	(73)	(0.26)
Pension settlement loss	7	2	28.6 %	5	0.02
Benefit from favorable foreign tax ruling	—	29		(29)	(0.11)
Adjusted, continuing operations, excluding certain charges	$1,824	$436	23.9 %	$1,364	$4.88

Year-ended December 31, 2013

($ in millions, except percentages and per share amounts)	Income Before Income Taxes	Tax Expense	Effective Tax Rate	Net income from continuing operations (attributable to	Earnings per diluted share

					PPG)	
As reported, continuing operations	$1,226	$253	20.6	%	$950	$3.27
Includes:						
Charges related to business restructuring	98	25	25.5	%	73	0.25
Charges related to environmental remediation	101	37	36.6	%	64	0.22
Charges related to transaction-related costs(1)	36	12	33.3	%	24	0.08
Legacy pension settlement loss	18	5	27.8	%	13	0.04
U.S. tax law change enacted in 2013	—	10			(10)	(0.03)
As reported, continuing operations, excluding certain charges	$1,479	$342	23.1	%	$1,114	$3.83

(1) Transaction-related costs include advisory, legal, accounting, valuation, and other professional or consulting fees incurred to effect significant acquisitions, as well as similar fees and other costs to effect disposals not classified as discontinued operations. These costs also include the flow-through cost of sales of the step up to fair value of inventory acquired in acquisitions. These costs also include certain nonrecurring severance costs and charges associated with the Company’s business portfolio transformation.

Performance of Reportable Business Segments

Performance Coatings

($ in millions, except per share amounts)	December 31, 2015	2014	2013	$ Change 2015 vs. 2014	2014 vs. 2013	Percent Change 2015 vs. 2014	2014 vs. 2013
Net sales	$8,765	$8,698	$7,934	$67	$764	0.8 %	9.6 %
Segment income	$1,302	$1,205	$1,043	$97	$162	8.0 %	15.5 %

2015 vs. 2014

Performance Coatings net sales increased (1%) due to the following:

Net sales from acquisitions (9%), largely Comex

Selling prices were modestly higher

Partially offset by:

Unfavorable foreign currency translation of approximately $700 million (8%)

Lower sales volumes (1%)

Architectural coatings - EMEA sales volumes declined 1%. Demand was inconsistent throughout the region with modest growth continuing in certain countries, including the U.K., while several other countries experienced lower demand, including France.

Protective and marine coatings net sales volumes were slightly higher year-over-year. Sales for the business increased due to acquisition-related sales synergies from the Comex acquisition offset by unfavorable foreign currency translation.

Organic sales growth continued in aerospace coatings, aided by increased end-use market demand, but moderated versus the prior period reflecting the strong growth the business has delivered the past several years. Automotive refinish coatings sales volume growth was higher, with solid growth trends in the U.S. and Canada.

Excluding the impacts of acquisitions and currency, architectural coatings - Americas and Asia Pacific net sales were lower versus 2014. The year-over-year sales comparison was negatively impacted in the U.S. and Canada by several new PPG product pipeline fills at major customers in the previous year, as well as customer inventory management by most U.S. and Canadian retail customers and independent dealers at the end of a modest paint season. Organic sales growth in the recently acquired Comex architectural coatings business was a high-single-digit percentage, but was partially mitigated by unfavorable foreign currency translation caused by the impact of a weaker Mexican peso versus the U.S. dollar.

Segment income increased $97 million (8%) primarily due to acquisitions, lower manufacturing costs and modestly higher selling prices, partially offset by unfavorable foreign currency translation and lower sales volumes.

2014 vs. 2013

Performance Coatings net sales increased (10%) due to the following:

Net sales from acquisitions (8%), which included the 2013 acquisition of a North American architectural coatings business and Comex

Selling prices increased modestly

Sales volumes, excluding acquisitions, advanced nearly 2% across all major regions

Partially offset by:

Unfavorable currency translation of $60 million

Architectural coatings-EMEA sales volumes improved by low-single digit percentages year-over-year aided by partial demand recovery in some regions and in comparison to strengthening prior year levels. Sales volume improvement occurred early in the year, aided by favorable weather conditions, which was partially offset by lower year-over-year sales volumes late in the year.

The protective and marine coatings business experienced modest sales improvement, driven primarily by sales volume increases in the North American and European protective markets. Marine new-build sales volumes were negative early in the year, but positive late in the year.

The aerospace coatings and automotive refinish businesses both delivered slightly higher sales volumes year-over-year in each major region. Demand trends in the overall aerospace industry continued to remain favorable globally. Automotive refinish coatings sales growth was supported by higher emerging region activity and solid growth in the developed regions, including benefits from the expansion of the vehicle parc in Asia, higher North American demand and a partial demand recovery in Europe.

Excluding the impacts of acquisitions and currency, architectural coatings, America and Asia Pacific, net sales were up modestly year over year.

Segment income increased $162 million (16%) primarily due to the increase in organic net sales and acquisitions, including the further realization of cost synergies, partially offset by cost inflation.

Looking Ahead

In the first quarter of 2016, we expect recently completed acquisitions to add $25 million to $30 million to net sales. We also expect sales volume growth to continue in the architectural coatings - EMEA business in the first quarter of 2016; although, we expect results to vary by country. In addition, the protective and marine coatings business is expected to deliver modest year-over-year volume growth in the first quarter 2016. For the aerospace coatings business, we anticipate sales volume performance to be in line with industry rates as customer order patterns return to normal levels. In our architectural coatings Americas and Asia Pacific business, we are implementing various initiatives in our North American "Do it Yourself" business, consistent with PPG's multi-year rebranding strategy announced in 2015. These initiatives include investments in new product labeling and improved store displays, along with associated growth-oriented initiatives, which will result in incremental costs of approximately $15 million. Additionally, based on current exchange rates, we expect foreign currency translation on segment sales and income to be less unfavorable sequentially versus the fourth quarter of 2015 and year-over-year as the Euro and other major currencies weakened during 2015.

Industrial Coatings

	December 31,			$ Change		Percent Change	
($ in millions, except per share amounts)	2015	2014	2013	2015 vs. 2014	2014 vs. 2013	2015 vs. 2014	2014 vs. 2013
Net sales	$5,476	$5,552	$5,264	$(76)	$288	(1.4)%	5.5%
Segment income	$985	$951	$824	$34	$127	3.6%	15.4%

2015 vs. 2014

Industrial Coatings segment net sales decreased (1%) due to the following:

- Unfavorable foreign currency translation of nearly $400 million (8%)
- Lower sales prices (1%)

Partially offset by:

- Net sales from acquired businesses (4%)
- Higher sales volumes (3%), with growth in all regions, led by Asia-Pacific and EMEA

PPG’s global automotive OEM coatings business achieved sales volume growth in all regions, with an aggregate business unit growth rate of a high-mid-single-digit percentage year-over-year in comparison with the global auto industry production growth rate of approximately 2%. PPG sales volume growth was led by strong European and Asian demand. PPG continues to benefit from the adoption of new technologies and ongoing focus on customer service and customer process improvement initiatives.

Sales volumes declined modestly in PPG’s general industrial coatings and specialty coatings and materials businesses in comparison to strong volume growth in the prior year period. Demand was mixed across various end-use markets and regions.

Global packaging coatings sales volumes were up a high-mid-single-digit percentage, aided by new product introductions and continued emerging region growth.

Segment income increased $34 million (4%) primarily due to lower manufacturing costs, higher sales volumes and acquisitions, partially offset by unfavorable foreign currency translation.

2014 vs. 2013

Industrial Coatings segment net sales increased (6%) due to the following:

- Sales volume growth (6%) in all regions, led by North America

PPG’s global automotive OEM business grew net sales by a high-single-digit percentage year-over-year and continued a multi-quarter trend of outperforming global industry growth.

Growth accelerated in the industrial coatings business, aided by continued North American and emerging region strength, and European demand remained positive year-over-year.

Specialty coatings and materials net sales grew year-over-year aided by higher sales volumes in OLED materials, optical materials, precipitated silicas and Teslin substrate.

Packaging coatings year-over-year net sales were lower, reflecting continued weakness in Europe.

Segment income increased $127 million (15%) primarily due to the benefit from sales volume growth and lower manufacturing costs as a result of our continued focus on increased productivity and efficiency.

Looking ahead

In the first quarter of 2016, we expect recently completed acquisitions to add between $80 million and $90 million to net sales. We expect modest automotive industry production growth worldwide in the first quarter of 2016, with growth in all regions except South America. For the packaging coatings business, we expect a continued industry shift toward BPA non-intent (BPA-NI) products on the inside of food and beverage cans globally, resulting in sustained PPG sales volume growth in early 2016. Overall, we expect modest general industrial sales volume growth to continue, but to likely remain varied by region and industrial sub-sector. Additionally, based on current exchange rates, we expect foreign currency translation on segment sales and income to be less unfavorable sequentially versus the fourth quarter of 2015 and year-over-year as the Euro and other major currencies weakened during 2015.

Glass

($ in millions, except per share amounts)	December 31, 2015	2014	2013	$ Change 2015 vs. 2014	2014 vs. 2013	Percent Change 2015 vs. 2014	2014 vs. 2013
Net sales	$1,089	$1,110	$1,067	$(21)	$43	(1.9)%	4.0%
Segment income	$137	$81	$56	$56	$25	69.1%	44.6%

2015 vs. 2014

Glass segment net sales decreased (2%) due to the following:

- Lower sales stemming from a 2014 flat glass production facility divestiture (5%)
- Unfavorable foreign currency translation (4%)

Partially offset by:

- Higher selling prices (4%)
- Higher sales volumes (3%)

Flat glass organic sales grew modestly year-over-year aided by continued strong non-residential construction demand and improved pricing. Additionally, product mix was favorable from higher value-added and specialty glass stemming from end-use market growth coupled with an internal product mix shift related to the 2014 facility divestiture.

Fiber glass sales volumes increased a low-single-digit percentage in the U.S. market. Selling prices improved modestly year-over-year in the U.S. and Europe.

Segment income increased $56 million (69%) due to favorable flat glass product mix and lower manufacturing costs stemming from the reduction in PPG's system-wide flat glass capacity. Segment income was partially offset by weak manufacturing cost performance related to challenges at the Fresno, Ca flat glass facility. The facility was subject to a force majeure in the third quarter of 2015 due to manufacturing issues and is undergoing a major repair commencing in the first quarter of 2016. Segment income was also unfavorably impacted by higher pension costs.

2014 vs. 2013

Glass segment net sales increased (4%) due to the following:

- Higher selling prices (2%)
- Higher sales volumes (3%)

Partially offset by:

- Unfavorable foreign currency translation (1%)

Sales volumes in flat glass reflect improvements in residential and non-residential end-use market demand, partly offset by unfavorable currency translation, primarily the Canadian dollar.

Fiber glass sales volumes were higher year over year led by Europe, partly offset by declines in the U.S.

Segment income increased $25 million (45%) due to lower manufacturing costs and the increase in organic sales partially offset by higher costs stemming from scheduled maintenance projects. Higher natural gas-based energy costs early in the year were also a negative factor, although this impact declined later in the year.

Looking ahead

In the first quarter of 2016, we expect a relatively stable industry demand environment for the flat glass business, with lower PPG sales due to the Fresno facility maintenance outage. The maintenance expenses associated with the Fresno repair project are expected to be approximately $8 million. We anticipate fiber glass demand to be in line with the prior year. Additionally, based on current exchange rates, we expect foreign currency translation on segment sales and income to be less unfavorable sequentially versus the fourth quarter of 2015 and year-over-year as the Euro and other major currencies weakened during 2015.

Review and Outlook

During 2015, overall economic conditions remained mixed among the major global economies and across the various end-use markets PPG supplies. Despite the uneven overall market conditions, PPG's aggregate sales volumes grew about 1%. In addition to the organic growth, acquisitions, led by Comex, contributed significantly to the Company sales, adding about 6% to net sales. These net sales additions were offset by 7% unfavorable foreign currency translation as the U.S. dollar strengthened versus most major foreign currencies.

The U.S. and Canada remained PPG's largest region representing 46% of 2015 sales. During 2015, industrial activity was mixed by end-use market and by country, with modestly positive trends in the U.S., and lower demand in Canada largely due to lower commodity and energy prices. Certain consumer-facing industries, like automotive OEM, continued to expand. These gains were driven by lower unemployment rates and rising consumer disposable income, partly related to lower energy prices.

In addition to overall market gains, PPG's leading products continued to gain broader market acceptance. Consistent with previous years, PPG automotive OEM coatings continued to outpace regional industry growth. In packaging coatings, PPG's new interior can coatings contributed to above-market end-use growth rates, and PPG's waterborne refinish coatings, continued to be a major factor in new customer adoption within the region.

Construction spending in the region continued to recover in a measured manner, building on the recovery in recent years. U.S. housing starts grew over 10% during the year and were supplemented by continued improvement in the residential remodeling market. Non-residential construction demand recovered as well, although the results were mixed across the different U.S. regions. Although smaller in size, Canadian construction market demand declined as regional gross domestic product (GDP) in the country was negative for a large portion of the year reflecting the impact from falling global energy prices, which is an important element of the Canadian economy.

European economic activity continued to modestly strengthen and broaden throughout the year. In general, economic factors, including GDP and industrial production, improved within the region. Demand remained mixed by country as some European countries experienced relatively strong growth rates while others were flat or declined. Regional demand for PPG products also strengthened throughout the year, with first quarter year-over-year sales volumes growing one percent, and performance steadily improving during the year ending with about 3% growth in the fourth quarter. Demand for PPG's products in several end-use markets aided PPG's overall regional growth rate, including automotive OEM and refinish coatings, aerospace coatings, and protective and marine coatings.

Europe remains a very large region for PPG, representing just under 30% of PPG's 2015 sales, down slightly versus the prior year due to the impact of lower currency exchange rates and the addition of acquisition-related sales in other PPG regions. Company coatings sales volumes in the region are still down about 17%, or just under $900 million, when compared to 2008 pre-recession levels, reflecting economic weakness in the years during and following the recession, without a substantive recovery since. From a currency perspective, the Euro and other

currencies in the region weakened considerably against the U.S. dollar, resulting in unfavorable currency translation for the Company.

The emerging market regions of Asia and Latin America represented 26% of PPG's 2015 sales versus 22% in 2014. This expansion was primarily due to the Comex acquisition that was completed in November 2014. In the aggregate, emerging region economies continued to expand during 2015, but at a lower rate than the previous year. Within the emerging regions, growth rates varied considerably by country. PPG sales volume growth of 4% in Asia was partly offset by a decline of less than 1% in Latin America.

Asia was the largest emerging region with sales of about $2.4 billion, led by China which remained PPG's second largest individual country from a sales perspective in 2015. The largest gains in Asia were in the Industrial Coatings segment, including the benefit of 5% industry growth in Chinese automotive production. Offsetting these improvements was muted demand in several general industrial end-use markets, including heavy-duty equipment and construction-related metal products. In addition to the Industrial Coatings gains, protective and marine coatings, aerospace coatings, and other businesses experienced increased sales volumes.

Demand in the Latin American economies was bifurcated, with economic growth continuing in Mexico, aided by increased industrial production. This was partly offset by economic contraction in South America, particularly in Brazil, due to high inflation and unemployment rates. Also, weakening South American currencies versus the U.S.

dollar were unfavorable to PPG net sales.

Looking ahead to 2016, we anticipate PPG volume growth rates to improve in each region and in aggregate versus the prior year. We expect broadening growth to continue in Europe, including a continuation of demand growth in automotive OEM and packaging coatings. We expect moderate growth trends to remain in most end-use markets in the U.S, with Canada stabilizing at lower demand levels. We anticipate emerging regions growth to remain mixed, but for PPG to post solid aggregate growth based on the specific end-use markets and countries that the Company supplies.

In November 2014, PPG completed the acquisition of Comex, Mexico's leading architectural coatings company. The Company targeted $45 million to $50 million in annual savings from business synergies. Throughout 2015, PPG executed actions to capture these synergies and achieved the targeted annual run-rate savings. In addition to cost synergies, the company expects to realize $40 million to $50 million of annual revenue synergies related to the sale of legacy PPG products through Comex's distribution network. Also anticipated are other additional annual revenue synergies of $60 million to $70 million in Central America by 2019.

During 2015, PPG announced a $140 million corporate restructuring program, with anticipated annual savings of about $105 million once fully implemented. The impact and expected cost saving encompass all major regions and most business units. The company achieved approximately $20 million (pre-tax) in restructuring-related savings in 2015 and expects to recognize an incremental $60 million to $70 million in additional restructuring savings in 2016. We expect substantially all 2015 restructuring actions to be completed in 2016. PPG remains aggressive with respect to cost management, and will continually monitor the company's cost structure relative to projected regional and end use-market demand levels. The Company will proactively make adjustments to its cost structure as appropriate.

Raw materials are a significant input cost in the manufacture of coatings. PPG typically experiences fluctuating prices for energy and raw materials driven by various factors, including supply and demand imbalances, global industrial activity levels, changes in supplier feedstock costs and inventories, and foreign currency exchange rates. Given the recent volatility in certain energy-based input costs and foreign currencies, the Company is not able to predict with certainty the 2016 full year impact of related changes in raw material pricing. Also, given the distribution nature of many of our businesses, logistics and distribution costs are sizable, as are wages and benefits to a lesser degree. In aggregate, raw material feedstock prices in 2015 were lower, including oil-related products. Since oil is traded in U.S. dollars globally, the strengthening of the dollar against a wide variety of foreign currencies muted some of the oil-related benefits in certain regions, and in certain cases resulted in inflationary raw material prices.

Pension and postretirement benefit costs, excluding curtailments and special termination benefits, were $173 million in 2015, up $50 million from $123 million in 2014. This change was principally due to a change in the mortality rates utilized to estimate the pension costs. In 2016, the Company will change the method it uses to estimate the service and interest cost components of net periodic benefit cost for pension and other postretirement benefit costs for substantially all of its U.S. and foreign plans. Historically, the service and interest cost components were estimated using a single weighted-average discount rate derived from the yield curve used to measure the projected benefit obligation at the beginning of the period. The Company has elected to use a full yield curve approach ("Split-rate") to estimate these components of benefit cost by applying specific spot rates along the yield curve used to determine the benefit obligation to the relevant projected cash flows. The Company will make this change to improve the correlation between projected benefit cash flows and the corresponding yield curve spot rates and to provide a more precise measurement of service and interest costs. This change does not affect the measurement of the Company's total benefit obligations. The Company will account for this change as a change in estimate and, accordingly, will recognize its effect prospectively beginning in fiscal year 2016. We expect 2016 defined benefit expense to decrease by approximately $20 million to $25 million. During 2015, PPG's cash contributions to defined benefit pension plans totaled $289 million. Total cash contributions to global defined benefit pension plans were $41 million and $174 million in 2014 and 2013, respectively. We expect to make mandatory contributions to our non-U.S. plans in the range of $35 million to $40 million in 2016. We may also make voluntary contributions to our U.S. pension plans in 2016 and beyond.

In aggregate, the Company selling prices were flat in 2015 reflecting employee-related cost inflation, with energy-related cost inputs providing an offset. While selective pricing actions are currently planned in 2016, the Company expects flat aggregate pricing again in 2016.

A variety of foreign currencies weakened throughout 2015 versus the U.S. dollar. For 2015, foreign currency translation unfavorably impacted sales by $1.1 billion and pre-tax income by about $120 million. Based on mid-January 2016 exchange rates, the Company expects year-over-year currency translation to unfavorably impact 2016 sales by $550 million to $600 million, and 2016 pre-tax income by about $70 million to $80 million. Since mid-January, certain foreign currencies have strengthened versus the U.S. dollar, as the foreign currency environment continues to be volatile. Thus, the foreign currency impact on 2016 net sales and pre-tax income could differ from the mid-January guidance. The Company generally purchases raw materials, incurs manufacturing costs and sells finished products in the same currency, so it typically incurs modest transactional-related currency impacts to earnings.

The Company expects Interest expense, net of Interest income in 2016 to be approximately $20 million higher than 2015 due to debt issuances during 2015. We also expect somewhat lower Interest income in 2016.

We expect our adjusted effective tax rate from continuing operations to be in the range of 24.5% to 25.5% in 2016. This rate is slightly higher than the equivalent 2015 rate primarily due to a shift in the mix of earnings to jurisdictions with higher statutory tax rates. Other factors may impact the 2016 tax rate positively or negatively throughout the year, including changes to various tax regulations around the world.

Over the past five years, the Company has used $3.5 billion of cash to repurchase about 49 million shares of stock. The Company ended the year with approximately $920 million remaining under its current share repurchase authorization. During 2015, the Company deployed over $400 million for acquisitions (purchase price) and nearly $400 million for dividends. PPG increased its annual per-share dividend by 7% in 2015, marking the 44th annual increase and the 116th consecutive year of dividend payments. In January 2015, the Company announced a cash deployment target for acquisitions and share repurchases of between $1.5 billion and $2.5 billion for years 2015 and 2016 combined. The Company adjusted this range in September 2015 to reflect the year-to-date pace of cash deployment to between $2.0 billion and $2.5 billion. The Company expects continued strong free cash generation in 2016.

Accounting Standards Adopted in 2015

Note 1, “Summary of Significant Accounting Policies,” under Item 8 of this Form 10-K describes the Company’s recently adopted accounting pronouncements.

Accounting Standards to be Adopted in Future Years

Note 1, “Summary of Significant Accounting Policies,” under Item 8 of this Form 10-K describes accounting pronouncements that have been promulgated prior to December 31, 2015 but are not effective until a future date.

Commitments and Contingent Liabilities, including Environmental Matters

PPG is involved in a number of lawsuits and claims, both actual and potential, including some that it has asserted against others, in which substantial monetary damages are sought. See Item 3, "Legal Proceedings" and Note 13, "Commitments and Contingent Liabilities," under Item 8 of this Form 10-K for a description of certain of these lawsuits, including a description of the proposed asbestos settlement.

As discussed in Item 3 and Note 13, although the result of any future litigation of such lawsuits and claims is inherently unpredictable, management believes that, in the aggregate, the outcome of all lawsuits and claims involving PPG, including asbestos-related claims in the event the proposed asbestos settlement described in Note 13 does not become effective, will not have a material effect on PPG's consolidated financial position or liquidity; however, any such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized.

It is PPG's policy to accrue expenses for contingencies when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. Reserves for environmental contingencies are exclusive of claims against third parties and are generally not discounted. In management's opinion, the Company operates in an environmentally sound manner and the outcome of the Company's environmental contingencies will not have a material effect on PPG's financial position or liquidity; however, any such outcome may be material to the results of operations of any particular period in which costs, if any, are recognized. Management anticipates that the resolution of the Company's environmental contingencies will occur over an extended period of time.

The Company continues to analyze, assess and remediate the environmental issues associated with PPG's former chromium manufacturing plant in Jersey City, N.J. and associated sites ("New Jersey Chrome"). Information will continue to be generated from the ongoing groundwater remedial investigation activities related to New Jersey Chrome and will be incorporated into a final draft remedial action work plan for groundwater expected to be submitted to the New Jersey Department of Environmental Protection no later than 2020.

There are multiple, future events yet to occur, including further remedy selection and design, remedy implementation and execution and applicable governmental agency or community organization approvals. Considerable uncertainty exists regarding the timing of these future events for the New Jersey Chrome sites. Final resolution of these events is expected to occur over the next several years. As these events occur and to the extent that the cost estimates of the environmental remediation remedies change, the existing reserve for this environmental remediation matter will be adjusted.

Liquidity and Capital Resources

During the past three years, PPG has had sufficient financial resources to meet its operating requirements, to fund our capital spending, including acquisitions, share repurchases and pension plans and to pay increasing dividends to shareholders.

Cash and Cash Equivalents and Short Term Investments

($ in millions)	December 31,	
	2015	2014
Cash and cash equivalents	$1,311	$686
Short term investments	144	497
Total	$1,455	$1,183

Summary Cash Flow Information

($ in millions, except percentages)	December 31,			Percent Change	
	2015	2014	2013	2015 vs. 2014	2014 vs. 2013
Cash from operating activities - continuing operations	$1,837	$1,807	$1,562	1.7 %	15.7 %
Cash (used for) from investing activities - continuing operations	$(395)	$(856)	$22	(53.9)%	(3,990.9)%
Cash used for financing activities - continuing operations	$(754)	$(929)	$(1,893)	(18.8)%	(50.9)%

Cash from operating activities - continuing operations

Increases in cash from continuing operating activities in 2015 compared to 2014 and in 2014 compared to 2013 were aided by higher income from continuing operations, including income from acquired businesses.

Operating Working Capital

Operating Working Capital is a subset of total working capital and represents (1) receivables from customers, net of allowance for doubtful accounts, (2) inventories, and (3) trade liabilities. See Note 3, "Working Capital Detail" under Item 8 of this Form 10-K for further information related to the components of the Company's Operating Working Capital. We believe Operating Working Capital represents the key components of working capital under the operating control of our businesses. Operating Working Capital at December 31, 2015 and 2014 was $2.3 billion and $2.5 billion, respectively.

A key metric we use to measure our working capital management is Operating Working Capital as a percentage of sales (fourth quarter sales annualized).

($ in millions, except percentages)	2015		2014	
Trade Receivables, net	$2,413		$2,366	
Inventories, FIFO	1,868		2,007	
Trade Creditor's Liabilities	1,940		1,919	
Operating Working Capital	$2,341		$2,454	
Operating Working Capital as % of Sales	15.8	%	16.5	%

Operating working capital at December 31, 2015 decreased $113 million compared with the prior year. Trade receivables from customers, net, as a percentage of 2015 fourth quarter sales, annualized, was 16.3%, up slightly from 16.0% for 2014. Days sales outstanding was 54 days in 2015, consistent with 2014. Inventories on a FIFO basis as a percentage of 2015 fourth quarter sales, annualized, was 12.6% compared to 13.5% in 2014. Inventory turnover was 4.9 times in 2015 and 4.8 times in 2014.

Cash outlays related to environmental remediation were $109 million, $165 million, and $111 million in 2015, 2014 and 2013, respectively. We expect cash outlays in 2016 to be between $40 million and $60 million.

Defined Benefit Pension Plan Contributions

($ in millions)	December 31,		
	2015	2014	2013
U.S. defined benefit pension voluntary contributions	$250	$2	$50
Non-U.S. defined benefit pension plans	$39	$39	$124

We did not have a mandatory contribution to our U.S. defined benefit pension plans in 2015, 2014 or 2013, and we do not expect to be required to make contributions to our U.S. defined benefit pension plans in 2016. Some contributions to our non-U.S. defined benefit pension plans were required by local funding requirements. We expect to make mandatory contributions to our non-U.S. plans in the range of $35 million to $40 million in 2016. We may also make voluntary contributions to our U.S. pension plans in 2016 and beyond.

Cash used for investing activities - continuing operations

Total Capital Spending, Including Acquisitions

($ in millions, except percentages)	December 31,			Percent Change	
	2015	2014	2013	2015 vs. 2014	2014 vs. 2013
Capital spending [1]	$476	$587	$494	(18.9)%	18.8%
Capital spending, business acquisitions, net of cash acquired [2]	$320	$2,113	$983	(84.9)%	115.0%
Total capital spending, including acquisitions	$796	$2,700	$1,477	(70.5)%	82.8%
Capital spending, excluding acquisitions as a percentage of sales	3.1%	3.8%	3.5%	(18.4)%	8.6%

(1) Includes modernization and productivity improvements, expansion of existing businesses and environmental control projects

(2) Excluding cash acquired, Capital spending, business acquisitions totaled $440 million, $2,183 million and $997 million in 2015, 2014 and 2013, respectively.

Spending related to modernization and productivity improvements, expansion of existing businesses and environmental control projects is expected to be in the range of 3.0% to 3.5% of sales during 2016.

A primary focus for the Company in 2016 will continue to be prudent cash deployment focused on profitable income growth, including pursuing opportunities for additional strategic acquisitions.

In 2015, the Company spent $320 million, net of cash acquired, to make several strategic bolt-on business acquisitions with a total purchase price of $440 million. PPG also acquired approximately $40 million of third party debt.

In November 2014, the Company acquired Comex, an architectural coatings company with headquarters in Mexico City, Mexico. In 2014, PPG also completed the acquisition of several smaller companies. The total cost of the 2014 acquisitions, including acquired debt repaid, was $2,427 million, net of cash acquired.

In March 2014, PPG received $1.735 billion in cash proceeds for the sale of its 51% ownership interest in its Transitions Optical joint venture and 100% of its optical sunlens business to Essilor.

In April 2013, the Company acquired the North American architectural coatings business of Akzo Nobel, N.V., Amsterdam

and certain assets of a privately-owned U.S. based specialty coatings company. The total cost of 2013 acquisitions was $983 million.

In January 2013, PPG received $900 million in cash proceeds in connection with the closing of the separation of its commodity chemicals business and subsequent merger of the subsidiary holding the PPG commodity chemicals business with a subsidiary of Georgia Gulf. Refer to Note 2, “Acquisitions and Dispositions” under Item 8 of this Form 10-K for financial information regarding these discontinued operations.

Cash used for financing activities - continuing operations

Share Repurchase Activity

($ in millions, except number of shares)	December 31,		
	2015	2014	2013
Number of shares repurchased (millions)	7.0	7.6	11.5

Cost of shares repurchased	$751	$750	$1,000

We anticipate completing additional share repurchases during 2016. The Company has approximately $920 million remaining under the current authorization from the Board of Directors, which was approved in 2014. The current authorized repurchase program has no expiration date.

Dividends paid to shareholders

($ in millions)	December 31,		
	2015	2014	2013
Dividends paid to shareholders	$383	$361	$345

PPG has paid uninterrupted annual dividends since 1899, and 2015 marked the 44th consecutive year of increased annual per-share dividend payments to shareholders. The Company raised its per-share dividend by 7% to $0.36 per-share in April 2015.

Debt Issued and Repaid

In January 2016, PPG repaid its $250 million 1.9% notes upon their maturity, using cash on hand.

In June 2015, PPG's €300 million notes matured, upon which the Company paid $336 million to settle these obligations using cash on hand.

In March 2015, PPG completed a public offering of €600 million 0.875% Notes due 2022 and €600 million 1.400% Notes due 2027. These notes were issued pursuant to PPG's existing shelf registration statement. The aggregate cash proceeds from the notes, net of discounts and fees, was approximately $1.24 billion. The proceeds were used to repay outstanding borrowings and for general corporate purposes.

In the fourth quarter of 2014, PPG completed a debt refinancing which involved paying approximately $1.7 billion to redeem public notes which was funded by cash on hand and cash proceeds of approximately $1.2 billion from several debt issuances described below.

In November 2014, PPG completed a public offering of $300 million in principal amount of its 2.30% Notes due 2019. These notes were issued pursuant to PPG's existing shelf registration statement. Also in November 2014, PPG entered into three Euro-denominated borrowings as follows:

- 3-year €500 million, EURIBOR based variable rate bank loan
- 15-year €80 million 2.5% fixed interest note
- 30-year €120 million 3.0% fixed interest note.

In 2013, PPG repaid its $600 million 5.75% notes upon maturity, using cash on hand.
The ratio of total debt, including capital leases, to total debt and equity was 46% at December 31, 2015 up from 44% in 2014.
In December 2015, PPG entered into a five-year credit agreement (the “Credit Agreement”) with several banks and financial institutions as further discussed in Note 8, “Borrowings and Lines of Credit” under Item 8 of this Form 10-K. The Credit Agreement replaces the Company's existing Five Year Credit Agreement dated as of September 12, 2012. The Credit Agreement provides for a $1.8 billion unsecured revolving credit facility. The Credit Agreement will terminate on December 18, 2020. During the years ended December 31, 2015 and 2014, there were no borrowings outstanding under the existing or the prior Credit Agreement.
In addition to the amounts available under the lines of credit, the Company has an automatic shelf registration statement on file with the SEC pursuant to which it may issue, offer and sell from time to time on a continuous or delayed basis any combination of securities in one or more offerings.
See Note 8, “Borrowings and Lines of Credit,” under Item 8 of this Form 10-K for information regarding notes entered entered into and repaid as well as details regarding the use and availability of committed and uncommitted lines of credit, letters of credit, guarantees and debt covenants.
Contractual Obligations
We continue to believe that our cash on hand and short term investments, cash from operations and the Company’s available debt capacity will continue to be sufficient to fund our operating activities, capital spending, including acquisitions, dividend payments, debt service, amounts due under the proposed asbestos settlement, share repurchases, contributions to pension plans, and PPG’s significant contractual obligations. These significant contractual obligations, along with amounts due under the proposed asbestos settlement are presented in the following table.

		Obligations Due In:			
($ in millions)	Total	2016	2017-2018	2019-2020	There-after
Contractual Obligations					
Long-term debt	$3,807	$251	$662	$795	$2,099
Short-term debt	29	29	—	—	—
Commercial paper	459	—	—	459	—
Capital lease obligations	30	3	6	5	16
Operating leases	787	177	266	146	198
Interest payments(1)	1,177	107	190	169	711
Pension contributions(2)	40	40	—	—	—
Unconditional purchase commitments(3)	288	100	89	36	63
Other commitments	37	—	—	37	—
Total	$6,654	$707	$1,213	$1,647	$3,087
Asbestos Settlement(4)					
Aggregate cash payments	$825	$485	$67	$91	$182
PPG stock and other	290	290	—	—	—
Total	$1,115	$775	$67	$91	$182

(1) Includes interest on all outstanding debt.

(2) Includes the high end of the range of the expected mandatory pension contributions for 2016 only, as PPG is unable to estimate the pension contributions beyond 2016.

(3) The unconditional purchase commitments are principally take-or-pay obligations related to the purchase of certain materials, including industrial gases, natural gas, coal and electricity, consistent with customary industry practice.

(4) We have recorded an obligation equal to the net present value of the aggregate cash payments, along with the PPG stock and other assets to be contributed to a trust under the proposed asbestos settlement. However, PPG has no obligation to pay any amounts under this settlement until the Funding Effective Date, as more fully discussed in Note 13, “Commitments and Contingent Liabilities,” under Item 8 of this Form 10-K.

In January 2016, all pending appeals of the Pittsburgh Corning Plan of Reorganization were withdrawn. Under the plan, PPG and its participating insurers will make initial contributions to the asbestos trust established by the plan within 30 business days after the plan becomes effective and all conditions to funding have been met. PPG anticipates that those conditions to funding will be satisfied and funding will take place in the first half of 2016. Refer to Note 13, "Commitments and Contingent Liabilities" under Item 8 of this Form 10-K for additional information.

Other Liquidity Matters

At December 31, 2015, the total amount of unrecognized tax benefits for uncertain tax positions, including an accrual of related interest and penalties along with positions only impacting the timing of tax benefits, was approximately $90 million. The timing of payments will depend on the progress of examinations with tax authorities. PPG does not expect a significant tax payment related to these obligations within the next year. The Company is unable to make a reasonably reliable estimate as to when any significant cash settlements with taxing authorities may occur.

The Company has $5.0 billion of undistributed earnings of non-U.S. subsidiaries as of December 31, 2015 and 2014. These amounts relate to approximately 225 subsidiaries in more than 60 taxable jurisdictions. As discussed in Note 2, "Acquisitions and Dispositions," PPG recorded a deferred U.S. income tax liability on the foreign earnings generated from the sale of its Transitions Optical joint venture in 2014. At December 31, 2015 and 2014, the expected future tax cost to repatriate these earnings totaled $142 million and $247 million, respectively. No significant deferred U.S. income taxes have been provided on the remaining $4.2 billion of PPG's undistributed earnings as they are considered to be reinvested for an indefinite period of time or will be repatriated when it is tax effective to do so. The Company estimates repatriation of undistributed earnings of non-U.S. subsidiaries as of December 31, 2015 and 2014 would have resulted in a U.S. tax cost of approximately $375 million and $200 million, respectively.

Off-Balance Sheet Arrangements

The Company's off-balance sheet arrangements include the operating leases and unconditional purchase commitments disclosed in the "Liquidity and Capital Resources" section in the contractual obligations table as well as letters of credit and guarantees as discussed in Note 8, "Borrowings and Lines of Credit," under Item 8 of this Form 10-K.

Critical Accounting Estimates

Management has evaluated the accounting policies used in the preparation of the financial statements and related notes presented under Item 8 of this Form 10-K and believes those policies to be reasonable and appropriate. We believe that the most critical accounting estimates made in the preparation of our financial statements are those related to accounting for contingencies, under which we accrue a loss when it is probable that a liability has been incurred and the amount can be reasonably estimated, and to accounting for pensions, other postretirement benefits, business combinations, goodwill and other identifiable intangible assets with indefinite lives because of the importance of management judgment in making the estimates necessary to apply these policies.

Contingencies

Contingencies, by their nature, relate to uncertainties that require management to exercise judgment both in assessing the likelihood that a liability has been incurred as well as in estimating the amount of potential loss. The most important contingencies impacting our financial statements are those related to the collectability of accounts receivable, to environmental remediation, to pending, impending or overtly threatened litigation against the Company and to the resolution of matters related to open tax years. For more information on these matters, see Note 3, “Working Capital Detail,” Note 11, “Income Taxes” and Note 13, “Commitments and Contingent Liabilities” under Item 8 of this Form 10-K.

Defined Benefit Pension and Other Postretirement Benefit Plans

Accounting for pensions and other postretirement benefits involves estimating the cost of benefits to be provided well into the future and attributing that cost over the time period each employee works. To accomplish this, we make extensive use of assumptions about inflation, investment returns, mortality, turnover, medical costs and discount rates. The Company has established a process by which management reviews and selects these assumptions annually. See Note 12, “Employee Benefit Plans,” under Item 8 for information on these plans and the assumptions used.

Business Combinations

In accordance with the accounting guidance for business combinations, the Company uses the acquisition method of accounting to allocate costs of acquired businesses to the assets acquired and liabilities assumed based on their estimated fair values at the dates of acquisition. The excess costs of acquired businesses over the fair values of the assets acquired and liabilities assumed were recognized as goodwill. The valuations of the acquired assets and liabilities will impact the determination of future operating results. In addition to using management estimates and negotiated amounts, the Company uses a variety of information sources to determine the estimated fair values of acquired assets and liabilities including: third-party appraisals for the estimated value and lives of identifiable intangible assets and property, plant and equipment; third-party actuaries for the estimated obligations of defined benefit pension plans and similar benefit obligations; and legal counsel or other experts to assess the obligations associated with legal, environmental and other contingent liabilities. The business and technical judgment of management was used in determining which intangible assets have indefinite lives and in determining the useful lives of finite-lived intangible assets in accordance with the accounting guidance for goodwill and other intangible assets.

Goodwill and Intangible Assets

The Company tests indefinite-lived intangible assets and goodwill for impairment annually by either performing a qualitative evaluation or a quantitative test. The qualitative evaluation is an assessment of factors to determine whether it is more likely than not that the fair values of a reporting unit or asset is less than its carrying amount. Fair values under the quantitative test are estimated using discounted cash flow methodologies that are based on projections of the amounts and timing of future revenues and cash flows. For more information on these matters, see Note 1, “Summary of Significant Accounting Policies,” under Item 8 of this Form 10-K.

We believe that the amounts recorded in the financial statements under Item 8 of this Form 10-K related to these contingencies, pensions, other postretirement benefits, business combinations, goodwill and other identifiable intangible assets with indefinite lives are based on the best estimates and judgments of the appropriate PPG management, although actual outcomes could differ from our estimates.

Currency

Throughout 2015 and the last six months of 2014, the U.S. dollar strengthened over prior year comparable periods against the currencies in most countries in which PPG operates, most notably the Euro and the Mexican Peso. As a result, consolidated net assets at December 31, 2015 and 2014 decreased by $704 million and $623 million, respectively.

Comparing exchange rates during 2015 to those of 2014, in the countries in which PPG operates, the U.S. dollar was stronger overall, which had an unfavorable impact on full year 2015 income before income taxes from the translation of these foreign earnings into U.S. dollars of approximately $120 million.

Comparing exchange rates during 2014 to those of 2013, in the countries in which PPG operates, the U.S. dollar was weaker overall, which had an immaterial favorable impact on full year 2014 income before income taxes from the translation of these foreign earnings into U.S. dollars.

Forward-Looking Statements

The Private Securities Litigation Reform Act of 1995 provides a safe harbor for forward-looking statements made by or on behalf of the Company. Management’s Discussion and Analysis and other sections of this Annual Report contain forward-looking statements that reflect the Company’s current views with respect to future events and financial performance.

You can identify forward-looking statements by the fact that they do not relate strictly to current or historic facts. Forward-looking statements are identified by the use of the words “aim,” “believe,” “expect,” “anticipate,” “intend,” “estimate, “project,” “outlook,” “forecast” and other expressions that indicate future events and trends. Any forward-looking statement speaks only as of the date on which such statement is made, and the Company undertakes no obligation to update any forward looking statement, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosures we make on related subjects in our reports to the Securities and Exchange Commission. Also, note the following cautionary statements.

Many factors could cause actual results to differ materially from the Company’s forward-looking statements. Such factors include global economic conditions, increasing price and product competition by foreign and domestic competitors, fluctuations in cost and availability of raw materials, the ability to maintain favorable supplier relationships and arrangements, the timing of and the realization of anticipated cost savings from restructuring initiatives, difficulties in integrating acquired businesses and achieving expected synergies therefrom, economic and political conditions in international markets, the ability to penetrate existing, developing and emerging foreign and domestic markets, foreign exchange rates and fluctuations in such rates, fluctuations in tax rates, the impact of future legislation, the impact of environmental regulations, unexpected business disruptions and the unpredictability of existing and possible future litigation, including litigation that could result if the proposed asbestos settlement does not become effective. However, it is not possible to predict or identify all such factors.

Consequently, while the list of factors presented here and under Item 1A is considered representative, no such list should be considered to be a complete statement of all potential risks and uncertainties. Unlisted factors may present significant additional obstacles to the realization of forward-looking statements.

Consequences of material differences in the results compared with those anticipated in the forward-looking statements could include, among other things, lower sales or earnings, business disruption, operational problems, financial loss, legal liability to third parties, other factors set forth in Item 1A of this Form 10-K and similar risks, any of which could have a material adverse effect on the Company's consolidated financial condition, results of operations or liquidity.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

PPG is exposed to market risks related to changes in foreign currency exchange rates, interest rates, and to changes in PPG's stock price. The Company may enter into derivative financial instrument transactions in order to manage or reduce these market risks. A detailed description of these exposures and the Company's risk management policies are provided in Note 9, "Financial Instruments, Hedging Activities and Fair Value Measurements," under Item 8 of this Form 10-K.

The following disclosures summarize PPG's exposure to market risks and information regarding the use of and fair value of derivatives employed to manage its exposure to such risks. Quantitative sensitivity analyses have been provided to reflect how reasonably possible, unfavorable changes in market rates can impact PPG's consolidated results of operations, cash flows and financial position.

Foreign Currency Risk

We conduct operations in many countries around the world. Our results of operations are subject to both currency transaction and currency translation risk. Foreign currency forward contracts outstanding during 2015 and 2014 were generally designated as a hedge of PPG's exposure to foreign currency transaction risk. As of December 31, 2015 and 2014, the fair value of these contracts was immaterial. The potential reduction in PPG's income from continuing operations resulting from the impact of adverse changes in exchange rates on the fair value of its outstanding foreign currency hedge contracts of 10% for European and Canadian currencies and 20% for Asian and Latin American currencies for the years ended December 31, 2015 and 2014 would have been $29 million and $24 million, respectively.

As of December 31, 2015 and 2014, PPG had U.S. dollar to Euro cross currency swap contracts with a total notional amount of $560 million outstanding. As of December 31, 2015 and 2014, the fair value of these contracts was a net asset of $41 million and a net liability of $32 million, respectively. A 10% increase in the value of the Euro to the U.S. dollar would have had an unfavorable effect on the fair value of these swap contracts by reducing the value of this instrument by $60 million as of December 31, 2015 and increasing the liability by $70 million at December 31, 2014.

As of December 31, 2015 and 2014, PPG had non-U.S. dollar denominated debt outstanding of $2.1 billion and $1.3 billion, respectively. A weakening of the U.S. dollar by 10% against European currencies and by 20% against Asian and South American currencies would have resulted in unrealized translation losses of approximately $242 million and $154 million as of December 31, 2015 and 2014, respectively.

Interest Rate Risk

The Company manages its interest rate risk by balancing its exposure to fixed and variable rates while attempting to minimize its interest costs. A 10% increase in interest rates in the U.S., Canada, Mexico and Europe and a 20% increase in interest rates in Asia and South America would have an insignificant effect on PPG's variable rate debt obligations and interest expense for the years ended December 31, 2015 and 2014, respectively. Further, a 10%

reduction in interest rates would have increased the present value of the Company's fixed rate debt by approximately $75 million and $62 million as of December 31, 2015 and 2014, respectively; however, such changes would not have had an effect on PPG's annual income from continuing operations or cash flows.

Equity Price Risk

An equity forward arrangement was entered into to hedge the Company's exposure to changes in fair value of its future obligation to contribute PPG stock to an asbestos settlement trust (see Note 9, "Financial Instruments, Hedging Activities and Fair Value Measurements" and Note 13, "Commitments and Contingent Liabilities," under Item 8 of this Form 10-K). The fair value of these instruments as of December 31, 2015 and 2014 was an asset of $223 million and $268 million, respectively. A 10% decrease in PPG's stock price would have had an unfavorable effect on the fair value of these instruments of $27 million and $32 million at December 31, 2015 and 2014, respectively.

Item 8. Financial Statements and Supplementary Data

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of PPG Industries, Inc.

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of income, comprehensive income, shareholders’ equity, and cash flows present fairly, in all material respects, the financial position of PPG Industries, Inc. and its subsidiaries as of December 31, 2015 and 2014, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2015 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 appearing under Item 15(a)(2) presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2015, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). 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 the accompanying Management Report on Establishing and Maintaining Adequate Internal Control Over Financial Reporting. 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. 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.

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it presents deferred tax assets and liabilities on the balance sheet in 2015.

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
Pittsburgh, Pennsylvania
February 18, 2016

Management Report

Responsibility for Preparation of the Financial Statements and Establishing and Maintaining Adequate Internal Control Over Financial Reporting

We are responsible for the preparation of the financial statements included in this Annual Report. The financial statements were prepared in accordance with accounting principles generally accepted in the United States of America and include amounts that are based on the best estimates and judgments of management.

We are also responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended. Internal control over financial reporting, no matter how well designed, have inherent limitations. Therefore, a system of internal control over financial reporting can provide only reasonable assurance and may not prevent or detect misstatements. In addition, because of changing conditions, there is risk in projecting any evaluation of internal controls to future periods.

We conducted an evaluation of the effectiveness of the Company's internal control over financial reporting as of December 31, 2015. In making this evaluation, we used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control - Integrated Framework (2013). Our evaluation included reviewing the documentation of our controls, evaluating the design effectiveness of our controls and testing their operating effectiveness. Based on this evaluation we have concluded that, as of December 31, 2015, the Company's internal controls over financial reporting were effective.

PricewaterhouseCoopers LLP, an independent registered public accounting firm, has issued their report, included on page 32 of this Form 10-K, regarding the Company's internal control over financial reporting.

/s/ Michael H. McGarry
Michael H. McGarry
President and
Chief Executive Officer
February 18, 2016

/s/ Frank S. Sklarsky
Frank S. Sklarsky
Executive Vice President and
Chief Financial Officer
February 18, 2016

Consolidated Statement of Income

	For the Year		
($ in millions, except per share amounts)	2015	2014	2013
Net sales	$15,330	$15,360	$14,265
Cost of sales, exclusive of depreciation and amortization	8,591	8,791	8,314
Selling, general and administrative	3,679	3,758	3,486
Depreciation	363	350	333
Amortization	132	126	119
Research and development, net	486	492	463
Interest expense	126	187	196
Interest income	(40)	(50)	(43)
Asbestos settlement, net	12	12	11
Business restructuring	140	—	98
Debt refinancing charge	—	317	—
Other charges	104	221	189
Other income	(145)	(260)	(127)
Income before income taxes	1,882	1,416	1,226
Income tax expense	456	259	253
Income from continuing operations	1,426	1,157	973
Income from discontinued operations, net of tax	1	1,002	2,380
Net income attributable to the controlling and noncontrolling interests	1,427	2,159	3,353
Less: net income attributable to noncontrolling interests	21	57	122
Net income (attributable to PPG)	$1,406	$2,102	$3,231
Amounts Attributable to PPG			
Continuing operations	$1,405	$1,133	$950
Discontinued operations	1	969	2,281
Net income	$1,406	$2,102	$3,231
Earnings per common share			
Continuing operations	$5.18	$4.10	$3.31
Discontinued operations	—	3.50	7.96
Net income (attributable to PPG)	$5.18	$7.60	$11.27
Earnings per common share - assuming dilution			
Continuing operations	$5.14	$4.05	$3.27
Discontinued operations	—	3.47	7.86
Net income (attributable to PPG)	$5.14	$7.52	$11.13

Consolidated Statement of Comprehensive Income

	For the Year		
($ in millions)	2015	2014	2013
Net income attributable to the controlling and noncontrolling interests	$1,427	$2,159	$3,353
Unrealized foreign currency translation adjustment	(717)	(596)	(51)
Defined benefit pension and other postretirement benefit adjustments	113	(335)	440
Net change – derivative financial instruments	5	69	10
Other comprehensive (loss) / income, net of tax	(599)	(862)	399
Total comprehensive income	$828	$1,297	$3,752
Less: amounts attributable to noncontrolling interests:			
Net income	(21)	(57)	(122)
Unrealized foreign currency translation adjustment	13	6	7
Comprehensive income attributable to PPG	$820	$1,246	$3,637

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

Consolidated Balance Sheet

	December 31	
($ in millions)	2015	2014
Assets		
Current assets		
Cash and cash equivalents	$1,311	$686
Short-term investments	144	497
Receivables	2,788	2,815
Inventories	1,705	1,825
Other	606	620
Total current assets	6,554	6,443
Property, plant and equipment, net	3,017	3,092
Goodwill	3,669	3,801
Identifiable intangible assets, net	2,178	2,411
Deferred income taxes	672	875
Investments	367	443
Other assets	619	470
Total	$17,076	$17,535
Liabilities and Shareholders' Equity		
Current liabilities		
Accounts payable and accrued liabilities	$3,490	$3,547
Asbestos settlement	796	821
Restructuring reserves	87	26
Short-term debt and current portion of long-term debt	283	481
Total current liabilities	4,656	4,875
Long-term debt	4,042	3,533
Accrued pensions	712	995
Other postretirement benefits	1,021	1,132
Asbestos settlement	252	259
Deferred income taxes	460	666
Other liabilities	864	810
Total liabilities	12,007	12,270
Commitments and contingent liabilities (See Note 13)		
Shareholders' equity		
Common stock	969	484
Additional paid-in capital	635	1,028
Retained earnings	15,521	14,498
Treasury stock, at cost	(9,440)	(8,714)
Accumulated other comprehensive loss	(2,702)	(2,116)
Total PPG shareholders' equity	4,983	5,180
Noncontrolling interests	86	85
Total shareholders' equity	5,069	5,265
Total	$17,076	$17,535

The accompanying notes to the consolidated financial statements are an integral part of this consolidated statement.

Consolidated Statement of Shareholders' Equity

($ in millions)	Common Stock	Additional Paid-In Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Income/(Loss)	Total PPG	Non-controlling Interests	Total
Balance, January 1, 2013	$ 484	$ 870	$ 9,871	$ (5,496)	$ (1,666)	$ 4,063	$ 259	$ 4,322
Net income attributable to the controlling and noncontrolling interests	—	—	3,231	—	—	3,231	122	3,353
Other comprehensive income/(loss), net of tax	—	—	—	—	406	406	(7)	399
Cash dividends	—	—	(345)	—	—	(345)	—	(345)
Purchase of treasury stock	—	—	—	(1,000)	—	(1,000)	—	(1,000)
Issuance of treasury stock	—	25	—	55	—	80	—	80
Stock-based compensation activity	—	58	—	—	—	58	—	58
Separation and merger tender offer	—	—	—	(1,561)	—	(1,561)	—	(1,561)
Dividends paid on subsidiary common stock to noncontrolling interests	—	—	—	—	—	—	(90)	(90)
Joint venture formation and consolidation	—	—	—	—	—	—	(18)	(18)
Balance, December 31, 2013	$ 484	$ 953	$ 12,757	$ (8,002)	$ (1,260)	$ 4,932	$ 266	$ 5,198
Net income attributable to the controlling and noncontrolling interests	—	—	2,102	—	—	2,102	57	2,159
Other comprehensive loss, net of tax	—	—	—	—	(856)	(856)	(6)	(862)
Cash dividends	—	—	(361)	—	—	(361)	—	(361)
Purchase of treasury stock	—	—	—	(750)	—	(750)	—	(750)
Issuance of treasury stock	—	39	—	38	—	77	—	77
Stock-based compensation activity	—	64	—	—	—	64	—	64
Dividends paid on subsidiary common stock to noncontrolling interests	—	—	—	—	—	—	(50)	(50)
Reductions in noncontrolling interests	—	(28)	—	—	—	(28)	(182)	(210)
Balance, December 31, 2014	$ 484	$ 1,028	$ 14,498	$ (8,714)	$ (2,116)	$ 5,180	$ 85	$ 5,265
Net income attributable to the controlling and noncontrolling interests	—	—	1,406	—	—	1,406	21	1,427
Other comprehensive loss, net of tax	—	—	—	—	(586)	(586)	(13)	(599)
Cash dividends	—	—	(383)	—	—	(383)	—	(383)
2:1 Stock split	485	(485)	—	—	—	—	—	—

Purchase of treasury stock	—	—	—	(751)	—	(751)	—	(751)
Issuance of treasury stock	—	46	—	25	—	71	—	71
Stock-based compensation activity	—	46	—	—	—	46	—	46
Dividends paid on subsidiary common stock to noncontrolling interests	—	—	—	—	—	—	(4)	(4)
Reductions in noncontrolling interests	—	—	—	—	—	—	(3)	(3)
Balance, December 31, 2015	$ 969	$ 635	$ 15,521	$ (9,440)	$ (2,702)	$ 4,983	$ 86	$ 5,069

The accompanying notes to the consolidated financial statements are an integral part of this consolidated statement.

Consolidated Statement of Cash Flows

	For the Year		
($ in millions)	2015	2014	2013
Operating activities			
Net income attributable to the controlling and noncontrolling interests	$1,427	$2,159	$3,353
Less: Income from discontinued operations	1	1,002	2,380
Income from continuing operations	1,426	1,157	973
Adjustments to reconcile to cash from operations:			
Depreciation and amortization	495	476	452
Defined benefit pension expense	96	68	107
Business restructuring	140	—	98
Environmental remediation charge	—	138	101
Stock-based compensation expense	56	73	81
Equity affiliate losses/(earnings), net of dividends	63	(56)	17
Deferred income taxes	—	(89)	(16)
Cash contributions to pension plans	(289)	(41)	(174)
Restructuring cash spending	(45)	(57)	(86)
Debt refinancing charge	—	317	—
Change in certain asset and liability accounts (net of acquisitions):			
Receivables	(149)	(119)	(25)
Inventories	46	(95)	44
Other current assets	(82)	(68)	(34)
Accounts payable and accrued liabilities	75	215	5
Noncurrent assets and liabilities, net	(100)	(130)	(17)
Taxes and interest payable	122	64	19
Other	(17)	(46)	17
Cash from operating activities - continuing operations	1,837	1,807	1,562
Cash (used for)/from operating activities - discontinued operations	—	(279)	229
Cash from operating activities	1,837	1,528	1,791
Investing activities			
Capital Expenditures	(476)	(587)	(494)
Business acquisitions, net of cash balances acquired	(320)	(2,113)	(983)
Net proceeds from the 2014 sale of Transitions Optical and sunlens business and the 2013 separation of the commodity chemicals business	47	1,625	940
Proceeds from maturity of short-term investments	402	1,298	1,796
Purchase of short-term investments	(97)	(1,204)	(1,227)
Payments on cross currency swap contracts	(34)	(45)	(42)
Proceeds from cross currency swap contracts	37	37	37
Proceeds from net investment hedges	19	49	—
Other	27	84	(5)
Cash (used for)/from investing activities - continuing operations	(395)	(856)	22
Cash used for investing activities - discontinued operations	—	(1)	(19)
Cash (used for)/from investing activities	(395)	(857)	3
Financing activities			
Net change in borrowings with maturities of three months or less	(32)	89	(7)
Net (payments)/proceeds on commercial paper and short-term debt	(528)	932	—
Net Proceeds from the issuance of long-term debt (net of discount and issuance costs)	1,242	1,163	—
Repayment of long-term debt	(340)	(1,489)	(605)
Repayment of acquired debt	—	(314)	—
Premium paid for redemption of securities	—	(222)	—

Purchase of treasury stock	(751)	(750)	(1,000)
Issuance of treasury stock	53	57	68
Dividends paid on PPG common stock	(383)	(361)	(345)
Other	(15)	(34)	(4)
Cash used for financing activities - continuing operations	(754)	(929)	(1,893)
Cash used for financing activities - discontinued operations	—	(40)	(86)
Cash used for financing activities	(754)	(969)	(1,979)
Effect of currency exchange rate changes on cash and cash equivalents	(63)	(132)	(5)
Net increase/(decrease) in cash and cash equivalents	625	(430)	(190)
Cash and cash equivalents, beginning of year	686	1,116	1,306
Cash and cash equivalents, end of year	$1,311	$686	$1,116
Supplemental disclosures of cash flow information:			
Interest paid, net of amount capitalized	$115	$218	$201
Taxes paid, net of refunds	$383	$642	$319

The accompanying notes to the consolidated financial statements are an integral part of this consolidated statement.

Notes to the Consolidated Financial Statements

1. Summary of Significant Accounting Policies

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of PPG Industries, Inc. ("PPG" or the "Company") and all subsidiaries, both U.S. and non-U.S., that it controls. PPG owns more than 50% of the voting stock of most of the subsidiaries that it controls. For those consolidated subsidiaries in which the Company's ownership is less than 100%, the outside shareholders' interests are shown as noncontrolling interests. Investments in companies in which PPG owns 20% to 50% of the voting stock and has the ability to exercise significant influence over operating and financial policies of the investee are accounted for using the equity method of accounting. As a result, PPG's share of the earnings or losses of such equity affiliates is included in the accompanying consolidated statement of income and PPG's share of these companies' shareholders' equity is included in "Investments" in the accompanying consolidated balance sheet. Transactions between PPG and its subsidiaries are eliminated in consolidation.

Use of Estimates in the Preparation of Financial Statements

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported amounts of income and expenses during the reporting period. Such estimates also include the fair value of assets acquired and liabilities assumed resulting from the allocation of the purchase price related to business combinations consummated. Actual outcomes could differ from those estimates.

Revenue Recognition

The Company recognizes revenue when the earnings process is complete. Revenue from sales is recognized by all operating segments when goods are shipped and title to inventory and risk of loss passes to the customer or when services have been rendered.

Shipping and Handling Costs

Amounts billed to customers for shipping and handling are reported in "Net sales" in the accompanying consolidated statement of income. Shipping and handling costs incurred by the Company for the delivery of goods to customers are included in "Cost of sales, exclusive of depreciation and amortization" in the accompanying consolidated statement of income.

Selling, General and Administrative Costs

Amounts presented as "Selling, general and administrative" in the accompanying consolidated statement of income are comprised of selling, customer service, distribution and advertising costs, as well as the costs of providing corporate-wide functional support in such areas as finance, law, human resources and planning. Distribution costs pertain to the movement and storage of finished goods inventory at company-owned and leased warehouses, terminals and other distribution facilities.

Advertising Costs

Advertising costs are expensed as incurred and totaled $324 million, $297 million and $235 million in 2015, 2014 and 2013, respectively.

Research and Development

Research and development costs, which consist primarily of employee related costs, are charged to expense as incurred.

($ in millions)	2015	2014	2013
Research and development – total	$505	$509	$479
Less depreciation on research facilities	19	17	16
Research and development, net	$486	$492	$463

Legal Costs

Legal costs, primarily include costs associated with acquisition and divestiture transactions, general litigation, environmental regulation compliance, patent and trademark protection and other general corporate purposes, are charged to expense as incurred.

Foreign Currency Translation

The functional currency of most significant non-U.S. operations is their local currency. Assets and liabilities of those operations are translated into U.S. dollars using year-end exchange rates; income and expenses are translated using the average exchange rates for the reporting period. Unrealized foreign currency translation adjustments are deferred in accumulated other comprehensive loss, a separate component of shareholders' equity.

Cash Equivalents

Cash equivalents are highly liquid investments (valued at cost, which approximates fair value) acquired with an original maturity of three months or less.

Short-term Investments

Short-term investments are highly liquid, high credit quality investments (valued at cost plus accrued interest) that have stated maturities of greater than three months to one year. The purchases and sales of these investments are classified as investing activities in the consolidated statement of cash flows.

Marketable Equity Securities

The Company's investment in marketable equity securities is recorded at fair market value and reported in "Other current assets" and "Investments" in the accompanying consolidated balance sheet with changes in fair market value recorded in income for those securities designated as trading securities and in other comprehensive income, net of tax, for those designated as available for sale securities.

Notes to the Consolidated Financial Statements

Inventories

Inventories are stated at the lower of cost or market. Most U.S. inventories are stated at cost, using the last-in, first-out ("LIFO") method of accounting, which does not exceed market. All other inventories are stated at cost, using the first-in, first-out ("FIFO") method of accounting, which does not exceed market. PPG determines cost using either average or standard factory costs, which approximate actual costs, excluding certain fixed costs such as depreciation and property taxes. See Note 3, "Working Capital Detail" for further information concerning the Company's inventory.

Derivative Financial Instruments

The Company recognizes all derivative financial instruments (a "derivative") as either assets or liabilities at fair value on the balance sheet. The accounting for changes in the fair value of a derivative depends on the use of the instrument.

For a derivative that is considered "effective" as a hedge of an exposure to variability in expected future cash flows (cash flow hedge), the effective portion of the gain or loss on the derivative is recorded in other comprehensive income ("OCI") and the ineffective portion, if any, is reported in income from continuing operations. Amounts accumulated in OCI are reclassified into income from continuing operations in the same period or periods during which the hedged transactions are recorded in income from continuing operations.

For a derivative that is considered "effective" as a hedge of an exposure to changes in the fair value (fair value hedge) of an asset, a liability or a firm commitment, the change in the derivative's fair value is reported in income from continuing operations offsetting the gain or loss recognized on the item that is hedged.

For a derivative, debt or other financial instrument that is considered "effective" as a hedge of a net investment in a foreign operation, the gain or loss on the instrument is reported as a translation adjustment in accumulated other comprehensive income ("AOCI"). Gains and losses in AOCI related to hedges of the Company's net investments in foreign operations are reclassified out of AOCI and recognized in income from continuing operations upon a substantial liquidation, sale or partial sale of such investments or upon impairment of all or a portion of such investments. The cash flow impact of these instruments have been and will be classified as investing activities in the consolidated statement of cash flows.

Changes in the fair value of derivative instruments not designated as hedges for hedge accounting purposes are recognized in income from continuing operations in the period of change.

Property, Plant and Equipment

Property, plant and equipment is recorded at cost. Depreciation is computed on a straight-line method based on the estimated useful lives of related assets. Additional depreciation expense is recorded when facilities or equipment are subject to abnormal economic conditions or obsolescence.

The cost of significant improvements that add to productive capacity or extend the lives of properties are capitalized. Costs for repairs and maintenance are charged to expense as incurred.

When a capitalized asset is retired or otherwise disposed of, the original cost and related accumulated depreciation balance are removed from the accounts and any related gain or loss is included in income from continuing operations. The amortization cost of capitalized leased assets is included in depreciation expense. Property and other long-lived assets are reviewed for impairment whenever events or circumstances indicate that their carrying amounts may not be recoverable. See Note 4, "Property, Plant and Equipment" for further details.

Goodwill and Identifiable Intangible Assets

Goodwill represents the excess of the cost over the fair value of acquired identifiable tangible and intangible assets less liabilities assumed from acquired businesses. Identifiable intangible assets acquired in business combinations are recorded based upon their fair value at the date of acquisition.

The Company tests goodwill of each reporting unit for impairment at least annually in connection with PPG's strategic planning process. The Company tests goodwill for impairment by either performing a qualitative evaluation or a two-step quantitative test. The qualitative evaluation is an assessment of factors, including reporting unit specific operating results as well as industry, market and general economic conditions, to determine whether it is more likely than not that the fair values of a reporting unit is less than its carrying amount, including goodwill. The Company may elect to bypass this qualitative assessment for some or all of its reporting units and perform a two-step quantitative test. The quantitative goodwill impairment test is performed during the fourth quarter by comparing the estimated fair value of the associated reporting unit as of September 30 to its carrying value. The Company's reporting units are its operating segments. (See Note 19, "Reportable Business Segment Information," for further information concerning the Company's operating segments.) Fair value is estimated using discounted cash flow methodologies.

The Company has determined that certain acquired trademarks have indefinite useful lives. The Company tests the carrying value of these trademarks for impairment at least annually, or as needed whenever events and circumstances indicate that their carrying amount may not be recoverable. The annual assessment takes place in the fourth quarter of each year either by completing a qualitative assessment or quantitatively by comparing the estimated fair value of each trademark as of September 30 to its carrying value. Fair value is estimated by using the relief from royalty method (a discounted cash flow methodology). The qualitative assessment includes consideration of factors, including revenue relative to the asset being assessed, the operating results of the related business as well as industry, market and general economic conditions, to determine whether it is more likely than not that the fair value of the asset is less than its carrying amount.

Identifiable intangible assets with finite lives are amortized on a straight-line basis over their estimated useful lives (1 to 30 years) and are reviewed for impairment whenever events or circumstances indicate that their carrying amount may not be recoverable.

Notes to the Consolidated Financial Statements

Receivables and Allowances

All trade receivables are reported on the balance sheet at the outstanding principal adjusted for any allowance for credit losses and any charge offs. The Company provides an allowance for doubtful accounts to reduce receivables to their estimated net realizable value when it is probable that a loss will be incurred. Those estimates are based on historical collection experience, current economic and market conditions, a review of the aging of accounts receivable and the assessments of current creditworthiness of customers.

Product Warranties

The Company accrues for product warranties at the time the associated products are sold based on historical claims experience. The reserve, pre-tax charges against income and cash outlays for product warranties were not significant to the consolidated financial statements of the Company for any year presented.

Asset Retirement Obligations

An asset retirement obligation represents a legal obligation associated with the retirement of a tangible long-lived asset that is incurred upon the acquisition, construction, development or normal operation of that long-lived asset. PPG recognizes asset retirement obligations in the period in which they are incurred, if a reasonable estimate of fair value can be made. The asset retirement obligation is subsequently adjusted for changes in fair value. The associated estimated asset retirement costs are capitalized as part of the carrying amount of the long-lived asset and depreciated over its useful life. PPG's asset retirement obligations are primarily associated with the retirement or closure of certain assets used in PPG's manufacturing process. The accrued asset retirement obligation recorded on PPG's balance sheet was $16 million and $18 million as of December 31, 2015 and 2014, respectively.

PPG's only conditional asset retirement obligation relates to the possible future abatement of asbestos contained in certain PPG production facilities. The asbestos in PPG's production facilities arises from the application of normal and customary building practices in the past when the facilities were constructed. This asbestos is encapsulated in place and, as a result, there is no current legal requirement to abate it. Inasmuch as there is no requirement to abate, the Company does not have any current plans or an intention to abate and therefore the timing, method and cost of future abatement, if any, are not known. The Company has not recorded an asset retirement obligation associated with asbestos abatement, given the uncertainty concerning the timing of future abatement, if any.

Reclassifications

Certain reclassifications of prior years' data have been made to conform to the current year presentation. These reclassifications had no impact on our previously reported net income, cash flows or shareholders' equity.

Accounting Standards Adopted in 2015

In November 2015, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2015-17, "Balance Sheet Classification of Deferred Taxes." This ASU simplifies the presentation of deferred taxes by requiring that deferred tax liabilities and assets be classified as noncurrent in a statement of financial position. The amendments in this ASU are effective for fiscal years beginning after December 15, 2016 and for interim periods therein. Earlier application is permitted for all entities as of the beginning of an interim or annual reporting period. PPG elected to early adopt this ASU and retroactively recast all periods presented to reflect all deferred tax assets and liabilities as long term on the balance sheet. Approximately $400 million of net current deferred income tax assets and liabilities as of December 31, 2014 were reclassified to noncurrent deferred tax assets and liabilities to conform to the current year presentation. Adoption of this ASU did not have a material impact on PPG's consolidated results of operations and cash flows.

In April 2015, the FASB issued ASU No. 2015-03, "Interest – Imputation of Interest (Subtopic 835-30): Simplifying the Presentation of Debt Issuance Costs." This ASU simplifies the presentation of debt issuance costs by requiring that such costs be presented in the balance sheet as a direct deduction from the carrying value of the associated debt instrument, consistent with debt discounts. The amendments in this ASU are effective for fiscal years beginning after December 15, 2015 and for interim periods therein. Earlier application is permitted for all entities as of the beginning of an interim or annual reporting period. PPG elected to early adopt this ASU and retroactively recast all periods presented. Adoption of this ASU did not have a material impact on PPG's consolidated financial position, results of operations and cash flows.

Accounting Standards to be Adopted in Future Years

In January 2016, the FASB issued ASU No. 2016-01, "Recognition and Measurement of Financial Assets and Liabilities." This ASU simplifies the accounting and disclosures related to equity investments. The amendments in this ASU are effective for fiscal years beginning after December 15, 2017 and for interim periods therein. Adoption of this ASU will not have a material impact on PPG's consolidated financial position, results of operations and cash flows.

In September 2015, the FASB issued ASU No. 2015-16, "Simplifying the Accounting for Measurement-Period Adjustments." This ASU simplifies the treatment of adjustments to provisional amounts recognized in the period for items in a business combination for which the accounting is incomplete at the end of the reporting period. The amendments in this ASU are effective for fiscal years beginning after December 15, 2015 and for interim periods therein. PPG will apply the provisions of this ASU commencing January 1, 2016. Adoption of this ASU will not have a material impact on PPG's consolidated financial position, results of operations and cash flows.

In July 2015, the FASB issued ASU No. 2015-11, "Simplifying the Measurement of Inventory." This ASU simplifies the measurement of inventory by requiring certain inventory to be measured at the lower of cost or net realizable

Notes to the Consolidated Financial Statements

value. The amendments in this ASU are effective for fiscal years beginning after December 15, 2016 and for interim periods therein. Adoption of this ASU will not have a material impact on PPG's consolidated financial position, results of operations and cash flows.

In April 2015, the FASB issued ASU No. 2015-05, "Customer's Accounting for Fees Paid in a Cloud Computing Arrangement." This ASU requires the accounting for the cost of licenses to be recognized separately from the fees for computing services. The guidance is effective for annual periods beginning after December 15, 2015. The provisions of the guidance may be applied prospectively or retrospectively. PPG plans to adopt this guidance prospectively, and adoption of this ASU is not expected to have a material impact on PPG's consolidated financial position, results of operations and cash flows.

In May 2014, the FASB issued ASU No. 2014-09, "Revenue from Contracts with Customers: Topic 606." This ASU replaces nearly all existing U.S. GAAP guidance on revenue recognition. The standard prescribes a five-step model for recognizing revenue, the application of which will require significant judgment. This standard is effective for fiscal years beginning after December 15, 2017, and for interim periods within those fiscal years. PPG is in the process of assessing the impact the adoption of this ASU will have on its consolidated financial position, results of operations and cash flows.

2. Acquisitions and Dispositions

Acquisitions

Consorcio Comex

In November 2014, PPG finalized the acquisition of Consorcio Comex, S.A. de C.V. ("Comex"), an architectural coatings company with headquarters in Mexico City, Mexico ($2.3 billion aggregate purchase price) for $1.95 billion, net of cash acquired of $69 million. PPG also repaid $280 million of third-party debt assumed in the acquisition. Comex manufactures coatings and related products in Mexico and sells them in Mexico and Central America principally through more than 4,000 stores that are independently owned and operated by more than 700 concessionaires. Comex also sells its products through regional retailers and wholesalers, and directly to customers. As of the acquisition date, Comex had approximately 3,900 employees, eight manufacturing facilities and six distribution centers. The acquisition further expands PPG's global coatings business and adds a leading architectural coatings business in Mexico and Central America. Since the acquisition, the results of this acquired business have been principally included in the results of the architectural coatings - Americas and Asia Pacific business, within the Performance Coatings reportable segment. Comex's net sales reported by PPG from this acquired business were approximately $900 million for the year ended December 31, 2015. Comex's income from continuing operations related to this acquisition was a mid-teen percentage return on sales.

The purchase price related to the Comex acquisition was allocated based on information available at the acquisition date and was subject to customary post-closing adjustments. During the ten-month period ended October 31, 2015, PPG obtained a valuation of property, plant and equipment acquired in the Comex acquisition and made other changes during the measurement period which resulted in adjustments to property, plant and equipment, non-current deferred tax liabilities and goodwill. These measurement period adjustments increased goodwill by a net, aggregate amount of $3 million. These measurement period adjustments are not considered material individually or in the aggregate, therefore, prior periods have not been revised.

The following table summarizes the fair value of assets acquired and liabilities assumed as reflected in the purchase price allocation for Comex.

($ in millions)	
Current assets	$340
Property, plant, and equipment	229
Trademarks with indefinite lives	1,022
Identifiable intangible assets with finite lives	281
Goodwill	1,089
Other non-current assets	54

Total assets	$3,015
Current liabilities	(331)
Non-current deferred tax liabilities	(410)
Long-term debt	(280)
Accrued pensions	(20)
Other long-term liabilities	(24)
Total liabilities	$(1,065)
Total purchase price, net of cash acquired	$1,950

The identifiable intangible assets with finite lives in the table above, which consist primarily of customer relationships and acquired technology, are subject to amortization over a weighted average period of 24 years. See Note 6, "Goodwill and Other Identifiable Intangible Assets" for further details regarding PPG's intangible assets.

The following information reflects the net sales of PPG for the years ended December 31, 2014 and 2013 on a pro forma basis as if the transaction for the Comex acquisition had been completed on January 1, 2013.

Condensed Consolidated Pro Forma information (unaudited)

($ in millions)	Year ended 2014	Year ended 2013
Net sales	$16,175	$15,232

The pro forma impact on PPG's results of operations, including the pro forma effect of events that were directly attributable to the acquisition, was not significant to PPG's consolidated results of operations for 2014 and 2013. While calculating this impact, no cost savings or operating synergies that may result from the acquisition were included.

Notes to the Consolidated Financial Statements

Akzo Nobel North American Architectural Coatings
In April 2013, PPG finalized the acquisition of the North American architectural coatings business of Akzo Nobel N.V., Amsterdam, the Netherlands ("North American architectural coatings acquisition") for $947 million, net of cash acquired and a working capital adjustment. The acquisition further extended PPG's architectural coatings business in the United States, Canada and the Caribbean. With this acquisition, PPG expanded its reach in all three major North American architectural coatings distribution channels, including home centers, independent paint dealers and company-owned paint stores. Since the date of acquisition, the results of this acquired business have been included in the results of the architectural coatings - Americas and Asia Pacific operating segment, within the Performance Coatings reportable segment.
The following table summarizes the fair value of assets acquired and liabilities assumed as reflected in the final purchase price allocation for the North American architectural coatings acquisition.

($ in millions)	
Current assets	$558
Property, plant, and equipment	184
Trademarks with indefinite lives	174
Identifiable intangible assets with finite lives	196
Goodwill	225
Other non-current assets	49
Total assets	$1,386
Current liabilities	(326)
Accrued pensions	(29)
Other post-retirement benefits	(40)
Other long-term liabilities	(44)
Total liabilities	$(439)
Total purchase price, net of cash acquired	$947

The identifiable intangible assets with finite lives in the table above, which consist primarily of customer relationships and acquired technology, are subject to amortization over a weighted average period of 10 years. See Note 6 "Goodwill and Other Identifiable Intangible Assets" for further details regarding PPG's intangible assets.
The following information reflects the net sales of PPG for the year ended December 31, 2013 on a pro forma basis as if the transaction for the North American architectural coatings acquisition had been completed on January 1, 2013.
Condensed Consolidated Pro Forma information (unaudited)

($ in millions)	Year-ended 2013
Net sales	$14,637

The pro forma impact on PPG's results of operations, including the pro forma effect of events that were directly attributable to the acquisition, was not significant to PPG's consolidated results of operations for 2013. While calculating this impact, no cost savings or operating synergies that may result from the acquisition were included.

Other Acquisitions
In 2015, 2014 and 2013, the Company completed several smaller business acquisitions. The total consideration paid for these acquisitions, net of cash acquired, debt assumed and other post closing adjustments, was $371 million, $189 million and $36 million, respectively.
Dispositions
Mt. Zion Flat Glass Facility
In September 2014, PPG completed the sale of substantially all of the assets of its former Mt. Zion, Illinois, flat glass manufacturing facility to automotive glass manufacturer Fuyao Glass America Incorporated. As a result of this transaction, the Company recognized a pre-tax gain of $22 million which is reported in the caption "Other income" on the Consolidated Statement of Income. The sale did not include certain production assets which are unique to PPG.

Pittsburgh Glass Works

In July 2014, Pittsburgh Glass Works LLC (“PGW”), an equity affiliate in which PPG has an approximate 40% ownership interest, sold its insurance and services business and recognized a pre-tax gain. PPG accounts for its interest in PGW under the equity method of accounting and recognized $94 million as its share of the pre-tax gain on this transaction. This gain is reported in the caption “Other income” on the Consolidated Statement of Income. In addition, PPG received a cash distribution of approximately $41 million from PGW to offset PPG’s expected income tax liability associated with this transaction. The pre-tax gain and the cash distribution are both reported within the “Equity affiliate earnings, net of distributions received” caption on the Consolidated Statement of Cash Flows.

Transitions Optical Joint Venture and Sunlens Business

In March 2014, the Company completed the sale of its 51% ownership interest in its Transitions Optical joint venture and 100% of its optical sunlens business to Essilor International (Compagnie Generale D’Optique) SA (“Essilor”). PPG received cash at closing of $1.735 billion pre-tax (approximately $1.5 billion after-tax). The sale of these businesses, which were previously reported in the former Optical and Specialty Materials segment, resulted in a pre-tax gain of $1,468 million ($946 million after-tax) reported in discontinued operations. During the first quarter of 2014, the Company recognized $522 million of tax expense on the sale, of which $262 million is deferred U.S. income tax on the foreign earnings of the sale, as PPG does not consider these earnings to be reinvested for an indefinite period of time. The pre-tax gain on this sale reflects the excess of the sum of the cash proceeds received over the net book value of the net assets of PPG’s former Transitions Optical and sunlens business. The Company also incurred $55 million of pre-tax expense, primarily for professional services related to the sale, post-closing adjustments, costs and other contingencies under the terms of the agreements. The net gain on the sale includes these related losses and expenses. During 2014, revisions to estimated tax liabilities associated with the transaction were recorded to discontinued operations.

The results of operations and cash flows of these businesses for the year ended December 31, 2014, and the net gain on the

Notes to the Consolidated Financial Statements

sale, are reported as results from discontinued operations for the year ended December 31, 2014. In prior periods presented, the results of operations and cash flows of these businesses were reclassified from continuing operations and presented as results from discontinued operations.
Essilor has also entered into 5 year agreements with PPG for the continued supply of photochromic materials and for research and development services, subject to renewal. PPG considered the significance of the revenues associated with the agreements compared to total operating revenues of the disposed businesses and determined that they were not significant.
Net sales and earnings from discontinued operations related to the Transitions Optical and sunlens transaction are presented in the table below:

	Year-ended	
($ in millions)	2014	2013
Net sales	$247	$843
Income from operations	$104	$263
Net gain from divestiture of PPG's interest in the Transitions Optical joint venture and sunlens business	1,468	—
Income tax expense	570	80
Income from discontinued operations, net of tax	$1,002	$183
Less: Net income attributable to non-controlling interests, discontinued operations	$(33)	$(99)
Net income from discontinued operations (attributable to PPG)	$969	$84

Commodity Chemicals Business Separation
In January 2013, the Company completed the separation of its commodity chemicals business and merger of its wholly-owned subsidiary, Eagle Spinco Inc., with a subsidiary of Georgia Gulf Corporation in a tax efficient Reverse Morris Trust transaction (the "Transaction"). Pursuant to the merger, Eagle Spinco, the entity holding PPG's former commodity chemicals business, became a wholly-owned subsidiary of Georgia Gulf. The combined company formed by uniting Georgia Gulf with PPG's former commodity chemicals business is named Axiall Corporation ("Axiall"). PPG holds no ownership interest in Axiall. PPG received the necessary ruling from the Internal Revenue Service and as a result this Transaction was generally tax free to PPG and its shareholders in the United States and Canada.
Under the terms of the Transaction, PPG received $900 million of cash and 35.2 million shares of Axiall common stock (market value of $1.8 billion on January 25, 2013) which was distributed to PPG shareholders by an exchange offer. In the exchange offer, PPG shareholders who tendered their shares of PPG common stock as part of this offer received 3.2562 shares of Axiall common stock for each share of PPG common stock accepted for exchange. PPG was able to accept the maximum of 21,650,454 shares of PPG common stock for exchange in the offer (after giving effect to the 2-for-1 stock split discussed in Note 10, "Earnings Per Common Share"). The completion of this exchange offer was a non-cash financing transaction, which resulted in an increase in "Treasury stock" at a cost of $1.561 billion based on the PPG closing stock price on January 25, 2013.

In addition, PPG received $67 million in cash for a preliminary post-closing working capital adjustment under the terms of the Transaction agreements. The net assets transferred to Axiall included $27 million of cash on the books of the business transferred. In the Transaction, PPG transferred environmental remediation liabilities, defined benefit pension plan assets and liabilities and other post-employment benefit liabilities related to the commodity chemicals business to Axiall.
PPG recorded a net gain of $2.2 billion on the Transaction reflecting the excess of the sum of the cash proceeds received and the cost (closing stock price on January 25, 2013) of the PPG shares tendered and accepted in the exchange for the 35.2 million shares of Axiall common stock over the net book value of the net assets of PPG's former commodity chemicals business. The Transaction resulted in a net partial settlement loss of $33 million associated with the spin out and termination of defined benefit pension liabilities and the transfer of other post-retirement benefit liabilities under the terms of the Transaction.

The results of operations and cash flows of PPG's former commodity chemicals business for January 2013 and the net gain on the Transaction are reported as results from discontinued operations for the year-ended December 31, 2013. The net sales and income before income taxes of the commodity chemicals business that have been reclassified and reported as discontinued operations are presented in the table below:

($ in millions)	Year-ended 2013
Net sales	$108
Net gain from separation and merger of commodity chemicals business	2,192
Income tax expense	(5)
Net income from discontinued operations (attributable to PPG)	$2,197

Notes to the Consolidated Financial Statements

3. Working Capital Detail

($ in millions)	2015	2014
Receivables		
Trade - net[(1)]	$2,413	$2,366
Equity affiliates	4	10
Other - net	371	439
Total	$2,788	$2,815
Inventories[(2)]		
Finished products	$1,082	$1,169
Work in process	160	157
Raw materials	413	439
Supplies	50	60
Total	$1,705	$1,825
Accounts payable and accrued liabilities		
Trade	$1,940	$1,919
Accrued payroll	474	497
Customer rebates	234	264
Other postretirement and pension benefits	130	94
Income taxes	106	61
Other	606	712
Total	$3,490	$3,547

(1) Allowance for Doubtful Accounts was $51 million and $87 million as of December 31, 2015 and 2014, respectively.

(2) Inventories valued using the LIFO method of inventory valuation comprised 39% and 40% of total gross inventory values as of December 31, 2015 and 2014, respectively. If the FIFO method of inventory valuation had been used, inventories would have been $163 million and $182 million higher as of December 31, 2015 and 2014, respectively. During the years ended December 31, 2015 and 2014, certain inventories accounted for on the LIFO method of accounting were reduced, which resulted in the liquidation of certain quantities carried at costs prevailing in prior years. The effect on income from continuing operations was expense of $3.0 million and income of $0.3 million for the years ended December 31, 2015 and 2014, respectively.

4. Property, Plant and Equipment

($ in millions)	Useful Lives (years)	2015	2014
Land and land improvements	5-30	$495	$489
Buildings	20-40	1,557	1,563
Machinery and equipment	5-25	4,233	4,284
Other	3-20	813	751
Construction in progress		353	383
Total[(1)]		$7,451	$7,470
Less: accumulated depreciation		$4,434	4,378
Net		$3,017	$3,092

(1) Interest capitalized in 2015, 2014 and 2013 was $9 million, $16 million and $10 million, respectively.

5. Investments

($ in millions)	2015	2014
Investments in equity affiliates	$221	$295
Marketable equity securities - Trading (See Note 9)	77	74

Other	69	74
Total	$367	$443

The Company's investments in equity affiliates are comprised principally of 50% ownership interests in a number of joint ventures that manufacture and sell coatings and glass products, the most significant of which produces fiber glass products and is located in Asia. The Company's investments in and advances to equity affiliates also include its approximate 40% ownership interest in Pittsburgh Glass Works LLC ("PGW"), which had a carrying value of $18 million and $94 million at December 31, 2015 and 2014, respectively. In December 2015, PGW refinanced certain long term debt arrangements and recorded a debt extinguishment charge. PPG's share of the debt extinguishment charge was $11 million and was recorded in "Other income" on the Consolidated Statement of Income. PGW distributed a portion of the debt proceeds to its owners, of which PPG's share was $72 million. The extinguishment charge and the cash distribution are both reported within the "Equity affiliate earnings, net of distributions received" caption on the Consolidated Statement of Cash Flows.

PPG's share of undistributed net earnings of equity affiliates was $93 million and $171 million as of December 31, 2015 and December 31, 2014, respectively. Dividends received from equity affiliates were $77 million, $5 million and $9 million in 2015, 2014 and 2013, respectively.

PPG accounts for a noncontrolling interest related to a certain consolidated affiliate as a liability, based on a call and put option which have similar terms, which approximates $37 million.

Notes to the Consolidated Financial Statements

6. Goodwill and Other Identifiable Intangible Assets

The change in the carrying amount of goodwill attributable to each reportable business segment for the years ended December 31, 2015 and 2014 was as follows:

($ in millions)	Performance Coatings	Industrial Coatings	Glass	Total
Balance, Jan. 1, 2014	$2,381	$575	$52	$3,008
Goodwill from acquisitions	1,165	—	—	1,165
Goodwill reduction due to divestitures	—	(47)	—	(47)
Foreign currency translation	(279)	(42)	(4)	(325)
Balance, Dec. 31, 2014	$3,267	$486	$48	$3,801
Goodwill from acquisitions	109	104	—	213
Foreign currency translation	(303)	(38)	(4)	(345)
Balance, Dec. 31, 2015	$3,073	$552	$44	$3,669

The carrying amount of acquired trademarks with indefinite lives as of December 31, 2015 and 2014 totaled $1,250 million and $1,421 million, respectively. The decrease is primarily due to the strengthening of the U.S. dollar against most currencies. Refer to "Currency" section under Item 7 in "Management Discussion and Analysis."

The Company's identifiable intangible assets with finite lives are being amortized over their estimated useful lives and are detailed below.

($ in millions)	Dec. 31, 2015 Gross Carrying Amount	Accumulated Amortization	Net	Dec. 31, 2014 Gross Carrying Amount	Accumulated Amortization	Net
Acquired technology	$572	$(421)	$151	$560	$(394)	$166
Customer-related intangibles	1,267	(574)	693	1,302	(570)	732
Tradenames	132	(61)	71	134	(60)	74
Other	39	(26)	13	42	(24)	18
Balance	$2,010	$(1,082)	$928	$2,038	$(1,048)	$990

Aggregate amortization expense was $132 million, $126 million and $119 million in 2015, 2014 and 2013, respectively. The estimated future amortization expense of identifiable intangible assets per year is as follows:

($ in millions)	2016	2017	2018	2019	2020
Estimated future amortization expense	$125	$125	$120	$110	$95

7. Business Restructuring

The Company records restructuring liabilities that represent charges incurred in connection with consolidations of certain operations, including operations from acquisitions, as well as headcount reduction programs. These charges consist primarily of severance costs and asset write-downs.

On April 15, 2015, the Company approved a business restructuring plan which includes actions necessary to achieve cost synergies related to recent acquisitions. In addition, the program aims to further align employee levels and production capacity in certain businesses and regions with current product demand, as well as reductions in various global administrative functions. A pre-tax restructuring charge of $140 million was recorded in PPG's second quarter 2015 financial results, of which about 85% represents employee severance and other cash costs. The restructuring actions are expected to be substantially completed during 2016.

The following table summarizes the 2015 restructuring charges and the reserve activity since inception and through the year ended December 31, 2015:

($ in millions, except no. of employees)	Severance and Other Costs	Asset Write-offs	Total Reserve	Employees Impacted
Performance Coatings	$71	$6	$77	1,259
Industrial Coatings	42	13	55	534
Glass	4	—	4	33
Corporate	4	—		