MoSys, Inc.
Form 10-K
March 15, 2016

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

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

For the Fiscal Year December 31, 2015 or

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

Commission file number: 000-32929

MOSYS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**77-0291941**
(State or other jurisdiction of incorporation or organization)	(IRS Employer Identification Number)

3301 Olcott Street
Santa Clara, California 95054
(Address of principal executive offices)
(408) 418-7500
(Registrant's telephone number, including area code)

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 $0.01 per share	Global Select Market of the NASDAQ Stock Market, LLC

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

Title of each class	Name of each exchange on which registered
Series AA Preferred Stock, par value $0.01 per share	None

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

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 o No ý

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§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 ý No o

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) 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. ý

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 definition of "large accelerated filer," "large accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer o	Accelerated filer ý	Non-accelerated filer o (Do not check if a smaller reporting company)	Smaller reporting company o

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

The aggregate market value of the common stock held by non-affiliates of the registrant, as of June 30, 2015 was $120,238,800 based upon the last sale price reported for such date on the Global Select Market of the NASDAQ Stock Market. For purposes of this disclosure, shares of common stock held by persons who beneficially own more than 5% of the outstanding shares of common stock and shares held by officers and directors of the Registrant have been excluded because such persons may be deemed to be affiliates. This determination is not necessarily conclusive.

As of March 2, 2016, 65,975,362 shares of the registrant's common stock, $0.01 par value per share, were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement to be delivered to stockholders in connection with the registrant's 2016 Annual Meeting of Stockholders to be held on or about June 7, 2016 are incorporated by reference into Part III of this Form 10-K. The registrant intends to file its proxy statement within 120 days after its fiscal year end.

ANNUAL REPORT ON FORM 10-K
FOR THE YEAR ENDED DECEMBER 31, 2015

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Part I

This Annual Report on Form 10-K and the documents incorporated herein by reference contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934, which include, without limitation, statements about the market for our products, technology, our strategy, competition, expected financial performance and other aspects of our business identified in this Annual Report, as well as other reports that we file from time to time with the Securities and Exchange Commission. Any statements about our business, financial results, financial condition and operations contained in this Annual Report that are not statements of historical fact may be deemed to be forward- looking statements. Without limiting the foregoing, the words "believes," "anticipates," "expects," "intends," "plans," "projects," or similar expressions are intended to identify forward-looking statements. Our actual results could differ materially from those expressed or implied by these forward-looking statements as a result of various factors, including the risk factors described in Part I., Item 1A, "Risk Factors," and elsewhere in this report. We undertake no obligation to update publicly any forward-looking statements for any reason, except as required by law, even as new information becomes available or other events occur in the future.

Item 1. Business

Overview

MoSys, Inc., together with its subsidiaries ("*MoSys*," the "*Company*," "*we*," "*our*" or "us"), is a fabless semiconductor company focused on the development and sale of integrated circuits, or ICs, for the high-speed networking, communications, storage and computing markets. Our solutions deliver time-to-market, performance, signal integrity, power, area and economic benefits for system original equipment manufacturers, or OEMs. We have developed two IC product lines under the Bandwidth Engine and LineSpeed product names. Bandwidth Engine ICs integrate our proprietary 1T-SRAM high-density embedded memory with our integrated macro function technology and a highly efficient serial interface protocol resulting in a monolithic memory IC solution optimized for transaction performance. As the bandwidth requirements and amount of processing per packet increase in high-speed networking systems, critical memory access bottlenecks occur. Our Bandwidth Engine IC, with its combination of serial I/O, high-speed memory, offload functions and efficient, intelligent access, drastically increases memory accesses per second, removing these bottlenecks. In addition, the serial interface and high memory capacity reduce the board footprint, number of pins and complexity using less power. The LineSpeed IC product line, which we announced in March 2013, is comprised of non-memory, high-speed serialization-deserialization, or SerDes, I/O physical layer, or PHY, devices that ensure signal integrity between interfaces commonly referred to as clock data recovery, or CDR, or retimer functionality, which perform multiplexing to transition from one speed to another, commonly referred to as Gearbox functionality. These PHY devices reside within optical modules and networking equipment line cards designed for next-generation Ethernet and optical transport network applications.

We are currently supporting existing design win customers, primarily for Bandwidth Engine, and actively pursuing additional design wins for the use of our ICs in networking communications and data center equipment. We have established initial pricing of our IC products ordered to date, but longer-term volume prices will be subject to negotiations with our customers and may vary substantially from these initial prices.

Historically, our primary business was the design, development, marketing, sale and support of differentiated intellectual property, or IP, including embedded memory and high-speed parallel and serial I/O used in advanced systems-on-chips, or SoCs. Currently, we are focused on developing differentiated IP-rich IC products and are dedicating all our research and development, marketing and sales budget to these IC products. Royalty and other revenue generated from our existing IP

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agreements represented 58% of our total revenue in 2014 and 45% in 2015. We expect royalty and other revenue to continue to decline in 2016 both in absolute dollars and as a percentage of revenues.

Our future success and ability to achieve and maintain profitability are dependent on the marketing and sales of our IC products into networking, communications and other markets. Since the beginning of 2010, we have invested substantially all of our of our research and development resources toward development of our ICs, and, as of the end of 2012, had ceased our efforts to actively market our IP and establish license agreements for customers' new SoC development projects.

Industry Background

The amount of data being transferred by networking, storage and computing systems is increasing rapidly, primarily driven by the growth of the Internet and demand for real-time processing of bandwidth intensive applications, such as video-on-demand, Internet protocol TV, peer-to-peer and cloud computing, web2.0 applications, 4G/LTE wireless, voice-over-Internet protocol, and many others. In order to meet these demands, the network backbone, access, storage and data center infrastructure must scale in bandwidth and processing capability. In addition, system designers face the challenge of increasing the throughput of all subsystems for a variety of applications, such as video games, medical record and imaging transfers, and file sharing. These increased demands strain communication between onboard IC devices, limiting the data throughput in network switches and routers and the network backbone.

To meet these demands, carrier and enterprise networks are undergoing significant changes and, most significantly, are migrating to packet-based Ethernet networks that enable higher throughput, lower cost and uniform technology across access, core and metro network infrastructure. These networks are now being designed to deliver voice, video and high-speed Internet access on one converged, efficient and flexible network. These trends require networking systems, especially the high-speed switches and routers that primarily comprise these networks, to comply with evolving market requirements and be capable of providing new services and better quality of service while supporting new protocols and standards. To support these trends, OEM network and telecommunications equipment manufacturers, such as Alcatel-Lucent (a subsidiary of Nokia Corporation), Brocade Communications Systems, Inc., Cisco Systems, Inc., Tel. LM Ericsson, Fujitsu Ltd., Hitachi Ltd., Huawei Technologies, Juniper Networks, Inc., Nokia Corporation, and ZTE Corporation, must offer higher levels of packet forwarding rates, bandwidth density and be optimized to enable higher-density, lower power data path connectivity in the next generations of their networking systems.

Networking and telecommunications systems throughout the network must operate at higher speed and performance levels and so require new generations of packet processors and improved memory subsystems, as well as new physical interface products, to enable system performance. These systems and their component line cards generally need to support aggregate rates of 100 gigabits per second, or Gbps, and above to meet the continued growth in network traffic. Cloud services have accelerated this transition with applications such as security. Data centers and access equipment that were previously aggregating slower traffic such at 1Gbps to 10Gbps, and 40Gbps, now are being designed to aggregate traffic at 10Gbps to 100Gbps, or more. The transition to 100 Gbps networks has begun, and 100 Gbps networks are expected to grow rapidly over the coming years.

Several types of semiconductors are included on each line card, including PHY, one or more packet processors and multiple memory chips. Packet processors are complex ICs or IC chipsets that perform high speed processing for functions, such as traffic routing, shaping, metering, billing, statistics, detection and steering. The line cards use various types of memory ICs to facilitate temporary packet storage and assist in the analysis and tracking of information embedded within each packet flowing through the processors. After a packet enters the line card through a PHY, a packet or data processor helps separate the packet into smaller pieces for rapid analysis. Typically, the data is broken up into the packet header, which contains vital information on packet destination and type, such as the Internet

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protocol address, and the payload, which contains the data being sent. Generally, the line card operations must occur at full data rates and typically require accessing memory ICs many times. Simultaneously, the packet's payload, which may be substantially larger than the packet header, is also stored in memory ICs until processing is complete and the packet can re-combine and be sent to its next system destination. Within the line card, communication between the packet processor and memory ICs occurs through an interface consisting of combinations of physical pins on each type of chip. These pins are grouped together in a parallel or a serial architecture to form a pathway, called a bus, through which information is transferred from one IC to the next.

Today, the majority of physical buses that connect networking equipment and components use a parallel architecture to communicate between processors and memory ICs, which means information can travel only in one direction and in one instance at a time. As processing speeds increase, the number of pins required and the speed of the bus in a parallel architecture become a limitation on system performance and capability. In contrast, the number of connections is reduced substantially across fewer, higher-rate pins in a serial architecture, and data is transferred simultaneously in both directions. Data transfer rates with high-speed serial bus architectures and more advanced I/O protocols are limited by the capabilities of the various ICs included on the line card, thus leading to bottlenecks when these ICs perform inadequately. In order to remove these bottlenecks and meet next-generation bandwidth requirements, the line card ICs must support high-speed serial bus architectures and these more advanced I/O protocols.

Most networking and communication systems sold and in operation today include line cards that process data at speeds ranging from 10 Gbps, to 100 Gbps, and support many aggregated slower ports. To accommodate the substantial and growing increase in demand for networking communications and applications, networking systems manufacturers are developing and bringing to market next-generation systems that run at aggregate speeds of 100 to 400 Gbps or more with developments underway to scale to thousands of Gbps, or terabits, per second. However, although processor performance in applications such as computing and networking has continued to double nearly every 18 months, or even sooner, the performance of memory technology has generally been able to double only once every 10 years. Existing memory IC solutions based on parallel I/O architecture easily support speeds up to 40 Gbps, but are not optimal for meeting speeds of 100 Gbps and beyond due to system-level limitations for pin counts, power and performance. These networking and communications systems are generally comprised of a chassis populated by four to 16 line cards. Often, these systems are shipped to customers with only a portion of the line card slots populated, and the customer will add additional line cards subsequently to increase system performance and capacity.

Each line card requires a significant amount of memory to support its processing capabilities. Traditional external memory IC solutions currently used on line cards include both dynamic random access memory, or DRAM, and static random access memory, or SRAM. Line cards in networking systems use both specialized, high-performance DRAM ICs, such as reduced-latency DRAM, or RLDRAM, low-latency DRAM, or LLDRAM, and commodity DRAM, such as double data rate, or DDR ICs. In addition, networking systems use higher-performance SRAM ICs such as quad data rate, or QDR SRAM. Substantially all of these traditional memory IC solutions use parallel interfaces, which are slower than serial interfaces, so we believe they will be increasingly challenged to meet the performance, pin count, area and power requirements as networking systems expand beyond 100 Gbps. The result is a gap between processor and memory performance. To meet the higher performance requirements being demanded by the industry, while using current components and architectural approaches, system designers must add more discrete memory ICs to the line cards and/or add more embedded memory on the packet processor. This results in higher cost and power consumption, the use of more space on the line cards and additional communication interference between the ICs, which in turn results in additional bandwidth limitation problems. We believe our Bandwidth Engine family of products is well suited to address these challenges and replace these traditional memory solutions.

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In addition, each line card requires PHY products to provide interoperability and signal integrity functions. As network speeds increase beyond 100Gbps, the serial data rates are transitioning from 10Gbps to 25Gbps. This means that the signal integrity challenges (maintaining the quality of the electrical signals) of moving these high speed signals around within line cards, or between line cards and systems using fiber optic or copper cable, increase as data rates increase. These networking systems often use copper or optical modules to modify signals for transmission over longer distances ranging from tens of meters to thousands of kilometers. Optical modules convert electrical signals to optical signals for transportation over longer distances from one system to another system. Because of the challenges arising from the increase in network speeds, new 100Gbps standards have emerged that specify a CDR or retimed interface on optical modules, which was not the case at 10Gbps based interfaces. Each 100Gbps module and above using 25Gbps per lane will require a CDR/retimer function inside the module to meet these requirements. In addition, the systems themselves also require additional support to move signals between the module and the system, and these challenges become more acute as the distance increases. Our LineSpeed products address these new line card and optical module challenges by providing unique signal integrity and feature sets that align with the industry standards, as well as provide backward compatibility for the previous data rates. We believe our LineSpeed PHY products are well suited ensure the quality of signals and/or increase the transmission distance for both short reach (e.g., between ICs on a line card) or long-reach (e.g., between line cards or systems).

We have developed our Bandwidth Engine and LineSpeed families of ICs to synergistically address the need for high-speed data access and throughput currently confronting networking system designers. We expect our IC products to meet the increasing demands placed on conventional memory technology used on the line cards in high-bandwidth networking systems. We believe that our products and technology are well positioned as replacements for existing IC solutions in order to meet the needs of the next-generation networking systems that will require a large number of packet lookups and to support aggregated rates greater than 100 Gbps.

Our Approach

Our historical business was focused on the licensing of our proprietary 1T-SRAM and SerDes I/O technologies. We have leveraged our proprietary IP to design our Bandwidth Engine and LineSpeed IC product families to help networking OEMs address the growing bottlenecks in system performance. We have incorporated critical features into our product families to accomplish this objective.

On-chip Functionality

One significant performance bottleneck in any network line card is the need to transfer data between discrete ICs. Many of these data-transfer operations are iterative in nature, requiring subsequent, back-to-back accesses of the memory IC by the processor IC. Our Bandwidth Engine ICs include an arithmetic logic unit, or ALU, which enables the Bandwidth Engine IC to perform mathematical operations on data. Moving certain processing functions from the processor IC to the Bandwidth Engine IC through the use of this embedded ALU, reduces the number of I/O transactions and frees the processor IC to perform other important networking or micro-processing functions.

High-Performance Interface

High-speed, efficient interface I/Os are critical building blocks to meet high data transfer rate requirements for communication between ICs on network line cards. We believe that current networking system requirements necessitate an industry transition from parallel to serial I/O. As a result, semiconductor companies are increasingly turning to serial I/O architectures to achieve needed system performance. For example, high-performance ICs that are sold into wide markets, such as field programmable gate arrays, or FPGAs, and network processing units, NPUs, are using serial I/Os to ensure they can compete with custom designed application specific ICs, or ASICs, by matching their

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performance. Using serial I/O, IC developers also are able to reduce pin count (the wired electrical pins that connect an IC to the network line card on which it is mounted) on the IC. With reducing geometries, the size of most high-performance ICs is dictated by the number of pins required, rather than the amount of logic and memory embedded in the chip. As a result, using serial I/O facilitates cost reduction and reduced system power consumption, while improving the performance of both the IC itself and the overall system. While SerDes I/Os provide significantly enhanced performance over parallel I/Os, SerDes I/Os traditionally have had higher power consumption, which is a challenge for IC designers. Our SerDes I/Os, however, are tuned for low power consumption to meet our customers' stringent power consumption requirements.

We make our I/O technologies compliant with industry standards so that they can interoperate with interfaces on existing ICs. In addition, we make them programmable to support multiple data rates, which allows for greater flexibility for the system designer, while lowering their development and validation costs. Interoperability reduces development time, thereby reducing the overall time to market of our customers' systems.

Analog Design Capabilities

We have invested in personnel needed to define, design and market high-performance analog IC products. We have built a team of experienced engineers who combine industry expertise with advanced semiconductor design expertise to meet customer requirements and develop new products to bring to market. We intend to leverage these capabilities to achieve new levels of integration, power reduction and performance, enabling our customers to achieve differentiation in their end systems. We initially developed our team of analog engineers to develop the SerDes I/O used in our Bandwidth Engine families of products. We leveraged the capabilities of this team to produce our LineSpeed IC products, which are primarily comprised of analog circuitry.

GigaChip Interface Protocol

In addition to the physical characteristics of the serial I/O, the protocol used to transmit data is also an important element that impacts speed and performance. To address this and complement our Bandwidth Engine devices, we have developed the GigaChip Interface®, or GCI, which is an open-interface transport protocol optimized for efficient chip-to-chip communications. The GCI electrical interface is compatible with the current industry standard (Common Electrical Interface, release #11, or CEI-11G-SR and XFI) to simplify electrical interoperability between devices. GCI can enable highly efficient serial chip-to-chip communications, and its transport efficiency averages 90% for the data transfers it handles. GCI is included in our Bandwidth Engine ICs, and is offered to customers and prospective partners on terms intended to encourage widespread adoption.

High-Performance and High-Density Memory Architecture

The high-density of our proprietary 1T-SRAM technologies stems from the use of a single-transistor, or 1T, which is similar to DRAM, with a storage cell for each bit of information. Embedded memory utilizing our 1T-SRAM technologies is typically two to three times denser than the six-transistor storage cells used by traditional SRAM, or 6T-SRAM. Embedded memory utilizing our 1T-SRAM technologies typically provides speeds essentially equal to or greater than the speeds of traditional SRAM and DRAM, particularly for larger memory sizes. Our 1T-SRAM memory designs can sustain random access cycle times of less than three nanoseconds, significantly faster than embedded 6T-SRAM technology. Embedded memory utilizing our 1T-SRAM technologies can consume as little as one-half the active power and generate less heat than traditional SRAM when operating at the same speed. This reduces system level heat dissipation and enables reliable operation using lower cost packaging.

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Our Strategy

Our primary business objective is to be an IP-rich fabless semiconductor company offering ICs that deliver unparalleled memory bandwidth performance for packet processing and improved signal integrity performance for networking, security and data center systems. The key components of the expansion of our strategic plan to become an IC supplier include the following strategies:

Target Large and Growing Markets

Our initial strategy is to target the multi-billion dollar networking telecommunications, security and data center OEM equipment markets, and we have developed products to support the growth in 100 Gbps and higher networking speeds. We are currently supporting approximately 25 existing customers, with whom we have achieved over 85 design wins, which reflects broadening acceptance of our products. We define a design win as the point at which a customer has made a commitment to build a board against the fixed schematic for his system, and this board will utilize our IC products. We continue to actively pursue additional design wins for the use of our ICs in our target markets. We believe our design wins represent the potential for significant future revenues. With limited history to date, however, we cannot estimate how much revenue each design win is likely to generate, or how much revenue all of these (and future design wins) are likely to generate. For example, our first design wins from 2012 and 2013 are starting to ramp into production, and, while we cannot predict how steep these ramps might be, we expect our revenues from them to grow in successive periods over the next few years. There is no assurance that these customer designs will be shipped in large volume by our customers to their customers, however.

Leverage Technologies to Create New Products

Our strategy is to combine our proprietary IP and design and applications expertise to address the needs of several upcoming generations of advanced networking systems. We believe an IC combining our 1T-SRAM and serial I/O with logic, such as in an ALU, and other functions can provide a system-level solution and significantly improve overall system performance at lower cost while using less power. We also seek to leverage our high-speed serial I/O to create non-memory denominated ICs, such as our LineSpeed products. Our initial LineSpeed products targeted the line card and the same customers as our Bandwidth Engine products. This has given us the opportunity to provide both memory and PHY solutions during the sale process. In 2013, we introduced our first LineSpeed products to address the requirements new industry standards were placing on optical modules, as well as line cards.

Expand Adoption of the GigaChip Interface Protocol

We have provided our GCI interface protocol as an open industry standard that may be designed into other ICs in the system, as we believe this will further enable serial communication on network line cards and encourage adoption of our Bandwidth Engine IC products. A number of IC providers and partners have publicly announced their support of GCI and Bandwidth Engine, including the largest FPGA providers, Altera Corporation (a subsidiary of Intel Corporation), Xilinx, Inc., and EZchip Semiconductor Ltd. (a subsidiary of Mellanox Technologies Ltd.), with whom we work closely to support common customers. In addition, multiple networking systems companies, including actual and prospective customers, have adopted GCI.

Build Long-Term Relationships with Suppliers of Packet Processors

We believe that having long-term relationships with packet processor providers is critical to our success, as such relationships may enable us to reduce our time-to-market, provide us with a competitive advantage and expand our target markets. A key consideration of network system designers is to demonstrate interoperability between our Bandwidth Engine IC and the packet processors utilized in their systems. To obtain design wins for our Bandwidth Engine IC, we must demonstrate this interoperability, and also show that our IC works optimally with the packet processor to achieve the

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performance requirements. In addition, our current strategy requires packet processor suppliers to adopt our GCI interface. To that end, we have been working closely with FPGA, ASIC and NPU providers, to enable interoperability between our Bandwidth Engine IC products and their high-performance products. To facilitate the acceptance of our Bandwidth Engine ICs, we have made available development and characterization kits for system designers to evaluate and develop code for next-generation networking systems. Our characterization kits are fully-functional hardware platforms that allow FPGA and ASIC providers, and their customers, to demonstrate interoperability of the Bandwidth Engine IC with the ASIC or FPGA the designers use within their networking systems. Our recent announcement of the third-generation Bandwidth Engine Z30 device, designed for interoperability with the EZ-chip NPS-400, is an example and direct result of this strategy.

Our Products

Bandwidth Engine

The Bandwidth Engine is a memory-dominated IC that has been designed to be a high-performance companion IC to packet processors. While the Bandwidth Engine primarily functions as a memory device with a high-performance and high-efficiency interface, it also can accelerate certain processing operations by serving as a co-processor element. Our Bandwidth Engine ICs combine: (1) our proprietary high-density, high-speed, low latency embedded memory, (2) our high-speed serial interface technology, or SerDes, (3) an open-standard interface protocol and (4) intelligent access technology. We believe an IC combining our 1T-SRAM memory and serial I/O with logic and other intelligence functions provides a system-level solution and significantly improves overall system performance at lower cost, size and power consumption. Our Bandwidth Engine ICs can provide up to and over 4.5 billion memory accesses per second, which is more than twice the performance of current memory-based solutions. They also can enable system designers to significantly narrow the gap between processor and memory IC performance. Customers that design Bandwidth Engine ICs onto the line cards in their networking systems will re-architect their systems at the line-card level and use our product to replace traditional memory solutions. When compared with existing commercially available solutions, our Bandwidth Engine ICs may:

provide up to four times the performance;

reduce power by approximately 50%;

reduce cost by greater than 50%; and

result in a dramatic reduction in IC pin counts on the line card.

Our first generation Bandwidth Engine IC products contain 576 megabytes, or MB, of memory and use a serial I/O with up to 16 lanes operating at up to 10.3 Gbps per lane. Variations of this IC can have up to two interface ports, with up to eight serial receiver and eight serial transmitter lanes per port for a total of 16 lanes of 10.3 Gbps SerDes interface. These ICs include an ALU, which can perform read-modify-write operations. We have been shipping our initial Bandwidth Engine products since 2012.

Our second generation Bandwidth Engine IC products contain 576 MB of memory and use serial I/O with up to 16 lanes operating at up to 15 Gbps per lane. In addition to a speed improvement of up to 50%, the architecture will enable several family member parts with added specialized features. To date, we have announced three unique devices in this product family:

MSR620 with burst features optimized for oversubscription buffer applications;

MSR720 with a write cache and memory coherency capability that allows for deterministic look-ups optimized for state and queue type applications; and

MSR820 with increased intelligence for lookup, metering and statistics applications by adding dual counters, atomic and extensive metering functions.

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We have been shipping our Bandwidth Engine 2 IC products since 2013.

Our third generation Bandwidth Engine IC products contain 1152 MB of memory and use serial I/O with up to 16 lanes operating at up to 30 Gbps per lane. Bandwidth Engine 3 targets support for packet-processing applications with up to five billion memory single word accesses per second, as well as burst mode to enable full duplex buffering up to 400Gbps for ingress, egress and oversubscription applications. To date, we have announced three unique devices in this product family:

- MSR630 enables high rate lookup or high-performance buffer capabilities; and
- MSR830 offers additional offload capabilities for functions such as statistics and metering to increase performance and add features for next-generation networking and communications equipment; and
- MSRZ30 builds upon the capabilities and performance of the MSR830, with data rates, interface protocol and data structures that are optimized for the EZchip NPS-400 network processing unit, or NPU, and can increase memory bandwidth by up to 50%.

We commenced sampling of these products in the first quarter of 2016.

The devices provide benefits of size, power, pin count and cost savings to our customers.

LineSpeed

Our first generation LineSpeed products consist of single-chip PHY ICs, including a 100G multi-mode gearbox and a 100G quad retimer. These devices are designed to support 10, 40 and 100Gbps standards for high-density line cards or modules for next generation ethernet and optical transport network applications. These devices are capable of supporting both short and long reach connections across different specifications. We have developed these PHY ICs to provide the CDR function and to provide signal conversion from lower rates to higher rates both on the line card and within the optical module. We have defined performance and form factor (sizes) for specific devices for optimization of features and performance to solve challenges on the line card and in the optical module. We introduced and began sampling these devises in 2013.

Our second generation of LineSpeed products consists of our 100G low power retimer, which is optimized for ultra low power consumption, integrated test features and small size. The low-power retimer is primarily targeting opportunities in 100G CFP2, CFP4 and QSFP28 optical modules and active copper cables. We introduced and began sampling this product in 2014.

We announced our third generation of our LineSpeed products, the Flex family of 100G PHYs, and sampled first devices in the second half of 2015. These PHY devices are designed to support the latest industry standards and include gearbox, Multi-Link Gearbox, or MLG, and high density CDR/retimer devices designed to enable existing and next generation Ethernet and OTN line card applications to support the latest high-density electrical and optical interfaces. To date, we have announced four unique devices in this product family:

- MSH320, a 100Gbps Gearbox with RS-FEC: For adapting 10x10 to 4x25 from 100Gbps optical standards to a host ASIC, MAC/Framer, NPU or FPGA with 10x10G interfaces. The MSH320 includes an integrated Reed-Solomon forward error correction, or RS-FEC, option to enable systems to also support new electrical and optical standards. The device also includes a 10x10Gbps retimer to allow seamless support of 10 and 40Gbps interfaces;
- MSH225, a 10 Lane Full-Duplex Retimer: For high-density retiming applications where the line rates may be up to 28Gbps per lane and connect to host ASIC, framer, NPU or FPGA ICs equipped with 25Gbps interfaces. Each one of the 20 total independent lanes can be configured to support 10, 25, 40 or 100Gbps standards. The MSH225 integrates optional 100Gbps RS-FEC capability and includes a unique redundant link mode feature to support redundancy, scaling or monitoring features;

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MSH322, a 100Gbps Multi-Link Gearbox for Line Cards for support of high-density, independent 10GE and 40GE interfaces multiplexed into a 100GE (4x25Gbps) host interface, while supporting the latest optical industry standards. The device enables line cards with high-density switches based on 25Gbps interfaces to support two times the density of 10 and 40Gbps ports; and

MSH321, a derivative Multi-Link Gearbox built into a highly compact package and optimized layout to support the MLG function in module and compact daughter card applications.

We do not anticipate significant revenues from our LineSpeed ICs until 2017 or later. While we have a robust pipeline of design win opportunities, to date, less than 10% of our design wins claimed are for our LineSpeed products, and we expect these customers to take a minimum of 18 months to commence production.

IP Licensing and Distribution

Historically, we have offered our memory and I/O technologies on a worldwide basis to semiconductor companies, electronic product manufacturers, foundries, intellectual property companies and design companies through product development, technology licensing and joint marketing relationships. We licensed our IP technology to semiconductor companies who incorporated our technology into ICs that they sold to their customers. As a result of the change in our corporate strategy, since early 2012, our IP licensing activities have been limited, and we expect this to continue. However, during 2015, 45% of our total revenues were generated from royalties related to our existing licensing arrangements, as we continue to collect royalties from 1T- SRAM licensees. Licensing and royalty revenues have been declining since 2010, and we expect continued decline in 2016.

Research and Development

Our ability to compete in the future depends on successfully improving our technology to meet the market's increasing demand for higher performance and lower cost requirements. We have assembled a team of highly skilled engineers whose activities are focused on developing higher density, higher bandwidth, higher speed and lower cost next generation IC products. Development of our IC products requires specialized chip design and product engineers, as well as significant fabrication and testing costs, including mask costs, as we bring these products to market. We expect our significant future research and development activities to include:

designing next generation ICs with larger memory blocks and higher-speed SerDes;

developing versions of our Bandwidth Engine ICs with alternative features, such as lower-speed SerDes, increased chip-level intelligence or smaller memory blocks to allow us to serve a broader range of applications and systems;

developing derivative versions of our LineSpeed ICs to meet customer demands; and

developing new products that can leverage our proprietary IP portfolio and expand our market opportunity.

No development efforts are being dedicated to creating new or enhanced technology solely for use in licensing offerings.

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Sales and Marketing

We believe that networking and communications systems OEMs typically prefer to extend the use of traditional memory solutions and their parallel interfaces, despite performance and costs challenges and are reluctant to change their technology platforms and adopt new designs and technologies, such as serial interfaces, which are an integral part of our product solutions. Therefore, our principal selling and marketing activities to date have been focused on persuading these OEMs and key component suppliers that our solutions provide critical performance advantages, as well as on securing design wins with them.

Our sales and marketing personnel are located in the United States, Japan and China. In addition to our direct sales team, we sell through sales representatives and distributors in the United States and Asia. We also have eight applications engineers who support our customer engagements and work closely with our engineering team on product definition. For our products, our applications engineers must engage with the customers' system architects and designers to propose our IC and IP solutions such as the GCI Interface, to address their systems challenges.

In the markets we serve, the time from initial customer engagement to design win to production volume shipments can range from 18-36 months. Networking and communications systems can have a product life from a few years to over 10 years once a product like ours has been designed into the system.

Our revenue has been highly concentrated, with a few customers accounting for a significant percentage of our total revenue. For the year ended December 31, 2015, Alcatel-Lucent, Taiwan Semiconductor Manufacturing Co., Ltd., or TSMC and Kogent, Inc., our Japanese IC distributor, represented 34%, 31% and 12% of total revenue, respectively. For the year ended December 31, 2014, TSMC, Kogent, Inc. and Broadcom Ltd., represented 34%, 31% and 11% of total revenue, respectively. For the year ended December 31, 2013, TSMC and Broadcom Ltd., licensees of our memory IP, represented 41% and 13% of total revenue, respectively.

Customers in North America accounted for 51%, 28% and 30% of our revenues for the years ended December 31, 2015, 2014 and 2013, respectively. Customers in Japan accounted for 15%, 36% and 27% of our revenues for the years ended December 31, 2015, 2014 and 2013, respectively. Customers in Taiwan accounted for 32%, 35% and 42% of our revenues for the years ended December 31, 2015, 2014 and 2013, respectively. Our remaining revenues were primarily from customers in the rest of Asia and in Europe.

Intellectual Property

We regard our patents, copyrights, trademarks, trade secrets and similar intellectual property as critical to our success, and rely on a combination of patent, trademark, copyright, and trade secret laws to protect our proprietary rights.

As of December 31, 2015, we held approximately 67 U.S. and 30 foreign patents on various aspects of our technology, with expiration dates ranging from 2016 to 2035. We currently have approximately 29 pending patent applications in the U.S. and abroad. There can be no assurance that others will not independently develop or patent similar or competing technology or design around any patents that may be issued to us, or that we will be able to successfully enforce our patents against infringement by others.

In December 2011, we sold 43 United States and 30 related foreign memory technology patents for $35 million in cash pursuant to a patent purchase agreement. Under the agreement, we retained a license to all of the sold patents that is unlimited with respect to our development, manufacturing and distribution of our Bandwidth Engine IC product line and any other proprietary products that we develop as long as they are not DRAM ICs. We also retained the rights necessary to renew existing

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1T-SRAM licenses and to grant licenses similar in scope to identified foundries. We also retained rights to grant licenses for our second source purposes, to enable certain kinds of technology development and, to a limited extent, for certain ASIC products that incorporate one of our technology macros. However, the patent purchase agreement limits our rights to grant licenses under the sold patents outside the scope of our retained license and, in particular, limits the number of future licenses of 1T-SRAM memory technology that we can grant to developers of SoCs, which used to be the principal focus of our 1T-SRAM licensing activities.

The semiconductor industry is characterized by frequent litigation regarding patent and other intellectual property rights. Our licensees or we might, from time to time, receive notice of claims that we have infringed patents or other intellectual property rights owned by others. Our successful protection of our patents and other intellectual property rights and our ability to make, use, import, offer to sell, and sell products free from the intellectual property rights of others are subject to a number of factors, particularly those described in Part I, Item 1A, "Risk Factors."

Competition

The markets for our products are highly competitive. We believe that the principal competitive factors are:

processing speed and performance;

density and cost;

power consumption;

reliability;

interface requirements;

ease with which technology can be customized for and incorporated into customers' products; and

level of technical support provided.

We believe that we can compete favorably with respect to each of these criteria. Our proprietary 1T-SRAM embedded memory and high-speed serial I/O IP can provide our Bandwidth Engine ICs with a competitive advantage over alternative devices. Alternative solutions are either DRAM or SRAM-based and can support either the memory size or speed requirements of high-performance networking systems, but generally not both. DRAM solutions provide a significant amount of memory at competitive cost, but DRAM solutions do not have the required fast access and cycle times to enable high-performance. The DRAM solutions currently used in networking systems include RLDRAM from Micron Technology, Inc., or Micron, and Integrated Silicon Solutions, Inc., LLDRAM from Renesas and DDR from Samsung Electronics Co., Ltd., Micron and others. In addition, Micron has a hybrid memory cube DRAM product, which consists of multiple DRAMs connected with a serial interface. SRAM solutions can meet high-speed performance requirements, but often lack adequate memory size. The SRAM solutions currently used in networking systems primarily include QDR or similar SRAM products from Cypress Semiconductor Corporation and GSI Technology, Inc. The majority of the currently available SRAM and DRAM solutions use a parallel, rather than a serial I/O. To offset these drawbacks, system designers generally must use more discrete memory ICs, resulting in higher power consumption and greater utilization of space on the line card.

Our competitors include established semiconductor companies with significantly longer operating histories, greater name recognition and reputation, large customer bases, dedicated manufacturing facilities and greater financial, technical, sales and marketing resources. This may allow them to respond more quickly than us to new or emerging technologies or changes in customer requirements.

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Many of our competitors also have significant influence in the semiconductor industry. They may be able to introduce new technologies or devote greater resources to the development, marketing and sales of their products than we can. Furthermore, in the event of a manufacturing capacity shortage, these competitors may be able to manufacture products when we are unable to do so.

Our Bandwidth Engine ICs compete with embedded memory solutions, stand-alone memory ICs, including both DRAM and SRAM ICs, and ASICs designed by customers in-house to meet their system requirements. Our prospective customers may be unwilling to adopt and design-in our ICs due to the uncertainties and risks surrounding designing a new IC into their systems and relying on a supplier that has limited history of manufacturing such ICs. In addition, Bandwidth Engine ICs require the customer and its other IC suppliers to implement our chip-to-chip communication protocol, the GCI interface. These parties may be unwilling to do this if they believe it could adversely impact their own future product developments or competitive advantages, or, if they believe it might complicate their development process or increase the cost of their products. In order to remain competitive, we believe we must provide unparalleled memory IC solutions with the highest bandwidth capability for our target markets, which solutions are engineered and built for high-reliability carrier and enterprise applications.

Our LineSpeed ICs compete with solutions offered by Broadcom Ltd., Inphi Corporation, M/A-COM Technology Solutions Holdings, Inc. and Semtech Corp., as well as other smaller analog signal processing companies. We also may compete with ASICs designed by customers in-house to meet their system requirements, as well as by optical module OEMs. The market for our LineSpeed products is highly competitive, and customers have a number of suppliers they can choose from. We must provide differentiated features with a reasonable IC power budget, while offering competitive pricing.

Manufacturing

We depend on third-party vendors to manufacture, package, assemble and test our IC products, as we do not own or operate a semiconductor fabrication, packaging or production testing facility for boards and system assembly. By outsourcing manufacturing, we are able to avoid the high cost associated with owning and operating our own facilities, allowing us to focus our efforts on the design and marketing of our products.

We perform an ongoing review of product manufacturing and testing processes. Our IC products are subjected to extensive testing to assess whether their performance meets design specifications. Our test vendors provide us with immediate test data and the ability to generate characterization reports that are made available to our customers. We have achieved ISO 9001:2008 certification, and all of our manufacturing vendors have also achieved ISO 9001 certification.

Employees

As of December 31, 2015, we had 104 employees, consisting of 75 in research and development, 8 in sales and marketing, 11 in manufacturing operations and 10 in finance and administration. By location, we had 81 employees in the United States, 21 in our development center in India and 2 sales and marketing employees in Asia. In January 2016, we committed to effect a reduction in our workforce and associated operating expenses, net loss and cash burn and to realign resources, as we have substantially concluded development of new products, including our third generation Bandwidth Engine IC product family, and expect to bring these products to market in 2016. We have reduced United States headcount by approximately 13 people and will cease operations at our subsidiary in Hyderabad, India in the first half of 2016.

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Available Information

We were founded in 1991 and reincorporated in Delaware in September 2000. Our website address is www.mosys.com. The information in our website is not incorporated by reference into this report. Through a link on the Investor section of our website, we make available our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 as soon as reasonably practicable after they are filed with, or furnished to, the Securities and Exchange Commission, or SEC. You can also read and obtain copies of any materials we file with the SEC, at the SEC's Public Reference Room at 450 Fifth Street, NW, Washington, DC 20549. You can obtain additional information about the operation of the Public Reference Room by calling the SEC at 1.800.SEC.0330. In addition, the SEC maintains a website (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including us.

Executive Officers

The names of our executive officers and certain information about them are set forth below:

Name	Age	Position(s) with the Company
Leonard Perham	72	President and Chief Executive Officer
James W. Sullivan	47	Vice President of Finance and Chief Financial Officer
Thomas Riordan	59	Chief Operating Officer and Executive Vice President
John Monson	53	Vice President of Marketing and Sales

Leonard Perham. Mr. Perham was appointed President and Chief Executive Officer in November 2007. Mr. Perham was one of the original investors in MoSys and served on our Board of Directors from 1991 to 1997. In 2000, Mr. Perham retired from Integrated Device Technology, Inc., or IDT, where he served as Chief Executive Officer from 1991 and President and board member from 1986. From March 2000 to February 2012, Mr. Perham served as a member of or chairman of the board of directors of NetLogic Microsystems, a fabless semiconductor company. Prior to joining IDT, Mr. Perham was President and CEO of Optical Information Systems, Inc., a division of Exxon Enterprises. He was also a member of the founding team at Zilog, Inc. and held management positions at Advanced Micro Devices and Western Digital. Mr. Perham received a Bachelor of Science degree in Electrical Engineering from Northeastern University.

James W. Sullivan. Mr. Sullivan became our Vice President of Finance and Chief Financial Officer in January 2008. From July 2006 until January 2008, Mr. Sullivan served as Vice President of Finance and Chief Financial Officer at Apptera, Inc., a venture-backed company providing software for mobile advertising, search and commerce. From July 2002 until June 2006, Mr. Sullivan was the Chief Financial Officer at 8x8, Inc., a provider of voice over internet protocol communication services. Mr. Sullivan's prior experience includes various positions at 8x8, Inc. and PricewaterhouseCoopers LLP. He received a Bachelor of Science degree in Accounting from New York University and is a Certified Public Accountant.

Thomas Riordan. Mr. Riordan became our Chief Operating Officer and Executive Vice President in May 2011. Prior to joining the Company, Mr. Riordan was President and Chief Executive Officer of Exclara, a fabless semiconductor supplier of ICs for solid-state lighting from 2006 until 2010. From 2000 to 2004, Mr. Riordan served as Vice President of PMC-Sierra's microprocessor division. Mr. Riordan joined PMC-Sierra in August 2000 when it purchased Quantum Effects Devices, which he had co founded and served as President and Chief Executive Officer. Mr. Riordan serves on the board of directors of Mellanox Technologies. Mr. Riordan holds Bachelor of Science and Master of Science degrees in Electrical Engineering as well as a Bachelor of Arts degree in Government from the

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University of Central Florida and has done post-graduate work in Electrical Engineering at Stanford University.

John Monson. Mr. Monson became our Vice President of Marketing in February 2012. In early 2014, he assumed, on a permanent basis, additional responsibilities for our sales and business development activities and became our Vice President of Marketing and Sales. Prior to joining the Company, Mr. Monson was Vice President of Marketing for Mellanox Technologies, a supplier of interconnect solutions and services, from 2009 to 2012. From 2007 to 2008, Mr. Monson was Vice President of the EDC/PhyOptik business line at Inphi Corporation. He joined Inphi Corporation through a business unit acquisition of Scintera Networks, where he was Vice President of Sales and Marketing from 2005 to 2007. Previously, he held various management positions at PMC-Sierra, Inc., Lucent Technologies and AT&T Microelectronics. Mr. Monson received a Bachelor of Science degree in Electrical Engineering from the University of Minnesota.

Item 1A. Risk Factors

If any of the following risks actually occur, our business, results of operations and financial condition could suffer significantly.

We have a history of losses and are uncertain as to our future profitability.

We recorded an operating loss of $31.5 million for the year ended December 31, 2015 and ended the period with an accumulated deficit of $182.0 million. We recorded an operating loss of $32.7 million for the year ended December 31, 2014 and ended the period with an accumulated deficit of $150.5 million. We recorded an operating loss of $25.6 million, excluding the one-time gain on sale of assets of $0.6 million, for the year ended December 31, 2013. These and prior year losses have resulted in significant negative cash flows for more than a decade and have required us to raise substantial amounts of additional capital during this period. We expect to continue to incur operating losses for the foreseeable future as we secure customers for and continue to invest in the commercialization of our IC products. Due to the strong commitment of our resources to research and development and expansion of our product offerings to customers, we will need to increase revenues substantially beyond levels that we have attained in the past in order to generate sustainable operating profit and sufficient cash flows to continue doing business without raising additional capital from time to time. Given our history of fluctuating revenues and operating losses, the expected reduction in royalty and licensing revenues and challenges we face in securing customers for our IC products, we cannot be certain that we will be able to achieve profitability on either a quarterly or annual basis in the future.

Our success depends upon the networking and communications systems markets' acceptance of our ICs.

The future prospects of our business depend on the adoption and acceptance by our target markets, networking communications and data center equipment providers, of our Bandwidth Engine and LineSpeed ICs. In 2011, we began focusing our engineering, marketing and sales efforts on our IC products and de-emphasizing our technology licensing activities, which historically have been our primary revenue source. Our prospective customers may be unwilling to adopt and design-in our ICs due to the uncertainties and risks surrounding designing a new IC into their systems and relying on a supplier that has almost no history of manufacturing such ICs. In addition, our Bandwidth Engine IC products require our customers and their other IC suppliers to implement our new and proprietary chip-to-chip communication protocol, GCI, which they may be unwilling to do. We have determined and negotiated prices with a few customers for our ICs and have gained only limited experience with the cost of making and selling these products. Thus, currently, we do not know whether we will be able to profitably make and sell these products. We are investing significant resources to develop our next

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generation IC products, but may not introduce these new products successfully or obtain significant revenue from them.

An important part of our strategy to gain market acceptance is to penetrate new markets by targeting market leaders to accept our IC solutions. This strategy is designed to encourage other participants in those markets to follow these leaders in adopting our solutions. If a high-profile industry participant adopts our ICs for one or more of its products but fails to achieve success with those products, or is unable to successfully implement our ICs, other industry participants' perception of our solutions could be harmed. Any such event could reduce the amount of future sales of our IC products.

Our future revenue depends on our winning designs with our customers, and those customers designing our solutions into their product offerings and successfully selling and marketing such products. If we do not continue to win designs in the short term, our product revenue in the following years will not grow.

We sell our ICs to original equipment manufacturer (OEM) customers that include our ICs in their products. Our technology is generally incorporated into products at the design stage, which we refer to as a design win, and which we define as the point at which a customer has made a commitment to build a board against the fixed schematic for his system, and this board will utilize our ICs. As a result, our future revenue depends on our OEM customers designing our ICs into their products, and on those products being produced in volume and successfully commercialized. If we fail to convince our current or prospective customers to include our ICs in their products and fail to achieve a consistent number of design wins, our results of operations and business will be harmed. In addition, if a current or prospective customer designs a competitor's offering into its product, it becomes significantly more difficult for us to sell our IC solutions to that customer because changing suppliers involves significant cost, time, effort and risk for the OEM. Even if a customer designs one of our ICs into its product, we cannot be assured that the OEM's product will be commercially successful over time or at all or that we will receive or continue to receive any revenue from that customer. Furthermore, the customer product for which we obtain a design win may be canceled before the product enters production or is introduced into the market. Because of our extended sales cycle, our revenue in future years is highly dependent on design wins we are awarded today.

The design win process is generally a lengthy, expensive and competitive process, with no guarantee of revenue, and if we fail to generate sufficient revenue to offset our expenses, our business and operating results would suffer.

Achieving a design win is typically a lengthy, expensive and competitive process because our customers generally take a considerable amount of time to evaluate our ICs. In the markets we serve, the time from initial customer engagement to design win to production volume shipments can range from two to three years, though it may take longer for new customers or markets we intend to address. In order to win designs, we are required to both incur design and development costs and dedicate substantial engineering resources in pursuit of a single customer opportunity. Even though we incur these costs, we may not prevail in the competitive selection process and, even if we do achieve a design win, we may never generate sufficient, or any, revenue to offset our development expenditures. Our customers have the option to decide whether or not to put our solutions into production after initially designing our products in the specification. The customer can make changes to its product after a design win has been awarded to us, which can have the effect of canceling a previous design win. The delays inherent in our protracted sales cycle increase the risk that a customer will decide to cancel, curtail, reduce or delay its product plans, causing us to lose anticipated revenue. In addition, any change, delay or cancellation of a customer's plans could harm our financial results, as we may have incurred significant expense while generating no revenue.

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If our foundries do not achieve satisfactory yields or quality, our cost of goods sold will increase, our operating margins will decline, and our reputation and customer relationships could be harmed.

We depend not only on sufficient foundry manufacturing capacity and wafer prices, but also on good production yields (the number of good die per wafer) and timely wafer delivery to meet customer demand and maintain profit margins. The fabrication of our products is a complex and technically demanding process. Minor deviations in the manufacturing process can cause substantial decreases in yields, and in some cases, cause production to be suspended. Our foundry, Taiwan Semiconductor Manufacturing Company (TSMC), from time to time, experiences manufacturing defects and reduced manufacturing yields. Changes in manufacturing processes or the inadvertent use of defective or contaminated materials by our foundries could result in lower than anticipated manufacturing yields, which would harm our revenue or increase our costs. For example, recently, our foundry produced ICs and met its process specification range but did not meet our customer's specifications causing us to write off a portion of our production lot. Many of these problems are difficult to detect at an early stage of the manufacturing process and may be time consuming and expensive to correct. Poor yields from our foundry, or defects, integration issues or other performance problems in our ICs, could cause us significant customer relations and business reputation problems, harm our operating results and give rise to financial or other damages to our customers. Our customers might consequently seek damages from us for their losses. A product liability claim brought against us, even if unsuccessful, would likely be time consuming and costly to defend.

We may experience difficulties in transitioning to new wafer fabrication process technologies or in achieving higher levels of design integration, which may result in reduced manufacturing yields, delays in product deliveries and increased costs.

We aim to use the most advanced manufacturing process technology appropriate for our solutions that is available from TSMC. As a result, we periodically evaluate the benefits of migrating our solutions to other technologies in order to improve performance and reduce costs. These ongoing efforts require us from time to time to modify the manufacturing processes for our products and to redesign some products, which in turn may result in delays in product deliveries. We are dependent on TSMC to support the production of wafers for future versions of our ICs, as TSMC is our sole foundry. Such production may require changes to TSMC's existing process technology. If TSMC elects to not alter their process technology to support future versions of our ICs, we would need to identify a new foundry.

In addition, to date, specifically with regard to our Bandwidth Engine products, TSMC has not provided us with a product roadmap for the 1T-SRAM technology at process nodes below 40 nanometers. If TSMC does not support our 1T-SRAM at process nodes below 40 nanometers, so, we have not developed any memory products below that process node yet. We would need to eventually identify a new foundry and/or no longer use our 1T-SRAM technology. We do not consider this to adversely affect our current product offerings but we may face difficulties, delays and increased expense as we transition our products to new processes, and potentially to new foundries for future products.

Because the manufacturing of integrated circuits is extremely complex, the process of qualifying a new foundry is a lengthy process and there can be no assurance that we will be able to find and qualify replacement suppliers without materially adversely affecting our business, financial condition, results of operations and prospects for future growth. We cannot assure you that we will be able to maintain our relationship with our foundries or develop relationships with new foundries. If we or TSMC experience significant delays in transitioning to smaller geometries or fail to efficiently implement transitions, we could experience reduced manufacturing yields, delays in product deliveries and increased costs, any of which could harm our relationships with our customers and our operating results.

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We may not achieve the anticipated benefits of becoming a fabless semiconductor company by developing and bringing to market the Bandwidth Engine and LineSpeed IC product lines.

In 2010, we expanded our business model to become a fabless semiconductor company through the development of a product line of memory ICs called the Bandwidth Engine. In March 2013, we announced a product line of SerDes ICs called LineSpeed. Our goal is to increase our total available market by creating high-performance ICs for networking communications and data center systems, using our proprietary technology and design expertise. This development effort has required that we add headcount and design resources, such as expensive software tools, which has increased our losses from and cash used in operations. We may not be successful in our development efforts to bring our ICs to market successfully nor be successful in selling ICs due to various risks and uncertainties, including, but not limited to:

customer acceptance;

adoption of the GCI protocol, without which our Bandwidth Engine products cannot function;

difficulties and delays in our product development, manufacturing, testing and marketing activities;

timeliness of new product introductions;

the anticipated costs and technological risks of developing and bringing ICs to market;

the willingness of our manufacturing partners to assist successfully with fabrication;

our ability to qualify our products for mass production and achieve wafer yield levels to be price competitive;

the availability of quantities of ICs supplied by our manufacturing partners at a competitive cost;

our ability to generate the desired gross margin percentages and return on our product development investment;

competition from established IC suppliers;

the adequacy of our intellectual property protection for our proprietary IC designs and technologies;

customer concerns over our financial condition and viability to be a long-term profitable supplier;

the vigor and growth of markets served by our current and prospective customers; and

our lack of recent experience as a fabless semiconductor company making and selling proprietary ICs.

If we experience significant delays in bringing our IC products to market or if customer adoption of our products is delayed, this could have a material adverse effect on our anticipated revenues in upcoming years due to the potential loss of design wins and future revenues. For example, we have experienced significant delays in bringing our third generation LineSpeed products to market, which has prevented us from achieving design wins and resulted in us introducing products after our competitors. We may continue to experience significant delays in the

future.

Our main objective is the development and sale of our products to networking communications and data center systems providers and their subsystem and component vendors, and, if demand for these products does not grow, we may not achieve revenue growth and our strategic objectives.

We market and sell our ICs to networking communications and data center equipment providers and their subsystem and component vendors. We believe our future business and financial success depends on market acceptance and increasing sales of these products. In order to meet our growth and strategic objectives, networking infrastructure OEMs must incorporate our products into their systems,

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and the demand for their systems must grow as well. We cannot provide assurance that sales of our products to these OEMs will increase substantially in the future or that the demand for our customers' systems will increase. Our future revenues from these products may not increase in accordance with our growth and strategic objectives if instead our OEM customers modify their product designs, select products sold by our competitors or develop their own proprietary ICs. Moreover, demand for their products that incorporate our ICs may not grow or result in significant sales of such products due to factors affecting the customers and their business, such as industry downturns, declines in capital spending in the enterprise and carrier markets and unfavorable macroeconomic conditions. Thus, the future success of our business depends in large part on factors outside our control, and sales of our products may not meet our revenue growth and strategic objectives.

Our failure to continue to develop new products and enhance our products on a timely basis could diminish our ability to attract and retain customers.

The existing and potential markets for our products are characterized by ever-increasing performance requirements, evolving industry standards, rapid technological change and product obsolescence. These characteristics lead to frequent new product introductions and enhancements, shorter product life cycles and changes in industry demands. In order to attain and maintain a significant position in the market, we will need to continue to enhance and evolve our products and the underlying proprietary technologies in anticipation of these market trends.

Our future performance depends on a number of factors, including our ability to:

identify target markets and relevant emerging technological trends;

develop and maintain competitive technology by improving performance and adding innovative features that differentiate our products from alternative technologies;

enable the incorporation of our products into the customers' products on a timely basis and at competitive prices;

develop our products to be manufactured at smaller process geometries; and

respond effectively to new technological developments or new product introductions by others.

We plan to continually introduce enhancements to our products to meet market requirements. However, we cannot be assured that these introductions will achieve market acceptance or that we will be able to sell the products on terms that are favorable to us. Our failure to develop future products that achieve market acceptance could harm our competitive position and impede our future growth.

Our ICs have a lengthy sales cycle, which makes it difficult to predict success in this market and the timing of future revenue.

Our ICs have a lengthy sales cycle, ranging from six to 24 months from the date of our initial proposal to a prospective customer until the date on which the customer confirms that it has designed our product into its system. As lengthy, or an even lengthier period, could ensue before we would know the volume of products that such customer will, or is likely to, order. A number of factors can contribute to the length of the sales cycle, including technical evaluations of our products by the customers, the design process required to integrate our products into the customers' products and the timing of the customers' new product announcements. In anticipation of product orders, we may incur substantial costs before the sales cycle is complete and before we receive any customer payments. As a result, in the event that a sale is not completed or is cancelled or delayed, we may have incurred substantial expenses, making it more difficult for us to become profitable or otherwise negatively impacting our financial results. Furthermore, because of this lengthy sales cycle, the recording of revenues from our selling efforts may be substantially delayed, our ability to forecast our future revenue may be more limited and our revenue may fluctuate significantly from quarter to quarter. We cannot provide any assurances that our efforts to build a strong and profitable business based on the

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sale of ICs will succeed. If these efforts are not successful, in light of the substantial resources that we have invested, our future operating results and cash flows could be materially and adversely affected.

The semiconductor industry is cyclical in nature and subject to periodic downturns, which can negatively affect our revenue.

The semiconductor industry is cyclical and has experienced pronounced downturns for sustained periods of up to several years. To respond to any downturn, many semiconductor manufacturers and their customers will slow their research and development activities, cancel or delay new product developments, reduce their workforces and inventories and take a cautious approach to acquiring new equipment and technologies. As a result, our business has been in the past and could be adversely affected in the future by an industry downturn, which could negatively impact our future revenue and profitability. Also, the cyclical nature of the semiconductor industry may cause our operating results to fluctuate significantly from year-to-year, which may tend to increase the volatility of the price of our common stock.

We expect our licensing and royalty revenues to decrease compared with our historical results, and there is no guarantee revenues from our IC products will replace these lost revenues in the near future.

In 2011, we began to place greater emphasis on our IC business and re-deploy engineering, marketing and sales resources from IP to IC activities. We are no longer actively pursuing new license arrangements, and, as a result, our license and royalty revenues in 2015 declined when compared with prior years. We do not expect to generate sufficient revenues from our IC business to allow us to achieve profitability in 2016, and we expect our royalty revenues to decline in 2016 compared with 2015. In addition, the production volumes of the current royalty-bearing products shipped by our licensees are expected to decrease; therefore we expect our royalty revenue to decrease in future periods. Historically, royalties have generated a 100% gross margin, and any decrease in royalties adversely affects our gross margin, operating results and cash flows.

Our revenue has been highly concentrated among a small number of licensees and customers, and our results of operations could be harmed if we lose a key revenue source and fail to replace it.

Our overall revenue has been highly concentrated, with a few customers accounting for a significant percentage of our total revenue. For the year ended December 31, 2015, our three largest customers represented 34%, 31% and 12% of total revenue, respectively. For the year ended December 31, 2014, our three largest customers represented 34%, 31% and 11% of total revenue, respectively. For the year ended December 31, 2013, our two largest customers represented 41%, and 13% of total revenue, respectively. We expect that a relatively small number of customers will continue to account for a substantial portion of our revenue for the foreseeable future.

As a result of this revenue concentration, our results of operations could be adversely affected by the decision of a single key licensee or customer to cease using our technology or products or by a decline in the number of products that incorporate our technology that are sold by a single licensee or customer or by a small group of licensees or customers.

Our revenue concentration may also pose credit risks, which could negatively affect our cash flow and financial condition.

We might also face credit risks associated with the concentration of our revenue among a small number of licensees and customers. As of December 31, 2015, three customers represented 94% of total trade receivables. Our failure to collect receivables from any customer that represents a large percentage of receivables on a timely basis, or at all, could adversely affect our cash flow or results of operations and might cause our stock price to fall.

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Our products must meet exact specifications, and defects and failures may occur, which may cause customers to return or stop buying our products.

Our customers generally establish demanding specifications for quality, performance and reliability that our products must meet. However, our products are highly complex and may contain defects and failures when they are first introduced or as new versions are released. If defects and failures occur in our products during the design phase or after, we could experience lost revenues, increased costs, including warranty and customer support expenses and penalties for non-performance stipulated in customer purchase agreements, delays in or cancellations or rescheduling of orders or shipments, product returns or discounts, diversion of management resources or damage to our reputation and brand equity, and in some cases consequential damages, any of which would harm our operating results. In addition, delays in our ability to fill product orders as a result of quality control issues may negatively impact our relationship with our customers. We cannot assure you that we will have sufficient resources to satisfy any asserted claims. Furthermore, any such defects, failures or delays may be particularly damaging to us as we attempt to establish our reputation as a reliable provider of IC products.

Because we sell our products on a purchase order basis and rely on estimated forecasts of our customers' needs, inaccurate forecasts could adversely affect our business.

We expect to sell our IC products pursuant to individual purchase orders, rather than long-term purchase commitments. Therefore, we will rely on estimated demand forecasts, based upon input from our customers, to determine how much product to manufacture. Because our sales will be based primarily on purchase orders, our customers may cancel, delay or otherwise modify their purchase commitments with little or no notice to us. For these reasons, we will generally have limited visibility regarding our customers' product needs. In addition, the product design cycle for networking OEMs is lengthy, and it may be difficult for us to accurately anticipate when they will commence commercial shipments of products that include our ICs.

Furthermore, if we experience substantial warranty claims, our customers may cancel existing orders or cease to place future orders. Any cancellation, delay or other modification in our customers' orders could significantly reduce our revenue, cause our operating results to fluctuate from period to period and make it more difficult for us to predict our revenue. In the event of a cancellation or reduction of an order, we may not have enough time to reduce operating expenses to mitigate the effect of the lost revenue on our business.

If we overestimate customer demand for our products, we may purchase products from our manufacturers that we cannot sell. Conversely, if we underestimate customer demand or if sufficient manufacturing and testing capacity were unavailable, we would forego revenue opportunities and could lose market share in the markets served by our products and could incur penalty payments under our customer purchase agreements. In addition, our inability to meet customer requirements for our products could lead to delays in product shipments, force customers to identify alternative sources and otherwise adversely affect our ongoing relationships with our customers.

We depend on contract manufacturers for a significant portion of our revenue from the sale of our IC products.

Many of our current and prospective OEM customers use third party contract manufacturers to manufacture their systems, and these contract manufacturers purchase our products directly from us on behalf of the OEMs. Although we expect to work with our OEM customers in the design and development phases of their systems, these OEMs often give contract manufacturers some authority in product purchasing decisions. If we cannot compete effectively for the business of these contract manufacturers, or, if any of the contract manufacturers that work with our OEM customers experience financial or other difficulties in their businesses, our revenue and our business could be adversely affected. For example, if a contract manufacturer becomes subject to bankruptcy proceedings, we may

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not be able to obtain our products held by the contract manufacturer or recover payments owed to us by the contract manufacturer for products already delivered to the contract manufacturer. If we are unable to persuade contract manufacturers to purchase our products, or if the contract manufacturers are unable to deliver systems with our products to OEMs on a timely basis, our business would be adversely affected.

We rely on independent foundries and contractors for the manufacture, assembly, testing and packaging of our integrated circuits, and the failure of any of these third parties to deliver products or otherwise perform as requested could damage our relationships with our customers and harm our sales and financial results.

As a fabless semiconductor company, we rely on third parties for substantially all of our manufacturing operations. We depend on these parties to supply us with material in a timely manner that meets our standards for yield, cost and quality. We do not have long-term supply contracts with any of our suppliers or manufacturing service providers, and therefore they are not obligated to manufacture products for us for any specific period, in any specific quantity or at any specified price, except as may be provided in a particular purchase order. Any problems with our manufacturing supply chain could adversely impact our ability to ship our products to our customers on time and in the quantity required, which in turn could damage our customer relationships and impede market acceptance of our IC solutions.

Our third party wafer foundries, testing and assembly vendors and sales offices are located in regions at high risk for earthquakes and other natural disasters. Any disruption to the operations of these foundries, vendors and offices resulting from earthquakes or other natural disasters could cause significant delays in the development, production, shipment and sales of our IC products.

TSMC, which manufactures our products, is located in Asia, as are other foundries we may use in the future. EAG, which handles the testing of our products, is headquartered in California. Our primary engineering design center is located in Santa Clara, California, and we have sales offices in Japan and China. The risk of an earthquake in the Pacific Rim region is significant due to the proximity of major earthquake fault lines. In September 1999, a major earthquake in Taiwan affected the facilities of several major foundries and other vendors. As a result of this earthquake, these vendors suffered power outages and disruptions that impaired their production capacity. In February 2016 and September 2003, additional disruptive earthquakes occurred in Taiwan. The occurrence of additional earthquakes or other natural disasters could result in the disruption of the wafer foundry or assembly and test capacity of the third parties that supply these services to us and may impede our research and development efforts, as well as our ability to market and sell our products. We may not be able to obtain alternate capacity on favorable terms, if at all.

Any claim that our products or technology infringe third party intellectual property rights could increase our costs of operation and distract management and could result in expensive settlement costs or the discontinuance of our technology licensing or product offerings. In addition, we may incur substantial litigation expense, which would adversely affect our profitability.

The semiconductor industry is characterized by vigorous protection and pursuit of intellectual property rights or positions, which has resulted in often protracted and expensive litigation. We are not aware of any third party intellectual property that our products or technology would infringe. However, like many companies of our size with limited resources, we have not searched for all potentially applicable intellectual property in the public databases. It is possible that a third party now has, or may in the future obtain, patents or other intellectual property rights that our products or technology may now, or in the future, infringe. Our licensees and IC customers, or we, might, from time to time, receive notice of claims that we have infringed patents or other intellectual property rights of others. Litigation against us can result in significant expense and divert the efforts of our technical and

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management personnel, whether or not the litigation has merit or results in a determination adverse to us.

Royalty amounts owed to us might be difficult to verify, and we might find it difficult, expensive and time-consuming to enforce our license agreements.

The standard terms of our 1T-SRAM license agreements require our licensees to document the manufacture and sale of products that incorporate our technology and generally report this data to us after the end of each quarter. We have the right to audit these royalty reports periodically, although we have not conducted any such audits since 2010. These audits can be expensive, time-consuming and potentially detrimental to our business relationships. A failure to fully enforce the royalty provisions of our license agreements could cause our revenue to decrease and impede our ability to achieve and maintain profitability.

We might not be able to protect and enforce our intellectual property rights, which could impair our ability to compete and reduce the value of our technology.

Our technology is complex and is intended for use in complex SoCs and networking systems. Our licensees' products utilize our embedded memory and/or I/O technology, and a large number of companies manufacture and market these products. Because of these factors, policing the unauthorized use of our intellectual property is difficult and expensive. We cannot be certain that we will be able to detect unauthorized use of our technology or prevent other parties from designing and marketing unauthorized products based on our technology. In the event we identify any past or present infringement of our patents, copyrights or trademarks, or any violation of our trade secrets, confidentiality procedures or licensing agreements, we cannot assure you that the steps taken by us to protect our proprietary information will be adequate to prevent misappropriation of our technology. Our inability to adequately protect our intellectual property would reduce significantly the barriers of entry for directly competing technologies and could reduce the value of our technology. Furthermore, we might initiate claims or litigation against third parties for infringement of our proprietary rights or to establish the validity of our proprietary rights. Litigation by us could result in significant expense and divert the efforts of our technical and management personnel, whether or not such litigation results in a determination favorable to us.

Our existing patents might not provide us with sufficient protection of our intellectual property, and our patent applications might not result in the issuance of patents, either of which could reduce the value of our core technology and harm our business.

We rely on a combination of patents, trademarks, copyrights, trade secret laws and confidentiality procedures to protect our intellectual property rights. As of December 31, 2015, we held approximately 67 patents in the United States, and approximately 30 foreign patents, which expire at various times from 2016 to 2035. In addition, as of December 31, 2015, we had approximately 29 pending patent applications worldwide. We cannot be sure that any patents will be issued from any of our pending applications or that any claims allowed from pending applications will be of sufficient scope or strength, or issued in all countries where our products can be sold, to provide meaningful protection or any commercial advantage to us. In December 2011, we sold 43 United States and 30 related foreign patents, which reduced the size of our patent portfolio and diminishes our ability to assert counterclaims in the defense of actions against us that may arise. Also, competitors might be able to design around our patents. Failure of our patents or patent applications to provide meaningful protection might allow others to utilize our technology without any compensation to us.

The discovery of defects in our technology and products could expose us to liability for damages.

The discovery of a defect in our technologies and products could lead our customers to seek damages from us. Many of our agreements with customers include provisions waiving implied

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warranties regarding our technology and products and limiting our liability to our customers. We cannot be certain, however, that the waivers or limitations of liability contained in our agreements with customers will be enforceable.

If we fail to retain key personnel, our business and growth could be negatively affected.

Our business has been dependent to a significant degree upon the services of a small number of executive officers and technical employees. The loss of any key personnel could negatively impact our technology development efforts, our ability to deliver under our existing agreements, maintain strategic relationships with our partners, and obtain new customers. We generally have not entered into employment or non-competition agreements with any of our employees and do not maintain key-man life insurance on the lives of any of our key personnel.

Our failure to raise additional capital or generate the significant capital necessary to expand our operations and invest in new products could reduce our ability to compete and could harm our business.

We intend to continue spending substantial amounts to grow our business. In March 2016, we issued $8 million aggregate principal amount of 10% Subordinate Senior Secured Convertible Notes due August 15, 2018 (the "Notes"). The Note principal is convertible into our common stock, as well as the interest on the Notes, as we have the option of paying the interest in-kind by converting such interest into additional note principal. In addition, the Notes also include limited anti-dilution protection, such that the conversion price will be reset to a lower conversion price in some situations. As a result, our stockholders may experience significant dilution if these Notes and any additional paid-in-kind principal are converted into our common stock and the conversion price is reset. Although we believe that with the proceeds of this debt we will have capital sufficient to satisfy our working capital requirements for at least the next 12 months, we will still need to obtain additional financing to pursue our business strategy, develop new products, respond to competition and market opportunities and acquire complementary businesses or technologies. We may not be able to obtain such financing on favorable terms or at all.

If we were to raise additional capital through sales of our equity securities, our stockholders would suffer dilution of their equity ownership. If we engage in a subsequent debt financing, we may be required to accept terms that restrict our ability to incur additional indebtedness, prohibit us from paying dividends, repurchasing our stock or making investments, and force us to maintain specified liquidity or other ratios, any of which could harm our business, operating results and financial condition. If we need additional capital and cannot raise it on acceptable terms, we may not be able to, among other things:

develop or enhance our products;

continue to expand our product development and sales and marketing organizations;

acquire complementary technologies, products or businesses;

expand operations, in the United States or internationally;

hire, train and retain employees; or

respond to competitive pressures or unanticipated working capital requirements.

Our failure to do any of these things could seriously harm our ability to execute our business strategy and may force us to curtail our research and development plans or existing operations.

Our indebtedness could impair our financial condition, harm our ability to operate our business, limit our ability to borrow additional funds or capitalize on acquisition or other business opportunities.

We have indebtedness outstanding under the Notes. Pursuant to the terms of the Notes, we cannot engage in certain transactions, including disposing of certain assets, or incurring additional indebtedness, with limited exception, unless we receive prior approval from the Note holders. In the

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absence of such consent, we could be prohibited from engaging in transactions that could be beneficial to our business and our stockholders. In addition, the Notes are secured by a security interest in substantially all of our personal assets, and, in the event of a default by us, the Note holders would have a right to seize our assets. The Notes are payable in full on August 15, 2018 and holders of the Notes that do not elect to convert their Notes must be paid in cash. The holders of the Notes also have the right to require us to redeem the Notes for 120% of the Note principal in the event we are acquired or a majority of our board of directors is replaced within 12 months other than by reason of voluntary resignation or death. In the event of a required redemption, we must obtain the necessary funds if we do not have them at the time, or we will be in default under the Notes, which could have a material adverse effect on our financial condition and the price of our common stock.

We may incur additional debt in the future, subject to certain limitations contained in our senior secured convertible notes.

The degree to which we are leveraged and the restrictions governing our indebtedness could have important consequences including, but not limited to:

- limiting our ability to service all of our debt obligations;
- impacting our ability to incur additional indebtedness or obtain additional financing in the future for working capital, capital expenditures, acquisitions or general corporate or other purposes;
- increasing our vulnerability to general economic downturns and adverse industry conditions;
- limiting our flexibility in planning for, or reacting to, changes in our business and our industry; and
- limiting our ability to engage in certain transactions or capitalize on acquisition or other business opportunities.

If we are in violation of the terms of the Notes in the future and do not receive a waiver, the note holders could choose to accelerate payment on all outstanding loan balances. If we needed to obtain replacement financing, we may not be able to quickly obtain equivalent or suitable replacement financing. If we are unable to secure alternative sources of funding, such acceleration would have a material adverse impact on our financial condition.

Our failure to successfully address the potential difficulties associated with our international operations could increase our costs of operation and negatively impact our revenue.

We are subject to many difficulties posed by doing business internationally, including:

- foreign currency exchange fluctuations;
- unanticipated changes in local regulation;
- potentially adverse tax consequences, such as withholding taxes and transfer pricing issues;
- political and economic instability; and
- reduced or limited protection of our intellectual property.

Because we anticipate that integrated circuit sales to companies that operate primarily outside the United States may account for a substantial portion of our revenue in future periods, the occurrence of any of these circumstances could significantly increase our costs of

operation, delay the timing of our revenue and harm our profitability.

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

In the future, we may consider opportunities to acquire other businesses or technologies that would complement our current offerings, expand the breadth of our markets or enhance our technical capabilities. Acquisitions that we may do in the future will present a number of potential challenges

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that could, if not overcome, disrupt our business operations, substantially increase our operating expenses, negatively affect our operating results and cash flows and reduce the value to us of the acquired company or assets purchased, including:

- uncertainty related to future revenues;
- increased operating expenses and cost structure;
- integration of the acquired employees, operations, technologies and products with our existing business and products;
- focusing management's time and attention on our core business;
- retention of business relationships with suppliers and customers of the acquired business;
- entering markets in which we lack prior experience;
- retention of key employees of the acquired business;
- difficulties and delays in the further development, production, testing and marketing of the acquired technologies; and
- amortization of intangible assets, write-offs, stock-based compensation and other charges relating to the acquired business and our acquisition costs.

Provisions of our certificate of incorporation and bylaws or Delaware law might delay or prevent a change of control transaction and depress the market price of our stock.

Various provisions of our certificate of incorporation and bylaws might have the effect of making it more difficult for a third party to acquire, or discouraging a third party from attempting to acquire, control of our company. These provisions could limit the price that certain investors might be willing to pay in the future for shares of our common stock. Certain of these provisions eliminate cumulative voting in the election of directors, limit the right of stockholders to call special meetings and establish specific procedures for director nominations by stockholders and the submission of other proposals for consideration at stockholder meetings.

We are also subject to provisions of Delaware law which could delay or make more difficult a merger, tender offer or proxy contest involving our company. In particular, Section 203 of the Delaware General Corporation Law prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years unless specific conditions are met. Any of these provisions could have the effect of delaying, deferring or preventing a change in control, including without limitation, discouraging a proxy contest or making more difficult the acquisition of a substantial block of our common stock.

Under our certificate of incorporation, our board of directors may issue up to 20,000,000 shares of preferred stock without stockholder approval on such terms as the board might determine. The rights of the holders of common stock will be subject to, and might be adversely affected by, the rights of the holders of any preferred stock that might be issued in the future.

Our stockholder rights plan could prevent stockholders from receiving a premium over the market price for their shares from a potential acquirer.

We adopted a stockholder rights plan that generally entitles our stockholders to rights to acquire additional shares of our common stock when a third party acquires 15% of our common stock or commences or announces its intent to commence a tender offer for at least 15% of our common stock, other than for one group of related stockholders, as to whom this threshold is 20%. The plan also includes an exception to permit the acquisition of shares representing more than 15% of our common stock by a brokerage firm that manages independent customer accounts

and generally does not have any discretionary voting power with respect to such shares. This plan could delay, deter or prevent an investor from acquiring us in a transaction that could otherwise result in stockholders receiving a

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premium over the market price for their shares of common stock. Our intention is to maintain and enforce the terms of this plan, which could delay, deter or prevent an investor from acquiring us in a transaction that could otherwise result in stockholders receiving a premium over the market price for their shares of common stock.

Potential volatility of the price of our common stock could negatively affect your investment.

We cannot assure you that there will continue to be an active trading market for our common stock. Historically, the stock market, as well as our common stock, has experienced significant price and volume fluctuations. Market prices of securities of technology companies have been highly volatile and frequently reach levels that bear no relationship to the operating performance of such companies. These market prices generally are not sustainable and are subject to wide variations. If our common stock trades to unsustainably high levels, it is likely that the market price of our common stock will thereafter experience a material decline. In the past, our board of directors approved stock repurchase programs, and any future program could impact the price of our common stock and increase volatility.

In the past, securities class action litigation has often been brought against a company following periods of volatility in the market price of its securities. We could be the target of similar litigation in the future. Securities litigation could cause us to incur substantial costs, divert management's attention and resources, harm our reputation in the industry and the securities markets and negatively impact our operating results.

Our stock price could drop, and there could be significantly less trading activity in our stock, if securities or industry analysts downgrade our stock or do not publish research or reports about our business.

Our stock price and the trading market for our stock are likely to be affected significantly by the research and reports concerning our company and our business which are published by industry and securities analysts. We do not have any influence or control over these analysts, their reports or their recommendations. Our stock price and the trading market for our stock could be negatively affected if any analyst downgrades our stock, publishes a report which is critical of our business, or discontinues coverage of us.

If we fail to maintain compliance with the continued listing requirements of The NASDAQ Global Select Market, our common stock may be delisted and the price of our common stock and our ability to access the capital markets could be negatively impacted.

Our common stock currently trades on The NASDAQ Global Select Market under the symbol "MOSY." This market has continued listing standards that we must comply with in order to maintain the listing of our common stock. The continued listing standards include, among others, a minimum bid price requirement of $1.00 per share and any of: (i) a minimum stockholders' equity of $2.5 million; (ii) a market value of listed securities of at least $35.0 million; or (iii) net income from continuing operations of $500,000 in the most recently completed fiscal year or in the two of the last three fiscal years. Our results of operations and fluctuating stock price directly impact our ability to satisfy these continued listing standards. In the event we are unable to maintain these continued listing standards, our common stock may be subject to delisting from The NASDAQ Global Select Market.

In March 2016, we were notified by the Nasdaq staff that the bid price for our common stock must close at $1.00 per share or more for a minimum of ten consecutive trading days during the 180 calendar day period ending September 6, 2016 or we might be delisted. As mentioned above, the price of our common stock can be volatile, and there can be no assurance that we will be able to meet the minimum $1.00 bid price requirement or the other NASDAQ continued listing requirements in the future, and we may be subject to delisting as a result. If we are delisted, we would expect our common

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stock to be traded in the over-the-counter market, which could adversely affect the liquidity of our common stock. Additionally, we could face significant material adverse consequences, including:

- a limited availability of market quotations for our common stock;
- a reduced amount of analyst coverage;
- a decreased ability to issue additional securities or obtain additional financing in the future;
- reduced liquidity for our stockholders;
- potential loss of confidence by customers, collaboration partners and employees; and
- loss of institutional investor interest.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our principal administrative, sales, marketing, support and research and development functions are located in a leased facility in Santa Clara, California. We currently occupy approximately 47,000 square feet of space in the Santa Clara facility, the lease for which extends through August 2020. We have leased office space in Hyderabad, India for an engineering design center, which we expect to close by June 30, 2016, and in Tokyo, Japan, and Shanghai, China for our sales and support offices. We believe that our existing facilities are adequate to meet our current needs.

Item 3. Legal Proceedings

We are not a party to any material legal proceeding which could have a material adverse effect on our consolidated financial position or results of operations. From time to time, we may be subject to legal proceedings and claims in the ordinary course of business. These claims, even if not meritorious, could result in the expenditure of significant financial resources and diversion of management efforts.

Item 4. Mine Safety Disclosures

Not applicable.

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Part II

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

Our common stock is currently listed on the Global Select Market of the NASDAQ Stock Market under the symbol MOSY. The following table sets forth the range of high and low sales prices of our common stock for each period indicated.

Quarter ended	High	Low
December 31, 2015	$ 1.62	$ 1.08
September 30, 2015	$ 2.03	$ 1.38
June 30, 2015	$ 2.37	$ 1.83
March 31, 2015	$ 2.37	$ 1.68
December 31, 2014	$ 2.77	$ 1.53
September 30, 2014	$ 3.42	$ 2.33
June 30, 2014	$ 4.68	$ 2.86
March 31, 2014	$ 5.90	$ 4.39
December 31, 2013	$ 5.64	$ 4.01
September 30, 2013	$ 4.36	$ 3.50
June 30, 2013	$ 4.80	$ 3.98
March 31, 2013	$ 4.85	$ 3.36

We had 16 stockholders of record as of March 1, 2016.

Dividend Policy

We have not declared or paid any cash dividends on our common stock and presently intend to retain future earnings, if any, to fund the development and growth of our business and, therefore, do not anticipate paying any cash dividends in the foreseeable future.

Stock Performance Graph

The following graph compares cumulative total stockholder return on our common stock with that of the S&P 500 Index and the S&P Technology Sector Index from 2010 through 2015. The comparison assumes that $100 was invested on December 31, 2010 in our common stock, the stocks included in the S&P 500 Index and the stocks included in the S&P Technology Sector Index. We have never paid any cash dividends to holders of our common stock.

The comparisons shown in the graph below are based upon historical data, and we caution that the stock price performance shown in the graph below is not indicative of, nor intended to forecast, the potential future performance of our common stock. Information used in the graph was obtained from Standard and Poor's website, a source believed to be reliable, but we are not responsible for any errors or omissions in such information.

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Comparison of Five-Year Cumulative Return

	12/31/2010	12/31/2011	12/31/2012	12/31/2013	12/31/2014	12/31/2015
MOSYS, INC.	$ 100.00	$ 73.81	$ 61.16	$ 97.01	$ 32.86	$ 19.16
S & P 500	100.00	101.94	116.29	86.92	98.21	96.50
S & P TECHNOLOGY SECTOR	100.00	100.99	111.82	143.10	172.41	177.70

Securities Authorized for Issuance under Equity Compensation Plan

For information regarding securities authorized for issuance under equity compensation plans, please refer to Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

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Item 6. Selected Financial Data

The selected financial data presented below is derived from our consolidated financial statements that are included under Item 15. The selected financial data should be read in conjunction with our consolidated financial statements and notes related to those statements and with "Management's Discussion and Analysis of Financial Condition and Results of Operations" included herein.

	Year Ended December 31,				
	2015(1)	2014(2)	2013(3)	2012(4)	2011(5)
	(In thousands, except per share data)				
Statement of Operations Data:					
Total net revenue	$ 4,390	$ 5,380	$ 4,398	$ 6,082	$ 14,107
Cost of net revenue	2,474	2,318	474	334	3,295
Gross profit	1,916	3,062	3,924	5,748	10,812
Operating expenses	33,407	35,780	28,856	33,407	(526)
Income (loss) from operations	(31,491)	(32,718)	(24,932)	(27,659)	11,338
Other income, net	94	143	209	155	206
Income (loss) before income taxes	(31,397)	(32,575)	(24,723)	(27,504)	11,544
Income tax provision	86	107	71	110	288
Net income (loss)	$ (31,483)	$ (32,682)	$ (24,794)	$ (27,614)	$ 11,256
Net income (loss) per share:					
Basic	$ (0.50)	$ (0.66)	$ (0.55)	$ (0.70)	$ 0.30
Diluted	$ (0.50)	$ (0.66)	$ (0.55)	$ (0.70)	$ 0.28
Shares used in computing net income (loss) per share:					
Basic	62,497	49,528	45,246	39,176	37,861
Diluted	62,497	49,528	45,246	39,176	40,377
Allocation of stock-based compensation to cost of net revenue and operating expenses:					
Cost of net revenue	$	$	$ 7	$ 53	$ 407
Research and development	2,733	3,419	2,565	2,694	1,961
Selling, general and administrative	917	1,172	1,126	1,064	1,398
	$ 3,650	$ 4,591	$ 3,698	$ 3,811	$ 3,766

	Year Ended December 31,				
	2015	2014	2013	2012	2011
	(In thousands)				
Balance Sheet Data:					
Cash, cash equivalents and investments	$ 20,238	$ 25,794	$ 50,482	$ 40,710	$ 57,975
Working capital	19,661	22,649	36,020	30,155	47,968
Total assets	48,692	52,626	77,989	69,534	89,637
Current liabilities	3,604	2,845	2,355	4,821	4,035
Long-term liabilities	247	241	216	171	109
Stockholders' equity	44,841	49,540	75,418	64,542	85,493

(1) Operating expenses include $0.3 million of amortization of acquired intangible assets.

(2) Operating expenses include $1.0 million of amortization of acquired intangible assets.

(3) Operating expenses include a gain on the sale of patents of $0.6 million and $1.0 million of amortization of acquired intangible assets.

(4) Operating expenses include a gain on the sale of assets of $3.3 million and $1.7 million of amortization of acquired intangible assets.

(5) Operating expenses include a gain on the sale of patents of $35.6 million and $2.6 million of amortization of acquired intangible assets.

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

This Management's Discussion and Analysis of Financial Condition and Results of Operations should be read in conjunction with the accompanying consolidated financial statements and notes included in this report.

Overview

Our strategy and primary business objective is to become a fabless semiconductor company focused on the development and sale of integrated circuits, or ICs, for the high-speed networking, communications, storage and data center markets. Our solutions deliver time-to-market, performance, power, area and economic benefits for system original equipment manufacturers, or OEMs. We have developed two families of ICs under the Bandwidth Engine® and LineSpeed product names. Bandwidth Engine ICs combine our proprietary 1T-SRAM® high-density embedded memory, integrated macro functions and high-speed serial interface, or SerDes, I/O, with our intelligent access technology and a highly efficient interface protocol. The LineSpeed IC product line, which was announced in March 2013, is comprised of non-memory, high-speed SerDes I/O devices with clock data recovery, gearbox and retimer functionality, which convert lanes of data received on line cards or by optical modules into different configurations and/or ensure signal integrity.

Certain SerDes products have been developed under a strategic development and marketing agreement with Credo Semiconductor Ltd., or Credo. As of December 31, 2015, the Company had paid Credo $4.8 million cumulatively for achievement of development milestones, as well as for mask costs and wafer purchases from third-party vendors. All amounts incurred have been recorded as research and development expenses. Currently, under the strategic development and marketing agreement, the Company is entitled to a remaining reimbursement amount of $3.6 million of development costs based on payments made to Credo to date. This amount is subject to increase as additional payments are made to Credo. The reimbursement will be funded by the gross profits earned by the Company from the sale of the relevant SerDes products, with the initial gross profits being primarily applied to reimbursing the Company for these development payments and a portion paid to Credo. Once the full amount has been reimbursed, the gross profits from these products will be shared equally by the Company and Credo.

Historically, our primary business was the design, development, marketing, sale and support of differentiated intellectual property, or IP, including embedded memory and high-speed parallel and SerDes I/O used in advanced systems-on-chips, or SoCs. Currently, we are focused on developing differentiated IP-rich IC products and are dedicating all our research and development, marketing and sales budget to these IC products.

Our future success and ability to achieve and maintain profitability are dependent on the marketing and sales of our IC products into networking, communications and other markets requiring high-bandwidth memory access.

In January 2016, we committed to effect a reduction in our workforce and associated operating expenses, net loss and cash burn and to realign resources, as we have substantially concluded development of new products, including our third generation Bandwidth Engine IC product family, and expect to bring these products to market in 2016. We reduced United States headcount by approximately 16% and will cease operations at our subsidiary in Hyderabad, India, which has 18 employees. We anticipate that we will fully implement the planned reductions by the end of the second quarter of 2016, and expect to realize approximately $3.2 million of savings on an annual basis from the reductions. We expect operating expenses to decrease in 2016 as a result of the workforce reductions and subsequent reduction in computer-aided design software expenses.

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We expect product revenue to increase in 2016 primarily driven by increased Bandwidth Engine 2 IC revenues, as our existing customers commence full production of systems utilizing our ICs. Furthermore, we expect to expand our customer base and increase our cumulative design win count in 2016.

Critical Accounting Policies and Use of Estimates

Our consolidated financial statements are prepared in conformity with accounting principles generally accepted in the United States of America. Note 1 to the consolidated financial statements in Item 15 of this report describes the significant accounting policies and methods used in the preparation of our consolidated financial statements.

We have identified the accounting policies below as some of the more critical to our business and the understanding of our results of operations. These policies may involve estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses. Although we believe our judgments and estimates are appropriate, actual future results may differ from our estimates, and if different assumptions or conditions were to prevail, the results could be materially different from our reported results.

Revenue Recognition

General

We generate revenue from the sales of IC products and licensing of our IP. We recognize revenue when persuasive evidence of an arrangement exists, delivery or performance has occurred, the sales price is fixed or determinable, and collectibility is reasonably assured. Evidence of an arrangement generally consists of signed agreements or customer purchase orders.

IC products

Products are sold both directly to customers, as well as through distributors. Revenue from sales directly to customers is generally recognized at the time of shipment. We may record an estimated allowance, at the time of shipment, for future returns and other charges against revenue consistent with the terms of sale. IC product revenue and costs relating to sales made through distributors with rights of return or stock rotation are generally deferred until the distributors sell the product to end customers due to our inability to estimate future returns and credits to be issued. Distributors are generally able to return up to 10% of their purchases of slow, non-moving or obsolete inventory for credit every six months. At the time of shipment to distributors, an accounts receivable for the selling price is recorded, as there is a legally enforceable right to receive payment, and inventory is relieved, as legal title to the inventory is transferred upon shipment. Revenues are recognized upon receiving notification from the distributors that products have been sold to end customers. Distributors provide information regarding products and quantity, end customer shipments and remaining inventory on hand. The associated deferred margin is included in the accrued expenses and other line item in the consolidated balance sheets.

Royalty

Royalty revenue represents amounts earned under provisions in our memory licensing agreements that require our licensees to report royalties and make payments at a stated rate based on actual units manufactured or sold by licensees for products that include our memory IP. Our license agreements require the licensee to report the manufacture or sale of products that include our technology after the end of the quarter in which the sale or manufacture occurs. We recognize royalties in the quarter in which we receive the licensee's report. The timing and level of royalties are difficult to predict, and depend on the licensee's ability to market, produce and sell products incorporating our technology.

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Licensing

Licensing revenue consists of fees earned from license agreements, development services and support and maintenance. For stand-alone license agreements or license deliverables in multi-deliverable arrangements that do not require significant development, modification or customization, revenue is recognized when all revenue recognition criteria have been met. Delivery of the licensed technology is typically the final revenue recognition criterion met, at which time revenue is recognized. If any of the criteria are not met, revenue recognition is deferred until such time as all criteria have been met. Support and maintenance revenue is recognized ratably over the period during which the obligation exists, typically 12 months.

Fair Value Measurements of Financial Instruments

We measure the fair value of financial instruments using a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value into three broad levels, as follows:

Level 1 Inputs used to measure fair value are unadjusted quoted prices that are available in active markets for the identical assets or liabilities as of the reporting date.

Level 2 Pricing is provided by third party sources of market information obtained from investment advisors rather than models. We do not adjust for or apply any additional assumptions or estimates to the pricing information we receive from advisors. Our Level 2 securities include cash equivalents and available-for-sale securities, which consisted primarily of corporate debt, and government agency and municipal debt securities from issuers with high quality credit ratings. Our investment advisors obtain pricing data from independent sources, such as Standard & Poor's, Bloomberg and Interactive Data Corporation, and rely on comparable pricing of other securities because the Level 2 securities we hold are not actively traded and have fewer observable transactions. We consider this the most reliable information available for the valuation of the securities.

Level 3 Unobservable inputs that are supported by little or no market activity and reflect the use of significant management judgment are used to measure fair value. These values are generally determined using pricing models for which the assumptions utilize management's estimates of market participant assumptions. The determination of fair value for Level 3 investments and other financial instruments involves the most management judgment and subjectivity.

Valuation of long-lived Assets

We evaluate our long-lived assets for impairment at least annually, or more frequently when a triggering event is deemed to have occurred. This assessment is subjective in nature and requires significant management judgment to forecast future operating results, projected cash flows and current period market capitalization levels. If our estimates and assumptions change in the future, it could result in a material write-down of long-lived assets. We amortize our finite-lived intangible assets, such as developed technology and patent license, on a straight-line basis over their estimated useful lives of three to seven years. We recognize an impairment charge as the difference between the net book value of such assets and the fair value of the assets on the measurement date.

Goodwill

We review goodwill for impairment on an annual basis or whenever events or changes in circumstances indicate the carrying value of an asset may not be recoverable. We first assess qualitative factors to determine whether it is more-likely-than-not that the fair value of the reporting unit is less than the carrying amount as a basis for determining whether it is necessary to perform the two-step impairment test. If the qualitative assessment warrants further analysis, we compare the fair value of

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the reporting unit to its carrying value. The fair value of the reporting unit is determined using the market approach. If the fair value of the reporting unit exceeds the carrying value of net assets of the reporting unit, goodwill is not impaired, and no further testing is performed. If the carrying value of the reporting unit's goodwill exceeds its implied fair value, then we must record an impairment charge equal to the difference. We have determined that we have a single reporting unit for purposes of performing the goodwill impairment test. We use the market approach to assess impairment in the second step of the analysis. We performed the annual impairment test in September 2015, and the test did not indicate impairment of goodwill. As of December 31, 2015, we did not identify any factors to indicate there was an impairment of our goodwill and determined that no additional impairment analysis was required.

Deferred tax valuation allowance

When we prepare our consolidated financial statements, we estimate our income tax liability for each of the various jurisdictions where we conduct business. This requires us to estimate our actual current tax exposure and to assess temporary differences that result from differing treatment of certain items for tax and accounting purposes. These differences result in deferred tax assets, which we show on our consolidated balance sheet under the category of other current assets. The net deferred tax assets are reduced by a valuation allowance if, based upon weighted available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. We must make significant judgments to determine our provision for income taxes, our deferred tax assets and liabilities and any valuation allowance to be recorded against our net deferred tax asset.

Stock-based compensation

We recognize stock-based compensation for equity awards on a straight-line basis over the requisite service period, usually the vesting period, based on the grant-date fair value. We estimate the value of employee stock options on the date of grant using the Black-Scholes model. The determination of fair value of share-based payment awards on the date of grant using an option- pricing model is affected by our stock price as well as assumptions regarding a number of highly complex and subjective variables. These variables include, but are not limited to, the expected stock price volatility over the term of the awards, and actual and projected employee stock option exercise behaviors. The expected term of options granted is derived from historical data on employee exercises and post-vesting employment termination behavior. The expected volatility is based on the historical volatility of our stock price.

Results of Operations

Net Revenue.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Product	$ 2,400	$ 2,280	$ 394	$ 120	5%	$ 1,886	479%
Percentage of total net revenue	55%	42%	9%				

Product revenue increased in 2015 and 2014 due to increased volume of shipments for our ICs, mainly Bandwidth Engine, as we gained more customers. In 2015, our Bandwidth Engine 2 IC products were the primary source of IC revenue, while in 2014, our Bandwidth Engine 1 IC products accounted for most of our IC revenue. In 2014, we recognized $0.3 million of revenue from the reversal of sales return reserves recorded in prior periods following the completion of system-level tests in the field by

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customers, which reduced our expected risk of returns. We expect our product revenues to increase in the future in absolute dollars, as we expect our design wins to commence their production ramps.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Royalty and other	$ 1,990	$ 3,100	$ 4,004	$ (1,110)	(36)%	$ (904)	(23)%
Percentage of total net revenue	45%	58%	91%				

Royalty and other revenue is primarily comprised of revenue generated from licensing agreements. The sequential decreases were primarily due to a decrease in shipment volumes by licensees whose products incorporate our licensed IP and a decrease in revenue recognized from residual licensing agreements entered into in 2011 and prior years. We expect royalty and other revenue to decline in 2016, as we expect a decline in shipments of units incorporating our technology by licensees, as their products approach their end of life.

Cost of Net Revenue and Gross Profit.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Cost of net revenue	$ 2,474	$ 2,318	$ 474	$ 156	7%	$ 1,844	389%
Percentage of total net revenue	56%	43%	11%				

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Gross profit	$ 1,916	$ 3,062	$ 3,924	$ (1,146)	(37)%	$ (862)	(22)%
Gross margin	44%	57%	89%				

In each of 2015, 2014 and 2013, cost of net revenue primarily consisted of direct and indirect costs related to the sale of IC products.

Cost of net revenue increased in 2015 and 2014, primarily due to the increase in product material testing and other production costs related to our increased IC shipments. We expect the cost of net revenue to increase in the future in absolute dollars, because we anticipate an increase in sales of our IC products.

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Gross profit decreased in 2015 and 2014, primarily due to the decrease in our royalty revenue, which has no associated costs, coupled with the increase in IC shipments. The deferred margin recognized from the reversal of sales return reserves in 2014 and 2015 was not material. Gross margin percentage decreased in 2015 and 2014, primarily due to an increase in product revenue, which has associated costs, as compared with royalty revenue, which has no associated costs.

Research and Development.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Research and development	$ 27,108	$ 29,261	$ 23,325	$ (2,153)	(7)%	$ 5,936	25%
Percentage of total net revenue	618%	544%	530%				

Our research and development expenses include costs related to the development of our IC products and amortization of intangible assets. We expense research and development costs as they are incurred.

The $2.2 million decrease in 2015 over the prior year was primarily due to a decrease in consulting expenses, computer-aided software license fees, amortization of intangibles and stock-based compensation charges, partialy offset by an increase in mask tooling costs.

The $5.9 million increase in 2014 over the prior year was primarily due to increases in personnel-related costs, resulting from higher headcount, mask tooling costs, computer-aided software license fees and stock-based compensation charges.

Research and development expenses included stock-based compensation expense of $2.7 million, $3.4 million and $2.6 million for the years ended December 31, 2015, 2014 and 2013, respectively. We expect that research and development expenses will decrease in absolute dollars due to the reduction in force initiated in the first quarter of 2016 and reductions in computer-aided software license fees.

Selling, General and Administrative.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Selling, general and administrative	$ 6,299	$ 6,519	$ 6,161	$ (220)	(3)%	$ 358	6%
Percentage of total net revenue	144%	121%	140%				

Selling, general and administrative expenses consist primarily of personnel and related overhead costs for sales, marketing, finance, human resources and general management.

Selling, general and administrative expenses decreased $0.2 million for 2015, compared with the prior year, primarily as a result of a decrease in stock-based compensation expense.

Selling, general and administrative expenses increased $0.4 million for 2014, compared with the prior year, as a result of increases in personnel-related and consulting costs.

Selling, general and administrative expenses included stock-based compensation expense of $0.9 million, $1.2 million and $1.1 million for the years ended December 31, 2015, 2014 and 2013, respectively.

We expect total selling, general and administrative expenses to decrease slightly in absolute dollars in 2016.

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Gain on Sale of Assets.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Gain on sale of assets			$ 630			$ (630)	(100)%
Percentage of total net revenue			14%				

In March 2012, we entered into an asset purchase agreement for an exclusive license of a portion of our intellectual property pertaining to our high-speed serial I/O technology for approximately $4.3 million. As part of the agreement, we provided certain technology transfer support services, and 15 employees of our India subsidiary accepted employment with the purchaser. In March 2013, we received the final payment of $0.6 million under the agreement.

Other Income, net.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Other income, net	$ 94	$ 143	$ 209	$ (49)	(34)%	$ (66)	(32)%
Percentage of total net revenue	2%	3%	5%				

Other income, net primarily consisted of interest income on our investments, which was $0.1 million for the year ended December 31, 2015 and $0.2 million for each of the years ended December 31, 2014 and 2013, partially offset by other non-operating items.

Income Tax Provision.

	Year ended December 31,			Year-Over-Year Change			
	2015	2014	2013	2014 to 2015		2013 to 2014	
	(dollar amounts in thousands)						
Income tax provision	$ 86	$ 107	$ 71	$ (21)	(20)%	$ 36	51%
Percentage of total net revenue	2%	2%	2%				

Our income tax provisions were primarily attributable to taxes on earnings of our foreign subsidiaries and branches.

As of December 31, 2015, we had net operating loss carryforwards of approximately $163 million for U.S. federal income tax purposes and approximately $107 million for state income tax purposes that are available to reduce future income tax liabilities to the extent permitted under federal and state income tax laws. These net operating loss carryforwards expire from 2016 to 2035. In 2016, we anticipate that our effective income tax rate will continue to be less than the federal statutory tax rate because of expected losses.

As of December 31, 2015 and 2014, we had net deferred tax assets of approximately $81 million and $67 million, respectively. Because of uncertainties regarding the realization of these deferred tax assets, we had recorded a full valuation allowance as of December 31, 2015 and 2014.

Liquidity and Capital Resources

As of December 31, 2015, we had cash, cash equivalents and investments totaling $20.2 million compared with a combined balance of $25.8 million at December 31, 2014. On March 14, 2016, we issued $7 million aggregate principal amount of Notes at par. The Notes bear interest at the annual

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rate of 10% and interest is payable semi-annually in cash or in kind through the issuance of identical new Notes, or with a combination of the two, at our option.

In 2015, we used $27.5 million in operating activities, which primarily resulted from the net loss of $31.5 million, adjusted for non-cash charges and gains, which included stock-based compensation expenses of $3.7 million and depreciation and amortization expenses of $0.9 million, and changes to operating assets and liabilities of $0.6 million. The changes in assets and liabilities primarily related to the timing of the collection of receivables from customers and payments to vendors, including purchases of and increase in inventory.

In 2014, we used $26.3 million in operating activities, which primarily resulted from the net loss of $32.7 million, adjusted for non-cash charges and gains, which included stock-based compensation expenses of $4.6 million and depreciation and amortization expenses of $1.4 million, and changes to operating assets and liabilities of $0.3 million. The changes in assets and liabilities primarily related to the payments to vendors, including purchases of inventory.

In 2013, we used $22.6 million in operating activities, which primarily resulted from the net loss of $24.8 million, and $2.6 million used for operating assets and liabilities, adjusted for non-cash charges and gains, which included stock-based compensation expenses of $3.7 million and depreciation and amortization expenses of $1.7 million. The changes in assets and liabilities primarily related to the recognition of revenue related to deferred revenues and payments to vendors.

Our investing activities in 2015 primarily consisted of $1.2 million expended for purchases of fixed assets. Remaining investing activities consisted of investing our cash in marketable securities, which did not affect our liquidity. Our investing activities in 2014 primarily consisted of $0.6 million expended for purchases of fixed assets. Remaining investing activities consisted of investing our cash in marketable securities, which did not affect our liquidity. Our investing activities in 2013 primarily consisted of $0.6 million received for the sale of assets and $0.2 million expended for purchases of fixed assets. Remaining investing activities consisted of investing our cash in marketable securities, which did not affect our liquidity.

Our financing activities in 2015 primarily consisted of $21.4 million in net proceeds received from the sale of common stock though a public offering and $1.8 million in proceeds from the exercise of stock options and purchases of common stock under our employee stock purchase plan. Our financing activities in 2014 primarily consisted of proceeds from the exercise of stock options and sales under our employee stock purchase plan. Our financing activities in 2013 primarily consisted of $27.7 million in net proceeds received from the sale of common stock though a public offering and $4.2 million in proceeds from the exercise of stock options and purchases of common stock under our employee stock purchase plan.

Our future liquidity and capital requirements are expected to vary from quarter to quarter, depending on numerous factors, including:

level of revenue;

cost, timing and success of technology development efforts;

inventory levels, timing of product shipments and length of billing and collection cycles;

fabrication costs, including mask costs, of our ICs, currently under development;

variations in manufacturing yields, materials costs and other manufacturing risks;

costs of acquiring other businesses and integrating the acquired operations;

profitability of our business; and

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whether interest payments on the Notes are paid in cash or, at our election, in kind through the issuance of new Notes with identical terms for the accrued interest.

We expect our cash expenditures to continue to exceed receipts in 2016, as our revenues will not be sufficient to offset our operating expenses, which include significant research and development expenditures for the expansion and fabrication of our IC products. We believe our existing cash, cash equivalents and investments, along with our existing capital and cash generated from operations, if any, to be sufficient to meet our capital requirements for at least the next 12 months. However, there can be no assurance that our capital is sufficient to fund operations until such time as we begin to achieve positive cash flows. We have an effective shelf registration statement under which we could sell additional securities without advance notice. We might decide to raise additional capital, and there can be no assurance that such funding will be available to us on favorable terms, if at all. The failure to raise capital when needed could have a material adverse effect on our business and financial condition.

If we were to raise additional capital through sales of our equity securities, our stockholders would suffer dilution of their equity ownership. If we engage in debt financing, we may be required to accept terms that restrict our ability to incur additional indebtedness, prohibit us from paying dividends, repurchasing our stock or making investments, and force us to maintain specified liquidity or other ratios, any of which could harm our business, operating results and financial condition. If we need additional capital and cannot raise it on acceptable terms, we may not be able to, among other things:

develop or enhance our products;

continue to expand our product development and sales and marketing organizations;

acquire complementary technologies, products or businesses;

expand operations, in the United States or internationally;

hire, train and retain employees; or

respond to competitive pressures or unanticipated working capital requirements.

Our failure to do any of these things could seriously harm our ability to execute our business strategy and may force us to curtail our research and development plans or existing operations.

Disclosures about Contractual Obligations and Commercial Commitments

The impact that our contractual obligations as of December 31, 2015 are expected to have on our liquidity and cash flow in future periods is (in thousands):

	Payment Due by Period				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
Operating leases	$ 3,553	$ 796	$ 2,244	$ 513	$
Software licenses	2,091	1,305	786		
	$ 5,644	$ 2,101	$ 3,030	$ 513	$

As of December 31, 2015, our software licenses related to computer-aided design software.

Off-Balance Sheet Arrangements

We do not maintain any off-balance sheet arrangements or obligations that are reasonably likely to have a material current or future effect on our financial condition, results of operations, liquidity or capital resources.

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Indemnifications

In the ordinary course of business, we enter into contractual arrangements under which we may agree to indemnify the counter-party from losses relating to a breach of representations and warranties, a failure to perform certain covenants, or claims and losses arising from certain external events as outlined within the particular contract, which may include, for example, losses arising from litigation or claims relating to past performance. Such indemnification clauses may not be subject to maximum loss clauses. We have also entered into indemnification agreements with our officers and directors. No material amounts are reflected in our consolidated financial statements for the years ended December 31, 2015, 2014 or 2013 related to these indemnifications.

Recent Accounting Pronouncements

See Note 1 to the consolidated financial statements in Item 15 of this report for a full description of recent accounting pronouncements including the respective expected dates of adoption and effects on results of operations and financial condition.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Interest rate risk

We have exposure to interest rate risk due to our investment portfolio. Our investments are made in accordance with an investment policy under the guidance of the audit committee of our board of directors. The primary objective of our investment activities is to preserve principal and meet liquidity needs. To achieve this objective, we maintain our portfolio of cash equivalents and short-term and long-term investments in a variety of securities, including money market accounts, certificates of deposit, corporate debt, government-sponsored enterprise bonds and municipal bonds. We place our investments with high-credit quality issuers and, by policy, limit the amount of credit exposure with any one issuer or fund. The investments, other than money market funds, are classified as available-for-sale and are recorded on the balance sheet at fair value with unrealized gains and losses reported as a separate component of accumulated other comprehensive income (loss). Securities with an original maturity of three months or less are considered cash equivalents. Securities with original maturities greater than three months and remaining maturities less than one year are classified as short-term investments. Securities with remaining maturities greater than one year are classified as long-term investments. All investments have a maturity of less than two years. No single security should exceed 5% of the portfolio or $2.0 million at the time of purchase. The portfolio's dollar-weighted average maturity of investments is within 12 months. These securities, which approximated $18.5 million as of December 31, 2015 and earned an average annual interest rate of approximately 0.3% in 2015, are subject to interest rate and credit risks. As of December 31, 2015, we performed a sensitivity analysis on our investment portfolio. According to our analysis, parallel shifts in the yield curve of both +/ 0.5% would result in changes in fair market values for these investments of less than $25,000. We do not have any investments denominated in foreign currencies, and therefore are not subject to foreign currency risk on such investments.

Foreign currency exchange rate risk

Currently, all of our international sales are denominated in U.S. dollars and, as a result, we have not experienced significant foreign exchange gains or losses to date. However, the expenses of our foreign entities are primarily denominated in their local currencies, therefore we have risk of foreign exchange gains and losses through the funding of those expenditures. We do not currently enter into forward exchange contracts to hedge exposures denominated in foreign currencies or any other derivative financial instruments for trading or speculative purposes. However, in the event our exposure to foreign currency risk increases, we may choose to hedge those exposures. For most currencies, we are a net payer of foreign currencies and, therefore, benefit from a stronger U.S. dollar and are adversely affected by a weaker U.S. dollar relative to those foreign currencies.

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Item 8. Financial Statements and Supplementary Data

Reference is made to the consolidated financial statements listed under the heading (a) (1) Financial Statements and Reports of Burr Pilger Mayer, Inc. of Item 15, which consolidated financial statements are incorporated by reference in response to this Item 8.

Quarterly Results of Operations

The following tables set forth unaudited results of operations data for each of the eight quarters in the two year period ended December 31, 2015. This unaudited information has been prepared on a basis consistent with our audited financial statements appearing elsewhere in this report and, in the opinion of our management, includes all adjustments, consisting only of normal recurring adjustments, except as disclosed below, necessary for a fair presentation of the information for the periods presented. The unaudited quarterly information should be read in conjunction with the financial statements and notes included elsewhere in this report.

	Dec. 31, 2015	Sep. 30, 2015	Jun. 30, 2015	Mar. 31, 2015	Dec. 31, 2014	Sep. 30, 2014	Jun. 30, 2014	Mar. 31, 2014
	(In thousands, except per share data)							
	(Unaudited All periods)							
Net revenue:								
Product	$ 1,112	$ 565	$ 543	$ 180	$ 287	$ 437	$ 975	$ 581
Royalty and other	486	457	451	596	859	716	774	751
Total net revenue	1,598	1,022	994	776	1,146	1,153	1,749	1,332
Cost of net revenue	881	793	563	237	272	447	1,022	577
Gross profit	717	229	431	539	874	706	727	755
Operating expenses:								
Research and development	5,633	8,793	5,789	6,893	8,268	7,507	6,432	7,054
Selling, general and administrative	1,588	1,547	1,550	1,614	1,543	1,689	1,490	1,797
Total operating expenses	7,221	10,340	7,339	8,507	9,811	9,196	7,922	8,851
Operating loss	(6,504)	(10,111)	(6,908)	(7,968)	(8,937)	(8,490)	(7,195)	(8,096)
Other income, net	23	19	29	23	28	30	55	30
Loss before income taxes	(6,481)	(10,092)	(6,879)	(7,945)	(8,909)	(8,460)	(7,140)	(8,066)
Income tax provision	26	13	27	20	42	23	21	21
Net loss	$ (6,507)	$ (10,105)	$ (6,906)	$ (7,965)	$ (8,951)	$ (8,483)	$ (7,161)	$ (8,087)
Net loss per share:								
Basic and diluted	$ (0.10)	$ (0.15)	$ (0.11)	$ (0.15)	$ (0.18)	$ (0.17)	$ (0.14)	$ (0.16)
Shares used in computing net loss per share:								
Basic and diluted	65,496	65,317	64,737	54,282	49,783	49,634	49,511	49,174

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

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Item 9A. Controls and Procedures

RSUs with no requisite service period for employees who meet the criteria for a "Long Service Separation." Compensation expense was fully recognized immediately on the grant date for these employees. Award terms for the 2017 grant allow for continued vesting as of each vesting date specified in the award document for employees who meet the criteria for a "Long Service Separation" and fulfill a requisite service period of six months. Compensation expense for eligible employees for the 2017 grant is recognized over the period from the grant date to the end date of the six-month requisite service period. For employees who become eligible for a "Long Service Separation" subsequent to the end date of the six-month requisite service period and prior to the completion of the vesting period, compensation expense is recognized over the period from the grant date to the date eligibility is achieved.

Prior to 2017, all outstanding PRSU awards granted to employees eligible for a "Long Service Separation" may vest at the end of the performance period based upon achievement of the performance target. Compensation expense for the 2016 PRSU grant was fully recognized immediately on the grant date for these employees. For PRSU awards granted in 2017, only a prorated number of shares may vest at the end of the performance period based upon achievement of the performance target, with the proration based upon the number of months of continuous employment during the three-year performance period. Employees with a "Long Service Separation" must also fulfill a six-month requisite service period in order to be eligible for the prorated vesting of outstanding PRSU awards granted in 2017. Compensation expense for the 2017 PRSU grant is recognized on a straight-line basis over the three-year performance period for all participants.

During the second quarter of 2017, the 2014 Long-Term Incentive Plan (the Plan) was amended and restated. The Plan initially provided that up to 38,800,000 Common Shares would be reserved for future issuance under the Plan, subject to adjustment in certain events. Upon shareholder approval of the amendment and restatement of the Plan, an additional 36,000,000 Common Shares became available for all awards under the Plan.

We recognized pretax stock-based compensation expense of $48 million and $165 million for the three and nine months ended September 30, 2017, respectively and $41 million and $187 million for the three and nine months ended September 30, 2016, respectively.

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The following table illustrates the type and fair value of the stock-based compensation awards granted during the nine months ended September 30, 2017 and 2016, respectively:

	Nine Months Ended September 30, 2017			Nine Months Ended September 30, 2016		
	Shares Granted	Weighted-Average Fair Value Per Share	Weighted-Average Grant Date Stock Price	Shares Granted	Weighted-Average Fair Value Per Share	Weighted-Average Grant Date Stock Price
Stock options	2,701,644	$ 25.01	$ 95.66	4,243,272	$ 20.64	$ 74.77
RSUs	924,421	$ 90.11	$ 96.01	1,085,505	$ 68.04	$ 74.77
PRSUs	437,385	$ 86.78	$ 95.66	614,347	$ 64.71	$ 74.77

The following table provides the assumptions used in determining the fair value of the stock-based awards for the nine months ended September 30, 2017 and 2016, respectively:

	Grant Year	
	2017	2016
Weighted-average dividend yield	3.42%	3.23%
Weighted-average volatility	29.2%	31.1%
Range of volatilities	22.1-33.0%	22.5-33.4%
Range of risk-free interest rates	0.81-2.35%	0.62-1.73%
Weighted-average expected lives	8 years	8 years

As of September 30, 2017, the total remaining unrecognized compensation expense related to nonvested stock-based compensation awards was $188 million, which will be amortized over the weighted-average remaining requisite service periods of approximately 1.9 years.

4. Derivative financial instruments and risk management

Our earnings and cash flow are subject to fluctuations due to changes in foreign currency exchange rates, interest rates and commodity prices. Our Risk Management Policy (policy) allows for the use of derivative financial instruments to prudently manage foreign currency exchange rate, interest rate and commodity price exposures. Our policy specifies that derivatives are not to be used for speculative purposes. Derivatives that we use are primarily foreign currency forward, option and cross currency contracts, interest rate contracts and commodity forward and option contracts. Our derivative activities are subject to the management, direction and control of our senior financial officers. Risk management practices, including the use of financial derivative instruments, are presented to the Audit Committee of the Board of Directors at least annually.

All derivatives are recognized on the Consolidated Statement of Financial Position at their fair value. On the date the derivative contract is entered into, we designate the derivative as (1) a hedge of the fair value of a recognized asset or liability (fair value hedge), (2) a hedge of a forecasted transaction or the variability of cash flow (cash flow hedge) or (3) an undesignated instrument. Changes in the fair value of a derivative that is qualified, designated and highly effective as a fair value hedge, along with the gain or loss on the hedged recognized asset or liability that is attributable to the hedged risk, are recorded in current earnings. Changes in the fair value of a derivative that is qualified, designated and highly effective as a cash flow hedge are recorded in Accumulated other comprehensive income (loss) (AOCI), to the extent effective, on the Consolidated Statement of Financial Position until they are

reclassified to earnings in the same period or periods during which the hedged transaction affects earnings. Changes in the fair value of undesignated derivative instruments and the ineffective portion of designated derivative instruments are reported in current earnings. Cash flows from designated derivative financial instruments are classified within the same category as the item being hedged on the Consolidated Statement of Cash Flow. Cash flows from undesignated derivative financial instruments are included in the investing category on the Consolidated Statement of Cash Flow.

We formally document all relationships between hedging instruments and hedged items, as well as the risk-management objective and strategy for undertaking various hedge transactions. This process includes linking all derivatives that are

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designated as fair value hedges to specific assets and liabilities on the Consolidated Statement of Financial Position and linking cash flow hedges to specific forecasted transactions or variability of cash flow.

We also formally assess, both at the hedge's inception and on an ongoing basis, whether the designated derivatives that are used in hedging transactions are highly effective in offsetting changes in fair values or cash flow of hedged items. When a derivative is determined not to be highly effective as a hedge or the underlying hedged transaction is no longer probable, we discontinue hedge accounting prospectively, in accordance with the derecognition criteria for hedge accounting.

Foreign Currency Exchange Rate Risk

Foreign currency exchange rate movements create a degree of risk by affecting the U.S. dollar value of sales made and costs incurred in foreign currencies. Movements in foreign currency rates also affect our competitive position as these changes may affect business practices and/or pricing strategies of non-U.S.-based competitors. Additionally, we have balance sheet positions denominated in foreign currencies, thereby creating exposure to movements in exchange rates.

Our Machinery, Energy & Transportation operations purchase, manufacture and sell products in many locations around the world. As we have a diversified revenue and cost base, we manage our future foreign currency cash flow exposure on a net basis. We use foreign currency forward and option contracts to manage unmatched foreign currency cash inflow and outflow. Our objective is to minimize the risk of exchange rate movements that would reduce the U.S. dollar value of our foreign currency cash flow. Our policy allows for managing anticipated foreign currency cash flow for up to five years. As of September 30, 2017, the maximum term of these outstanding contracts was approximately 51 months.

We generally designate as cash flow hedges at inception of the contract any Australian dollar, Brazilian real, British pound, Canadian dollar, Chinese yuan, euro, Indian rupee, Japanese yen, Mexican peso, Norwegian krona, Singapore dollar or Thailand baht forward or option contracts that meet the requirements for hedge accounting and the maturity extends beyond the current quarter-end. Designation is performed on a specific exposure basis to support hedge accounting. The remainder of Machinery, Energy & Transportation foreign currency contracts are undesignated.

As of September 30, 2017, $4 million of deferred net gains, net of tax, included in equity (AOCI in the Consolidated Statement of Financial Position), are expected to be reclassified to current earnings (Other income (expense) in the Consolidated Statement of Results of Operations) over the next twelve months when earnings are affected by the hedged transactions. The actual amount recorded in Other income (expense) will vary based on exchange rates at the time the hedged transactions impact earnings.

In managing foreign currency risk for our Financial Products operations, our objective is to minimize earnings volatility resulting from conversion and the remeasurement of net foreign currency balance sheet positions, and future transactions denominated in foreign currencies. Our policy allows the use of foreign currency forward, option and cross currency contracts to offset the risk of currency mismatch between our assets and liabilities, and exchange rate risk associated with future transactions denominated in foreign currencies. Our foreign currency forward, option and cross currency contracts are primarily undesignated. We designate fixed-to-fixed cross currency contracts as cash flow hedges to protect against movements in exchange rates on foreign currency fixed rate assets and liabilities.

Interest Rate Risk

Interest rate movements create a degree of risk by affecting the amount of our interest payments and the value of our fixed-rate debt. Our practice is to use interest rate contracts to manage our exposure to interest rate changes.

Our Machinery, Energy & Transportation operations generally use fixed-rate debt as a source of funding. Our objective is to minimize the cost of borrowed funds. Our policy allows us to enter into fixed-to-floating interest rate contracts and forward rate agreements to meet that objective. We designate fixed-to-floating interest rate contracts as fair value hedges at inception of the contract, and we designate certain forward rate agreements as cash flow hedges at inception of the contract.

Financial Products operations has a match-funding policy that addresses interest rate risk by aligning the interest rate profile (fixed or floating rate) of Cat Financial's debt portfolio with the interest rate profile of their receivables portfolio within predetermined ranges on an ongoing basis. In connection with that policy, we use interest rate derivative instruments to modify the debt structure to match assets within the receivables portfolio. This matched funding reduces the volatility of margins between interest-bearing assets and interest-bearing liabilities, regardless of which direction interest rates move.

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Our policy allows us to use fixed-to-floating, floating-to-fixed and floating-to-floating interest rate contracts to meet the match-funding objective. We designate fixed-to-floating interest rate contracts as fair value hedges to protect debt against changes in fair value due to changes in the benchmark interest rate. We designate most floating-to-fixed interest rate contracts as cash flow hedges to protect against the variability of cash flows due to changes in the benchmark interest rate.

We have, at certain times, liquidated fixed-to-floating and floating-to-fixed interest rate contracts at both Machinery, Energy & Transportation and Financial Products. The gains or losses associated with these contracts at the time of liquidation are amortized into earnings over the original term of the previously designated hedged item.

Commodity Price Risk

Commodity price movements create a degree of risk by affecting the price we must pay for certain raw material. Our policy is to use commodity forward and option contracts to manage the commodity risk and reduce the cost of purchased materials.

Our Machinery, Energy & Transportation operations purchase base and precious metals embedded in the components we purchase from suppliers. Our suppliers pass on to us price changes in the commodity portion of the component cost. In addition, we are subject to price changes on energy products such as natural gas and diesel fuel purchased for operational use.

Our objective is to minimize volatility in the price of these commodities. Our policy allows us to enter into commodity forward and option contracts to lock in the purchase price of a portion of these commodities within a five-year horizon. All such commodity forward and option contracts are undesignated.

The location and fair value of derivative instruments reported in the Consolidated Statement of Financial Position are as follows:

(Millions of dollars)	Consolidated Statement of Financial Position Location	Asset (Liability) Fair Value	
		September 30, 2017	December 31, 2016
Designated derivatives			
Foreign exchange contracts			
Machinery, Energy & Transportation	Receivables – trade and other	$ 14	$ 13
Machinery, Energy & Transportation	Long-term receivables – trade and other	3	—
Machinery, Energy & Transportation	Accrued expenses	(8)	(93)
Machinery, Energy & Transportation	Other liabilities	(5)	(36)
Financial Products	Long-term receivables – trade and other	8	29
Financial Products	Accrued expenses	(41)	(3)
Interest rate contracts			
Financial Products	Long-term receivables – trade and other	3	4
Financial Products	Accrued expenses	(1)	(1)
		$ (27)	$ (87)
Undesignated derivatives			
Foreign exchange contracts			
Machinery, Energy & Transportation	Receivables – trade and other	$ 11	$ —

Machinery, Energy & Transportation	Accrued expenses	(2)	(30)
Financial Products	Receivables – trade and other	42	39
Financial Products	Accrued expenses	(8)	(4)
Commodity contracts			
Machinery, Energy & Transportation	Receivables – trade and other	12	10
		$ 55	$ 15

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The total notional amounts of the derivative instruments are as follows:

(Millions of dollars)	September 30, 2017	December 31, 2016
Machinery, Energy & Transportation	$ 2,081	$ 2,530
Financial Products	$ 3,560	$ 2,626

The notional amounts of the derivative financial instruments do not represent amounts exchanged by the parties. The amounts exchanged by the parties are calculated by reference to the notional amounts and by other terms of the derivatives, such as foreign currency exchange rates, interest rates or commodity prices.

The effect of derivatives designated as hedging instruments on the Consolidated Statement of Results of Operations is as follows:

Fair Value Hedges

(Millions of dollars)	Classification	Three Months Ended September 30, 2017 Gains (Losses) on Derivatives	Three Months Ended September 30, 2017 Gains (Losses) on Borrowings	Three Months Ended September 30, 2016 Gains (Losses) on Derivatives	Three Months Ended September 30, 2016 Gains (Losses) on Borrowings
Interest rate contracts					
Financial Products	Other income (expense)	$ —	$ —	$ (11)	$ 11
		$ —	$ —	$ (11)	$ 11

	Classification	Nine Months Ended September 30, 2017 Gains (Losses) on Derivatives	Nine Months Ended September 30, 2017 Gains (Losses) on Borrowings	Nine Months Ended September 30, 2016 Gains (Losses) on Derivatives	Nine Months Ended September 30, 2016 Gains (Losses) on Borrowings
Interest rate contracts					
Financial Products	Other income (expense)	$ (1)	$ 1	$ (11)	$ 10
		$ (1)	$ 1	$ (11)	$ 10

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Cash Flow Hedges

	Three Months Ended September 30, 2017			
		Recognized in Earnings		
(Millions of dollars)	Amount of Gains (Losses) Recognized in AOCI (Effective Portion)	Classification of Gains (Losses)	Amount of Gains (Losses) Reclassified from AOCI to Earnings	Recognized in Earnings (Ineffective Portion)
Foreign exchange contracts				
Machinery, Energy & Transportation	$16	Other income (expense)	$ 4	$ —
Financial Products	(21)	Other income (expense)	(20)	—
Interest rate contracts				
Machinery, Energy & Transportation	—	Interest expense excluding Financial Products	(2)	—
Financial Products	(1)	Interest expense of Financial Products	2	—
	$(6)		$ (16)	$ —

	Three Months Ended September 30, 2016			
		Recognized in Earnings		
	Amount of Gains (Losses) Recognized in AOCI (Effective Portion)	Classification of Gains (Losses)	Amount of Gains (Losses) Reclassified from AOCI to Earnings	Recognized in Earnings (Ineffective Portion)
Foreign exchange contracts				
Machinery, Energy & Transportation	$(29)	Other income (expense)	$ 4	$ —
Financial Products	(17)	Other income (expense)	(10)	—
Interest rate contracts				
Machinery, Energy & Transportation	—	Interest expense excluding Financial Products	(2)	—
Financial Products	2	Interest expense of Financial Products	—	—
	$(44)		$ (8)	$ —

	Nine Months Ended September 30, 2017			
		Recognized in Earnings		
	Amount of Gains (Losses) Recognized in AOCI	Classification of Gains (Losses)	Amount of Gains (Losses) Reclassified from AOCI to Earnings	Recognized in Earnings (Ineffective Portion)

	(Effective Portion)			
Foreign exchange contracts				
Machinery, Energy & Transportation	$72	Other income (expense)	$ (49)	$ —
Financial Products	(62)	Other income (expense)	(69)	—
Interest rate contracts				
Machinery, Energy & Transportation	—	Interest expense excluding Financial Products	(5)	—
Financial Products	(1)	Interest expense of Financial Products	5	—
	$9		$ (118)	$ —

	Nine Months Ended September 30, 2016			
	Recognized in Earnings			
	Amount of Gains (Losses) Recognized in AOCI (Effective Portion)	Classification of Gains (Losses)	Amount of Gains (Losses) Reclassified from AOCI to Earnings	Recognized in Earnings (Ineffective Portion)
Foreign exchange contracts				
Machinery, Energy & Transportation	$(35)	Other income (expense)	$ —	$ —
Financial Products	(23)	Other income (expense)	(16)	—
Interest rate contracts				
Machinery, Energy & Transportation	—	Interest expense excluding Financial Products	(5)	—
Financial Products	—	Interest expense of Financial Products	(3)	—
	$(58)		$ (24)	$ —

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The effect of derivatives not designated as hedging instruments on the Consolidated Statement of Results of Operations is as follows:

(Millions of dollars)	Classification of Gains (Losses)	Three Months Ended September 30, 2017	Three Months Ended September 30, 2016
Foreign exchange contracts			
Machinery, Energy & Transportation	Other income (expense)	$ 15	$ 2
Financial Products	Other income (expense)	11	(5)
Commodity contracts			
Machinery, Energy & Transportation	Other income (expense)	11	3
		$ 37	$ —

	Classification of Gains (Losses)	Nine Months Ended September 30, 2017	Nine Months Ended September 30, 2016
Foreign exchange contracts			
Machinery, Energy & Transportation	Other income (expense)	$ 67	$ 24
Financial Products	Other income (expense)	21	(33)
Commodity contracts			
Machinery, Energy & Transportation	Other income (expense)	12	9
		$ 100	$ —

We enter into International Swaps and Derivatives Association (ISDA) master netting agreements within Machinery, Energy & Transportation and Financial Products that permit the net settlement of amounts owed under their respective derivative contracts. Under these master netting agreements, net settlement generally permits the company or the counterparty to determine the net amount payable for contracts due on the same date and in the same currency for similar types of derivative transactions. The master netting agreements generally also provide for net settlement of all outstanding contracts with a counterparty in the case of an event of default or a termination event.

Collateral is generally not required of the counterparties or of our company under the master netting agreements. As of September 30, 2017 and December 31, 2016, no cash collateral was received or pledged under the master netting agreements.

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The effect of the net settlement provisions of the master netting agreements on our derivative balances upon an event of default or termination event is as follows:

September 30, 2017				Gross Amounts Not Offset in the Statement of Financial Position		
(Millions of dollars)	Gross Amount of Recognized Assets	Gross Amounts Offset in the Statement of Financial Position	Net Amount of Assets Presented in the Statement of Financial Position	Financial Instruments	Cash Collateral Received	Net Amount of Assets
Derivatives						
Machinery, Energy & Transportation	$ 40	$ —	$ 40	$ (14)	$ —	$ 26
Financial Products	53	—	53	(8)	—	45
Total	$ 93	$ —	$ 93	$ (22)	$ —	$ 71

September 30, 2017				Gross Amounts Not Offset in the Statement of Financial Position		
(Millions of dollars)	Gross Amount of Recognized Liabilities	Gross Amounts Offset in the Statement of Financial Position	Net Amount of Liabilities Presented in the Statement of Financial Position	Financial Instruments	Cash Collateral Pledged	Net Amount of Liabilities
Derivatives						
Machinery, Energy & Transportation	$ (15)	$ —	$ (15)	$ 14	$ —	$ (1)
Financial Products	(50)	—	(50)	8	—	(42)
Total	$ (65)	$ —	$ (65)	$ 22	$ —	$ (43)

December 31, 2016				Gross Amounts Not Offset in the Statement of Financial Position		
(Millions of dollars)	Gross Amount of Recognized Assets	Gross Amounts Offset in the Statement of Financial	Net Amount of Assets Presented in the Statement of	Financial Instruments	Cash Collateral Received	Net Amount of Assets

		Position	Financial Position			
Derivatives						
Machinery, Energy & Transportation	$ 23	$ —	$ 23	$ (21)	$ —	$ 2
Financial Products	72	—	72	(7)	—	65
Total	$ 95	$ —	$ 95	$ (28)	$ —	$ 67

December 31, 2016				Gross Amounts Not Offset in the Statement of Financial Position		
(Millions of dollars)	Gross Amount of Recognized Liabilities	Gross Amounts Offset in the Statement of Financial Position	Net Amount of Liabilities Presented in the Statement of Financial Position	Financial Instruments	Cash Collateral Pledged	Net Amount of Liabilities
Derivatives						
Machinery, Energy & Transportation	$ (159)	$ —	$ (159)	$ 21	$ —	$ (138)
Financial Products	(8)	—	(8)	7	—	(1)
Total	$ (167)	$ —	$ (167)	$ 28	$ —	$ (139)

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5. Inventories

Inventories (principally using the last-in, first-out (LIFO) method) are comprised of the following:

(Millions of dollars)	September 30, 2017	December 31, 2016
Raw materials	$ 2,777	$ 2,102
Work-in-process	2,241	1,719
Finished goods	4,990	4,576
Supplies	204	217
Total inventories	$ 10,212	$ 8,614

During the first nine months of 2017, there was a liquidation of LIFO inventory resulting from closure of our facility in Gosselies, Belgium. The liquidated inventory was carried at lower costs prevailing in prior years as compared with current costs. The effect of this reduction of inventory decreased Cost of goods sold by approximately $62 million and increased Profit by approximately $45 million or $0.07 per share.

6. Investments in unconsolidated affiliated companies

Investments in unconsolidated affiliated companies, included in Other assets in the Consolidated Statement of Financial Position, were as follows:

(Millions of dollars)	September 30, 2017	December 31, 2016
Investments in equity method companies	$ 219	$ 192
Plus: Investments in cost method companies	33	57
Total investments in unconsolidated affiliated companies	$ 252	$ 249

In May 2017, we sold our equity interest in IronPlanet Holdings Inc. for $93 million. We recognized a pretax gain of $85 million (included in Other income (expense)) and derecognized the carrying value of our noncontrolling interest, which was included in Other assets in the Consolidated Statement of Financial Position. The gain on the disposal is included as a reconciling item between Segment profit and Consolidated profit before taxes.

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7. Intangible assets and goodwill

A. Intangible assets

Intangible assets are comprised of the following:

		September 30, 2017		
(Millions of dollars)	Weighted Amortizable Life (Years)	Gross Carrying Amount	Accumulated Amortization	Net
Customer relationships	15	$2,433	$ (1,077)	$1,356
Intellectual property	11	1,529	(812)	717
Other	13	191	(89)	102
Total finite-lived intangible assets	14	$4,153	$ (1,978)	$2,175
		December 31, 2016		
	Weighted Amortizable Life (Years)	Gross Carrying Amount	Accumulated Amortization	Net
Customer relationships	15	$2,378	$ (934)	$1,444
Intellectual property	11	1,496	(706)	790
Other	14	192	(77)	115
Total finite-lived intangible assets	14	$4,066	$ (1,717)	$2,349

Amortization expense for the three and nine months ended September 30, 2017 was $82 million and $241 million, respectively. Amortization expense for the three and nine months ended September 30, 2016 was $82 million and $246 million, respectively. Amortization expense related to intangible assets is expected to be:

(Millions of dollars)

Remaining Three Months of 2017	2018	2019	2020	2021	Thereafter
$81	$319	$313	$302	$284	$876

B. Goodwill

No goodwill was impaired during the three or nine months ended September 30, 2017 or 2016.

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The changes in carrying amount of goodwill by reportable segment for the nine months ended September 30, 2017 were as follows:

(Millions of dollars)	December 31, 2016	Other Adjustments [1]	September 30, 2017
Construction Industries			
Goodwill	$ 296	$ 10	$ 306
Impairments	(22)	—	(22)
Net goodwill	274	10	284
Resource Industries			
Goodwill	4,110	111	4,221
Impairments	(1,175)	—	(1,175)
Net goodwill	2,935	111	3,046
Energy & Transportation			
Goodwill	2,756	54	2,810
All Other [2]			
Goodwill	55	1	56
Consolidated total			
Goodwill	7,217	176	7,393
Impairments	(1,197)	—	(1,197)
Net goodwill	$ 6,020	$ 176	$ 6,196

[1] Other adjustments are comprised primarily of foreign currency translation.
[2] Includes All Other operating segments (See Note 15).

8. Investments in debt and equity securities

We have investments in certain debt and equity securities, primarily at Insurance Services, that have been classified as available-for-sale and recorded at fair value. In addition, Insurance Services has an equity security investment in a real estate investment trust (REIT) which is recorded at fair value based on the net asset value (NAV) of the investment. These investments are primarily included in Other assets in the Consolidated Statement of Financial Position. Unrealized gains and losses arising from the revaluation of debt and equity securities are included, net of applicable deferred income taxes, in equity (Accumulated other comprehensive income (loss) in the Consolidated Statement of Financial Position). Realized gains and losses on sales of investments are generally determined using the specific identification method for debt and equity securities and are included in Other income (expense) in the Consolidated Statement of Results of Operations.

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The cost basis and fair value of debt and equity securities were as follows:

(Millions of dollars)	September 30, 2017			December 31, 2016		
	Cost Basis	Unrealized Pretax Net Gains (Losses)	Fair Value	Cost Basis	Unrealized Pretax Net Gains (Losses)	Fair Value
Government debt						
U.S. treasury bonds	$10	$ —	$10	$9	$ —	$9
Other U.S. and non-U.S. government bonds	48	—	48	60	—	60
Corporate bonds						
Corporate bonds	529	3	532	489	3	492
Asset-backed securities	76	—	76	90	—	90
Mortgage-backed debt securities						
U.S. governmental agency	245	(2)	243	225	(2)	223
Residential	8	—	8	10	—	10
Commercial	17	—	17	36	—	36
Equity securities						
Large capitalization value	313	36	349	280	32	312
Real estate investment trust (REIT)	104	5	109	77	2	79
Smaller company growth	43	22	65	41	15	56
Total	$1,393	$ 64	$1,457	$1,317	$ 50	$1,367

Available-for-sale investments in an unrealized loss position that are not other-than-temporarily impaired:

(Millions of dollars)	September 30, 2017					
	Less than 12 months [1]		12 months or more [1]		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses
Mortgage-backed debt securities						
U.S. governmental agency	102	1	89	2	191	3
Equity securities						
Large capitalization value	72	5	14	3	86	8
Small company growth	9	1	2	—	11	1
Total	$183	$ 7	$105	$ 5	$288	$ 12

(Millions of dollars)	December 31, 2016					
	Less than 12 months [1]		12 months or more [1]		Total	
	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses	Fair Value	Unrealized Losses
Corporate bonds						
Corporate bonds	$131	$ 1	$13	$ —	$144	$ 1
Mortgage-backed debt securities						
U.S. governmental agency	167	2	11	—	178	2
Equity securities						

Large capitalization value	68	6	11	2	79	8
Smaller company growth	10	1	3	1	13	2
Total	$376	$ 10	$38	$ 3	$414	$ 13

[1] Indicates length of time that individual securities have been in a continuous unrealized loss position.

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Mortgage-Backed Debt Securities. The unrealized losses on our investments in U.S. government agency mortgage-backed securities relate to changes in interest rates and credit-related yield spreads since time of purchase. We do not intend to sell the investments and it is not likely that we will be required to sell the investments before recovery of their amortized cost basis. We do not consider these investments to be other-than-temporarily impaired as of September 30, 2017.

Equity Securities. The unrealized losses on our investments in equity securities relate to inherent risks of individual holdings and/or their respective sectors. We do not consider these investments to be other-than-temporarily impaired as of September 30, 2017.

The cost basis and fair value of the available-for-sale debt securities at September 30, 2017, by contractual maturity, is shown below. Expected maturities will differ from contractual maturities because borrowers may have the right to prepay and creditors may have the right to call obligations.

	September 30, 2017	
(Millions of dollars)	Cost Basis	Fair Value
Due in one year or less	$ 169	$ 170
Due after one year through five years	415	417
Due after five years through ten years	55	55
Due after ten years	24	24
U.S. governmental agency mortgage-backed securities	245	243
Residential mortgage-backed securities	8	8
Commercial mortgage-backed securities	17	17
Total debt securities – available-for-sale	$ 933	$ 934

Sales of Securities:

	Three Months Ended September 30		Nine Months Ended September 30	
(Millions of dollars)	2017	2016	2017	2016
Proceeds from the sale of available-for-sale securities	$244	$109	$431	$304
Gross gains from the sale of available-for-sale securities	$38	$10	$40	$43
Gross losses from the sale of available-for-sale securities	$1	$1	$3	$3

9. Postretirement benefits

A. Pension and postretirement benefit costs

In the first quarter of 2017, we announced the closure of our Gosselies, Belgium, facility. This announcement impacted certain employees that participate in a defined benefit pension plan and resulted in a curtailment and the recognition of termination benefits. In March 2017, we recognized a net loss of $20 million for the curtailment and termination benefits. In addition, during the first quarter of 2017, we announced the decision to phase out production

at our Aurora, Illinois, facility which resulted in termination benefits of $9 million for certain hourly employees that participate in our U.S. hourly defined benefit pension plan.
See Note 18 for more information on the Gosselies closure.

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(Millions of dollars)	U.S. Pension Benefits		Non-U.S. Pension Benefits		Other Postretirement Benefits	
	September 30		September 30		September 30	
	2017	2016	2017	2016	2017	2016
For the three months ended:						
Components of net periodic benefit cost:						
Service cost	$29	$30	$23	$22	$19	$20
Interest cost	131	129	23	30	33	33
Expected return on plan assets	(184)	(190)	(55)	(59)	(10)	(11)
Amortization of prior service cost (credit) [1]	—	—	—	—	(6)	(15)
Net periodic benefit cost (benefit)	(24)	(31)	(9)	(7)	36	27
Curtailments and termination benefits [2]	—	—	—	1	—	—
Total cost (benefit) included in operating profit	$(24)	$(31)	$(9)	$(6)	$36	$27
For the nine months ended:						
Components of net periodic benefit cost:						
Service cost	$87	$89	$70	$68	$58	$61
Interest cost	393	388	73	90	98	98
Expected return on plan assets	(551)	(568)	(168)	(176)	(28)	(33)
Amortization of prior service cost (credit) [1]	—	—	(1)	—	(17)	(45)
Net periodic benefit cost (benefit)	(71)	(91)	(26)	(18)	111	81
Curtailments and termination benefits [2]	9	—	20	1	—	(2)
Total cost (benefit) included in operating profit	$(62)	$(91)	$(6)	$(17)	$111	$79
Weighted-average assumptions used to determine net cost:						
Discount rate used to measure service cost	4.2%	4.5%	2.3%	2.9%	3.9%	4.4%
Discount rate used to measure interest cost	3.3%	3.4%	2.3%	2.8%	3.3%	3.3%
Expected rate of return on plan assets	6.7%	6.9%	5.9%	6.1%	7.5%	7.5%
Rate of compensation increase	4.0%	4.0%	4.0%	3.5%	4.0%	4.0%

[1] Prior service cost (credit) for both pension and other postretirement benefits is generally amortized using the straight-line method over the average remaining service period of active employees expected to receive benefits from the plan. For pension plans in which all or almost all of the plan's participants are inactive and other postretirement benefit plans in which all or almost all of the plan's participants are fully eligible for benefits under the plan, prior service cost (credit) is amortized using the straight-line method over the remaining life expectancy of those participants.

[2] Curtailments and termination benefits were recognized in Other operating (income) expenses in the Consolidated Statement of Results of Operations.

We made $324 million and $522 million of contributions to our pension and other postretirement plans during the three and nine months ended September 30, 2017. We currently anticipate full-year 2017 contributions of approximately $610 million. We made $71 million and $270 million of contributions to our pension and other postretirement plans during the three and nine months ended September 30, 2016.

B. Defined contribution benefit costs

Total company costs related to our defined contribution plans were as follows:

	Three Months Ended September 30		Nine Months Ended September 30	
(Millions of dollars)	2017	2016	2017	2016
U.S. Plans	$97	$ 83	$267	$235
Non-U.S. Plans	19	16	54	51
	$116	$ 99	$321	$286

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10. Guarantees and product warranty

Caterpillar dealer performance guarantees
We have provided an indemnity to a third-party insurance company for potential losses related to performance bonds issued on behalf of Caterpillar dealers. The bonds have varying terms and are issued to insure governmental agencies against nonperformance by certain dealers. We also provided guarantees to third-parties related to the performance of contractual obligations by certain Caterpillar dealers. These guarantees have varying terms and cover potential financial losses incurred by the third-parties resulting from the dealers' nonperformance.

In 2016, we provided a guarantee to an end user related to the performance of contractual obligations by a Caterpillar dealer. Under the guarantee, which expires in 2025, non-performance by the Caterpillar dealer could require Caterpillar to satisfy the contractual obligations by providing goods, services or financial compensation to the end user up to an annual designated cap.

Customer loan guarantees
We provide loan guarantees to third-party lenders for financing associated with machinery purchased by customers. These guarantees have varying terms and are secured by the machinery. In addition, Cat Financial participates in standby letters of credit issued to third parties on behalf of their customers. These standby letters of credit have varying terms and beneficiaries and are secured by customer assets.

Supplier consortium performance guarantee
We have provided guarantees to a customer in Brazil and a customer in Europe related to the performance of contractual obligations by supplier consortiums to which our Caterpillar subsidiaries are members. The guarantees cover potential damages incurred by the customers resulting from the supplier consortiums' non-performance. The damages are capped except for failure of the consortiums to meet certain obligations outlined in the contract in the normal course of business. The guarantees will expire when the supplier consortiums perform all their contractual obligations, which is expected to be completed in 2022 for the customer in Europe and 2025 for the customer in Brazil.

Third party logistics business lease guarantees
We have provided guarantees to third-party lessors for certain properties leased by a third party logistics business, formerly Caterpillar Logistics Services LCC, in which we sold our 35 percent equity interest in the first quarter of 2015. The guarantees are for the possibility that the third party logistics business would default on real estate lease payments. The guarantees were granted at lease inception and generally will expire at the end of the lease terms.

We have dealer performance guarantees and third party performance guarantees that do not limit potential payment to end users related to indemnities and other commercial contractual obligations. In addition, we have entered into contracts involving industry standard indemnifications that do not limit potential payment. For these unlimited guarantees, we are unable to estimate a maximum potential amount of future payments that could result from claims made.

No significant loss has been experienced or is anticipated under any of these guarantees. At both September 30, 2017 and December 31, 2016, the related liability was $8 million. The maximum potential amount of future payments (undiscounted and without reduction for any amounts that may possibly be recovered under recourse or collateralized provisions) we could be required to make under the guarantees are as follows:

(Millions of dollars)	September 30, 2017	December 31, 2016

Caterpillar dealer performance guarantees	$ 1,425	$ 1,384
Customer loan guarantees	51	51
Supplier consortium performance guarantee	564	278
Third party logistics business lease guarantees	73	87
Other guarantees	100	56
Total guarantees	$ 2,213	$ 1,856

Cat Financial provides guarantees to repurchase certain loans of Caterpillar dealers from a special-purpose corporation (SPC) that qualifies as a variable interest entity. The purpose of the SPC is to provide short-term working capital loans

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to Caterpillar dealers. This SPC issues commercial paper and uses the proceeds to fund its loan program. Cat Financial has a loan purchase agreement with the SPC that obligates Cat Financial to purchase certain loans that are not paid at maturity. Cat Financial receives a fee for providing this guarantee, which provides a source of liquidity for the SPC. Cat Financial is the primary beneficiary of the SPC as its guarantees result in Cat Financial having both the power to direct the activities that most significantly impact the SPC's economic performance and the obligation to absorb losses, and therefore Cat Financial has consolidated the financial statements of the SPC. As of September 30, 2017 and December 31, 2016, the SPC's assets of $1,096 million and $1,088 million, respectively, were primarily comprised of loans to dealers and the SPC's liabilities of $1,095 million and $1,087 million, respectively, were primarily comprised of commercial paper. The assets of the SPC are not available to pay Cat Financial's creditors. Cat Financial may be obligated to perform under the guarantee if the SPC experiences losses. No loss has been experienced or is anticipated under this loan purchase agreement.

Our product warranty liability is determined by applying historical claim rate experience to the current field population and dealer inventory. Generally, historical claim rates are based on actual warranty experience for each product by machine model/engine size by customer or dealer location (inside or outside North America). Specific rates are developed for each product shipment month and are updated monthly based on actual warranty claim experience.

(Millions of dollars)	2017
Warranty liability, January 1	$1,258
Reduction in liability (payments)	(637)
Increase in liability (new warranties)	749
Warranty liability, September 30	$1,370

(Millions of dollars)	2016
Warranty liability, January 1	$1,354
Reduction in liability (payments)	(909)
Increase in liability (new warranties)	813
Warranty liability, December 31	$1,258

11. Profit per share

Computations of profit per share: (Dollars in millions except per share data)	Three Months Ended September 30		Nine Months Ended September 30	
	2017	2016	2017	2016
	$1,059	$283	$2,053	$1,104

Profit for the period (A)				
[1] Determination of shares (in millions):				
Weighted-average number of common shares outstanding	592.9	584.7	590.3	583.8
(B) Shares issuable on exercise of stock awards, net of shares assumed to be purchased out of proceeds at average market price	7.2	4.9	6.2	4.9
Average common shares outstanding for fully diluted computation (C)	600.1	589.6	596.5	588.7
[2] Profit per share				

of common stock: Assuming no dilution (A/B)	$1.79	$0.48	$3.48	$1.89
Assuming full dilution (A/C) [2]	$1.77	$0.48	$3.44	$1.88
Shares outstanding as of September 30 (in millions)			594.9	585.1

[1] Profit attributable to common shareholders.

[2] Diluted by assumed exercise of stock-based compensation awards using the treasury stock method.

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For the three months ended September 30, 2017, no outstanding SARs and stock options were excluded from the computation of diluted earnings per share because all outstanding SARs and stock options had a dilutive effect. For the nine months ended September 30, 2017, outstanding SARs and stock options to purchase 5,136,715 common shares were not included in the computation of diluted earnings per share because the effect would have been anti-dilutive. For the three and nine months ended September 30, 2016, there were outstanding SARs and stock options to purchase 21,874,118 and 26,088,324 common shares, respectively, which were anti-dilutive.

In January 2014, the Board authorized the repurchase of up to $10.0 billion of Caterpillar common stock, which will expire on December 31, 2018. As of September 30, 2017, approximately $4.5 billion of the $10.0 billion authorization was spent.

12. Accumulated other comprehensive income (loss)

Comprehensive income and its components are presented in the Consolidated Statement of Comprehensive Income. Changes in Accumulated other comprehensive income (loss), net of tax, included in the Consolidated Statement of Changes in Shareholders' Equity, consisted of the following:

(Millions of dollars)	Foreign currency translation	Pension and other postretirement benefits	Derivative financial instruments	Available-for-sale securities	Total
Three Months Ended September 30, 2017					
Balance at June 30, 2017	$ (1,499)	$ 14	$ (39)	$ 53	$ (1,471)
Other comprehensive income (loss) before reclassifications	237	—	(4)	11	244
Amounts reclassified from accumulated other comprehensive (income) loss	11	(4)	11	(24)	(6)
Other comprehensive income (loss)	248	(4)	7	(13)	238
Balance at September 30, 2017	$ (1,251)	$ 10	$ (32)	$ 40	$ (1,233)
Three Months Ended September 30, 2016					
Balance at June 30, 2016	$ (1,648)	$ 29	$ (49)	$ 35	$ (1,633)
Other comprehensive income (loss) before reclassifications	124	2	(28)	5	103
Amounts reclassified from accumulated other comprehensive (income) loss	13	(10)	6	(6)	3
Other comprehensive income (loss)	137	(8)	(22)	(1)	106
Balance at September 30, 2016	$ (1,511)	$ 21	$ (71)	$ 34	$ (1,527)

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(Millions of dollars)	Foreign currency translation	Pension and other postretirement benefits	Derivative financial instruments	Available-for-sale securities	Total
Nine Months Ended September 30, 2017					
Balance at December 31, 2016	$ (1,970)	$ 14	$ (115)	$ 32	$ (2,039)
Other comprehensive income (loss) before reclassifications	706	8	6	29	749
Amounts reclassified from accumulated other comprehensive (income) loss	13	(12)	77	(21)	57
Other comprehensive income (loss)	719	(4)	83	8	806
Balance at September 30, 2017	$ (1,251)	$ 10	$ (32)	$ 40	$ (1,233)
Nine Months Ended September 30, 2016					
Balance at December 31, 2015	$ (1,953)	$ (69)	$ (50)	$ 37	$ (2,035)
Other comprehensive income (loss) before reclassifications	429	119	(37)	21	532
Amounts reclassified from accumulated other comprehensive (income) loss	13	(29)	16	(24)	(24)
Other comprehensive income (loss)	442	90	(21)	(3)	508
Balance at September 30, 2016	$ (1,511)	$ 21	$ (71)	$ 34	$ (1,527)

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The effect of the reclassifications out of Accumulated other comprehensive income (loss) on the Consolidated Statement of Results of Operations is as follows:

(Millions of dollars)	Classification of income (expense)	Three Months Ended September 30 2017	2016
Foreign currency translation			
Gain (loss) on foreign currency translation	Other income (expense)	$(11)	$(13)
Tax (provision) benefit		—	—
Reclassifications net of tax		$(11)	$(13)
Pension and other postretirement benefits:			
Amortization of prior service credit (cost)	Note 9 [1]	$6	$15
Tax (provision) benefit		(2)	(5)
Reclassifications net of tax		$4	$10
Derivative financial instruments:			
Foreign exchange contracts	Other income (expense)	$(16)	$(6)
Interest rate contracts	Interest expense excluding Financial Products	(2)	(2)
Interest rate contracts	Interest expense of Financial Products	2	—
Reclassifications before tax		(16)	(8)
Tax (provision) benefit		5	2
Reclassifications net of tax		$(11)	$(6)
Available-for-sale securities:			
Realized gain (loss)	Other income (expense)	$36	$9
Tax (provision) benefit		(12)	(3)
Reclassifications net of tax		$24	$6
Total reclassifications from Accumulated other comprehensive income (loss)		$6	$(3)

[1]Amounts are included in the calculation of net periodic benefit cost. See Note 9 for additional information.

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(Millions of dollars)	Classification of income (expense)	Nine Months Ended September 30 2017	2016
Foreign currency translation			
Gain (loss) on foreign currency translation	Other income (expense)	$(13)	$(13)
Tax (provision) benefit		—	—
Reclassifications net of tax		$(13)	$(13)
Pension and other postretirement benefits:			
Amortization of prior service credit (cost)	Note 9 [1]	$18	$45
Tax (provision) benefit		(6)	(16)
Reclassifications net of tax		$12	$29
Derivative financial instruments:			
Foreign exchange contracts	Other income (expense)	$(118)	$(16)
Interest rate contracts	Interest expense excluding Financial Products	(5)	(5)
Interest rate contracts	Interest expense of Financial Products	5	(3)
Reclassifications before tax		(118)	(24)
Tax (provision) benefit		41	8
Reclassifications net of tax		$(77)	$(16)
Available-for-sale securities:			
Realized gain (loss)	Other income (expense)	$32	$36
Tax (provision) benefit		(11)	(12)
Reclassifications net of tax		$21	$24
Total reclassifications from Accumulated other comprehensive income (loss)		$(57)	$24

[1]Amounts are included in the calculation of net periodic benefit cost. See Note 9 for additional information.

13. Environmental and legal matters

The Company is regulated by federal, state and international environmental laws governing our use, transport and disposal of substances and control of emissions. In addition to governing our manufacturing and other operations, these laws often impact the development of our products, including, but not limited to, required compliance with air emissions standards applicable to internal combustion engines. We have made, and will continue to make, significant research and development and capital expenditures to comply with these emissions standards.

We are engaged in remedial activities at a number of locations, often with other companies, pursuant to federal and state laws. When it is probable we will pay remedial costs at a site, and those costs can be reasonably estimated, the investigation, remediation, and operating and maintenance costs are accrued against our earnings. Costs are accrued based on consideration of currently available data and information with respect to each individual site, including available technologies, current applicable laws and regulations, and prior remediation experience. Where no amount

within a range of estimates is more likely, we accrue the minimum. Where multiple potentially responsible parties are involved, we consider our proportionate share of the probable costs. In formulating the estimate of probable costs, we do not consider amounts expected to be recovered from insurance companies or others. We reassess these accrued amounts on a quarterly basis. The amount recorded for environmental remediation is not material and is included in Accrued expenses. We believe there is no more than a remote chance that a material amount for remedial activities at any individual site, or at all the sites in the aggregate, will be required.

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On January 7, 2015, the Company received a grand jury subpoena from the U.S. District Court for the Central District of Illinois. The subpoena requests documents and information from the Company relating to, among other things, financial information concerning U.S. and non-U.S. Caterpillar subsidiaries (including undistributed profits of non-U.S. subsidiaries and the movement of cash among U.S. and non-U.S. subsidiaries). The Company has received additional subpoenas relating to this investigation requesting additional documents and information relating to, among other things, the purchase and resale of replacement parts by Caterpillar Inc. and non-U.S. Caterpillar subsidiaries, dividend distributions of certain non-U.S. Caterpillar subsidiaries, and Caterpillar SARL and related structures. On March 2-3, 2017, agents with the Department of Commerce, the Federal Deposit Insurance Corporation and the Internal Revenue Service executed search and seizure warrants at three facilities of the Company in the Peoria, Illinois area, including its corporate headquarters. The warrants identify, and agents seized, documents and information related to, among other things, the export of products from the United States, the movement of products between the United States and Switzerland, the relationship between Caterpillar Inc. and Caterpillar SARL, and sales outside the United States. It is the Company’s understanding that the warrants, which concern both tax and export activities, are related to the ongoing grand jury investigation. The Company is continuing to cooperate with this investigation. The Company is unable to predict the outcome or reasonably estimate any potential loss; however, we currently believe that this matter will not have a material adverse effect on the Company’s consolidated results of operations, financial position or liquidity.

On March 20, 2014, Brazil’s Administrative Council for Economic Defense (CADE) published a Technical Opinion which named 18 companies and over 100 individuals as defendants, including two subsidiaries of Caterpillar Inc., MGE - Equipamentos e Serviços Ferroviários Ltda. (MGE) and Caterpillar Brasil Ltda. The publication of the Technical Opinion opened CADE's official administrative investigation into allegations that the defendants participated in anticompetitive bid activity for the construction and maintenance of metro and train networks in Brazil. While companies cannot be held criminally liable for anticompetitive conduct in Brazil, criminal charges have been brought against two current employees of MGE and one former employee of MGE involving the same conduct alleged by CADE. The Company has responded to all requests for information from the authorities. The Company is unable to predict the outcome or reasonably estimate the potential loss; however, we currently believe that this matter will not have a material adverse effect on the Company's consolidated results of operations, financial position or liquidity.

On October 24, 2013, Progress Rail received a grand jury subpoena from the U.S. District Court for the Central District of California. The subpoena requests documents and information from Progress Rail, United Industries Corporation, a wholly-owned subsidiary of Progress Rail, and Caterpillar Inc. relating to allegations that Progress Rail conducted improper or unnecessary railcar inspections and repairs and improperly disposed of parts, equipment, tools and other items. In connection with this subpoena, Progress Rail was informed by the U.S. Attorney for the Central District of California that it is a target of a criminal investigation into potential violations of environmental laws and alleged improper business practices. The Company is cooperating with the authorities and is currently in discussions regarding a potential resolution of the matter. Although the Company believes a loss is probable, we currently believe that this matter will not have a material adverse effect on the Company's consolidated results of operations, financial position or liquidity.

In addition, we are involved in other unresolved legal actions that arise in the normal course of business. The most prevalent of these unresolved actions involve disputes related to product design, manufacture and performance liability (including claimed asbestos and welding fumes exposure), contracts, employment issues, environmental matters, intellectual property rights, and securities laws. The aggregate range of reasonably possible losses in excess of accrued liabilities, if any, associated with these unresolved legal actions is not material. In some cases, we cannot reasonably estimate a range of loss because there is insufficient information regarding the matter. However, we believe there is no more than a remote chance that any liability arising from these matters would be material.

Although it is not possible to predict with certainty the outcome of these unresolved legal actions, we believe that these actions will not individually or in the aggregate have a material adverse effect on our consolidated results of operations, financial position or liquidity.

14. Income taxes

The provision for income taxes for the first nine months of 2017 reflects an estimated annual tax rate of 32 percent, which excludes the discrete items discussed in the following paragraph, compared with 25 percent for the first nine months of 2016. The increase is primarily due to higher non-U.S. restructuring costs in 2017 that are taxed at relatively lower non-U.S. tax rates along with other changes in the geographic mix of profits from a tax perspective. Under the terms of a manufacturing service agreement, Caterpillar SARL (CSARL) will bear substantially all of the restructuring costs related to the closure of our Gosselies, Belgium, facility, reducing CSARL's profits taxable in Switzerland.

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In addition, during the first nine months of 2017, a discrete tax benefit of $45 million was recorded for the settlement of stock-based compensation awards with associated tax deductions in excess of cumulative U.S. GAAP compensation expense. This benefit was partially offset by a $15 million increase to prior year taxes related to the Gosselies, Belgium, facility, restructuring costs.

In January 2015, we received a Revenue Agent's Report from the Internal Revenue Service (IRS) indicating the end of the field examination of our U.S. income tax returns for 2007 to 2009 including the impact of a loss carryback to 2005. The IRS field examination for 2010 to 2012 that began in 2015 is expected to be completed in 2017. In November 2016, we received notices of proposed adjustments from the IRS for the 2010 to 2012 exam. In both these audits, the IRS has proposed to tax in the United States profits earned from certain parts transactions by CSARL, based on the IRS examination team's application of the "substance-over-form" or "assignment-of-income" judicial doctrines. We are vigorously contesting the proposed increases to tax and penalties for these years of approximately $2 billion. We believe that the relevant transactions complied with applicable tax laws and did not violate judicial doctrines. We have filed U.S. income tax returns on this same basis for years after 2012. Based on the information currently available, we do not anticipate a significant increase or decrease to our unrecognized tax benefits for this matter within the next 12 months. We currently believe the ultimate disposition of this matter will not have a material adverse effect on our consolidated financial position, liquidity or results of operations.

Due to better than previously forecasted 2017 U.S. GAAP results in certain U.S. state jurisdictions, it is reasonably possible the valuation allowance for U.S. state deferred tax assets will decrease in the next twelve months.

15. Segment information

A. Basis for segment information

Our Executive Office is comprised of a Chief Executive Officer (CEO), five Group Presidents, a General Counsel & Corporate Secretary and a Chief Human Resources Officer. Group Presidents are accountable for a related set of end-to-end businesses that they manage. The General Counsel & Corporate Secretary leads the Law and Public Policy Division. The Chief Human Resources Officer leads the Human Services Division. The CEO allocates resources and manages performance at the Group President level. As such, the CEO serves as our Chief Operating Decision Maker and operating segments are primarily based on the Group President reporting structure.

Three of our operating segments, Construction Industries, Resource Industries and Energy & Transportation are led by Group Presidents. One operating segment, Financial Products, is led by a Group President who also has responsibility for Corporate Services. Corporate Services is a cost center primarily responsible for the performance of certain support functions globally and to provide centralized services; it does not meet the definition of an operating segment. One Group President leads two smaller operating segments that are included in the All Other operating segments. The Law and Public Policy Division and the Human Services Division are cost centers and do not meet the definition of an operating segment.

B. Description of segments

We have six operating segments, of which four are reportable segments. Following is a brief description of our reportable segments and the business activities included in the All Other operating segments:

Construction Industries: A segment primarily responsible for supporting customers using machinery in infrastructure, forestry and building construction applications. Responsibilities include business strategy, product design, product management and development, manufacturing, marketing and sales and product support. The product portfolio includes backhoe loaders, small wheel loaders, small track-type tractors, skid steer loaders, compact track loaders,

multi-terrain loaders, mini excavators, compact wheel loaders, telehandlers, select work tools, small, medium and large track excavators, wheel excavators, medium wheel loaders, medium track-type tractors, track-type loaders, motor graders, pipelayers, forestry and paving products and related parts. Inter-segment sales are a source of revenue for this segment.

Resource Industries: A segment primarily responsible for supporting customers using machinery in mining, quarry, waste, and material handling applications. Responsibilities include business strategy, product design, product management and development, manufacturing, marketing and sales and product support. The product portfolio includes large track-type tractors, large mining trucks, hard rock vehicles, longwall miners, electric rope shovels, draglines, hydraulic shovels, track and rotary drills, highwall miners, large wheel loaders, off-highway trucks, articulated trucks, wheel tractor scrapers,

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wheel dozers, landfill compactors, soil compactors, material handlers, continuous miners, scoops and haulers, hardrock continuous mining systems, select work tools, machinery components, electronics and control systems and related parts. In addition to equipment, Resource Industries also develops and sells technology products and services to provide customers fleet management, equipment management analytics and autonomous machine capabilities. Resource Industries also manages areas that provide services to other parts of the company, including integrated manufacturing and research and development. Inter-segment sales are a source of revenue for this segment.

Energy & Transportation: A segment primarily responsible for supporting customers using reciprocating engines, turbines, diesel-electric locomotives and related parts across industries serving power generation, industrial, oil and gas and transportation applications, including marine and rail-related businesses. Responsibilities include business strategy, product design, product management and development, manufacturing, marketing and sales and product support of turbines and turbine-related services, reciprocating engine powered generator sets, integrated systems used in the electric power generation industry, reciprocating engines and integrated systems and solutions for the marine and oil and gas industries; reciprocating engines supplied to the industrial industry as well as Cat machinery; the remanufacturing of Cat engines and components and remanufacturing services for other companies; the business strategy, product design, product management and development, manufacturing, remanufacturing, leasing and service of diesel-electric locomotives and components and other rail-related products and services and product support of on-highway vocational trucks for North America. Inter-segment sales are a source of revenue for this segment.

Financial Products Segment: Provides financing alternatives to customers and dealers around the world for Caterpillar products, as well as financing for vehicles, power generation facilities and marine vessels that, in most cases, incorporate Caterpillar products. Financing plans include operating and finance leases, installment sale contracts, working capital loans and wholesale financing plans. The segment also provides insurance and risk management products and services that help customers and dealers manage their business risk. Insurance and risk management products offered include physical damage insurance, inventory protection plans, extended service coverage for machines and engines, and dealer property and casualty insurance. The various forms of financing, insurance and risk management products offered to customers and dealers help support the purchase and lease of our equipment.

All Other operating segments: Primarily includes activities such as: business strategy, product management and development, and manufacturing of filters and fluids, undercarriage, tires and rims, ground engaging tools, fluid transfer products, precision seals, and rubber sealing and connecting components primarily for Cat products; parts distribution; distribution services responsible for dealer development and administration including a wholly owned dealer in Japan, dealer portfolio management and ensuring the most efficient and effective distribution of machines, engines and parts; digital investments for new customer and dealer solutions that integrate data analytics with state-of-the art digital technologies while transforming the buying experience. Results for the All Other operating segments are included as a reconciling item between reportable segments and consolidated external reporting.

C. Segment measurement and reconciliations

There are several methodology differences between our segment reporting and our external reporting. The following is a list of the more significant methodology differences:

- Machinery, Energy & Transportation segment net assets generally include inventories, receivables, property, plant and equipment, goodwill, intangibles, accounts payable and customer advances. Liabilities other than accounts payable and customer advances are generally managed at the corporate level and are not included in segment operations. Financial Products Segment assets generally include all categories of assets.

- Segment inventories and cost of sales are valued using a current cost methodology.

- Goodwill allocated to segments is amortized using a fixed amount based on a 20 year useful life. This methodology difference only impacts segment assets; no goodwill amortization expense is included in segment profit. In addition, only a portion of goodwill for certain acquisitions made in 2011 or later has been allocated to segments.

- The present value of future lease payments for certain Machinery, Energy & Transportation operating leases is included in segment assets. The estimated financing component of the lease payments is excluded.

- Currency exposures for Machinery, Energy & Transportation are generally managed at the corporate level and the effects of changes in exchange rates on results of operations within the year are not included in segment

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profit. The net difference created in the translation of revenues and costs between exchange rates used for U.S. GAAP reporting and exchange rates used for segment reporting is reported as a methodology difference.

- Stock-based compensation expense is not included in segment profit.

- Postretirement benefit expenses are split; segments are generally responsible for service and prior service costs, with the remaining elements of net periodic benefit cost included as a methodology difference.

- Machinery, Energy & Transportation segment profit is determined on a pretax basis and excludes interest expense and other income/expense items. Financial Products Segment profit is determined on a pretax basis and includes other income/expense items.

Reconciling items are created based on accounting differences between segment reporting and our consolidated external reporting. Please refer to pages 39 to 45 for financial information regarding significant reconciling items. Most of our reconciling items are self-explanatory given the above explanations. For the reconciliation of profit, we have grouped the reconciling items as follows:

- Corporate costs: These costs are related to corporate requirements primarily for compliance and legal functions for the benefit of the entire organization.

- Restructuring costs: Primarily costs for employee separation, long-lived asset impairments and contract terminations. These costs are included in Other Operating (Income) Expenses. Restructuring costs also include other exit-related costs primarily for accelerated depreciation, inventory write-downs, equipment relocation and project management costs and also LIFO inventory decrement benefits from inventory liquidations at closed facilities all of which are primarily included in Cost of goods sold. A table, Reconciliation of Restructuring costs on page 42, has been included to illustrate how segment profit would have been impacted by the restructuring costs. See Note 18 for more information.

- Methodology differences: See previous discussion of significant accounting differences between segment reporting and consolidated external reporting.

- Timing: Timing differences in the recognition of costs between segment reporting and consolidated external reporting. For example, certain costs are reported on the cash basis for segment reporting and the accrual basis for consolidated external reporting.

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Reportable Segments
Three Months Ended September 30
(Millions of dollars)

	2017 External sales and revenues	Inter-segment sales and revenues	Total sales and revenues	Depreciation and amortization	Segment profit	Segment assets at September 30	Capital expenditures
Construction Industries	$4,854	$ 32	$4,886	$ 99	$ 884	$ 4,739	$ 50
Resource Industries	1,870	86	1,956	129	226	6,596	41
Energy & Transportation	3,961	877	4,838	165	750	7,502	113
Machinery, Energy & Transportation	$10,685	$ 995	$11,680	$ 393	$ 1,860	$ 18,837	$ 204
Financial Products Segment	774	—	774	204	185	35,415	308
Total	$11,459	$ 995	$12,454	$ 597	$ 2,045	$ 54,252	$ 512

	2016 External sales and revenues	Inter-segment sales and revenues	Total sales and revenues	Depreciation and amortization	Segment profit (loss)	Segment assets at December 31	Capital expenditures
Construction Industries	$3,554	$ 27	$3,581	$ 117	$ 326	$ 5,367	$ 46
Resource Industries	1,377	69	1,446	150	(77)	7,135	68
Energy & Transportation	3,534	629	4,163	170	572	7,791	97
Machinery, Energy & Transportation	$8,465	$ 725	$9,190	$ 437	$ 821	$ 20,293	$ 211
Financial Products Segment	749	—	749	215	183	35,224	357
Total	$9,214	$ 725	$9,939	$ 652	$ 1,004	$ 55,517	$ 568

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Reportable Segments
Nine Months Ended September 30
(Millions of dollars)

	2017 External sales and revenues	Inter-segment sales and revenues	Total sales and revenues	Depreciation and amortization	Segment profit	Segment assets at September 30	Capital expenditures
Construction Industries	$13,875	$ 70	$13,945	$ 301	$2,420	$ 4,739	$ 107
Resource Industries	5,299	254	5,553	386	481	6,596	93
Energy & Transportation	11,258	2,484	13,742	485	2,002	7,502	320
Machinery, Energy & Transportation	$30,432	$ 2,808	$33,240	$ 1,172	$4,903	$ 18,837	$ 520
Financial Products Segment	2,310	—	2,310	616	559	35,415	1,018
Total	$32,742	$ 2,808	$35,550	$ 1,788	$5,462	$ 54,252	$ 1,538

	2016 External sales and revenues	Inter-segment sales and revenues	Total sales and revenues	Depreciation and amortization	Segment profit (loss)	Segment assets at December 31	Capital expenditures
Construction Industries	$12,023	$ 47	$12,070	$ 346	$1,316	$ 5,367	$ 114
Resource Industries	4,283	197	4,480	458	(336)	7,135	162
Energy & Transportation	10,562	1,919	12,481	505	1,584	7,791	340
Machinery, Energy & Transportation	$26,868	$ 2,163	$29,031	$ 1,309	$2,564	$ 20,293	$ 616
Financial Products Segment	2,251	—	2,251	633	553	35,224	1,266
Total	$29,119	$ 2,163	$31,282	$ 1,942	$3,117	$ 55,517	$ 1,882

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Reconciliation of Sales and revenues:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidating Adjustments	Consolidated Total
Three Months Ended September 30, 2017				
Total external sales and revenues from reportable segments	$ 10,685	$ 774	$ —	$ 11,459
All Other operating segments	56	—	—	56
Other	(28)	19	(93) [1]	(102)
Total sales and revenues	$ 10,713	$ 793	$ (93)	$ 11,413
Three Months Ended September 30, 2016				
Total external sales and revenues from reportable segments	$ 8,465	$ 749	$ —	$ 9,214
All Other operating segments	28	—	—	28
Other	(30)	19	(71) [1]	(82)
Total sales and revenues	$ 8,463	$ 768	$ (71)	$ 9,160

[1] Elimination of Financial Products revenues from Machinery, Energy & Transportation.

Reconciliation of Sales and revenues:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidating Adjustments	Consolidated Total
Nine Months Ended September 30, 2017				
Total external sales and revenues from reportable segments	$ 30,432	$ 2,310	$ —	$ 32,742
All Other operating segments	126	—	—	126
Other	(76)	53	(279) [1]	(302)
Total sales and revenues	$ 30,482	$ 2,363	$ (279)	$ 32,566
Nine Months Ended September 30, 2016				
Total external sales and revenues from reportable segments	$ 26,868	$ 2,251	$ —	$ 29,119
All Other operating segments	107	—	—	107
Other	(87)	54	(230) [1]	(263)
Total sales and revenues	$ 26,888	$ 2,305	$ (230)	$ 28,963

[1] Elimination of Financial Products revenues from Machinery, Energy & Transportation.

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Reconciliation of Consolidated profit before taxes:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidated Total
Three Months Ended September 30, 2017			
Total profit from reportable segments	$ 1,860	$ 185	$ 2,045
All Other operating segments	6	—	6
Cost centers	17	—	17
Corporate costs	(158)	—	(158)
Timing	(21)	—	(21)
Restructuring costs	(89)	(1)	(90)
Methodology differences:			
Inventory/cost of sales	(4)	—	(4)
Postretirement benefit expense	32	—	32
Stock-based compensation expense	(46)	(2)	(48)
Financing costs	(116)	—	(116)
Currency	(37)	—	(37)
Other income/expense methodology differences	(71)	—	(71)
Other methodology differences	(31)	(1)	(32)
Total consolidated profit before taxes	$ 1,342	$ 181	$ 1,523
Three Months Ended September 30, 2016			
Total profit from reportable segments	$ 821	$ 183	$ 1,004
All Other operating segments	(22)	—	(22)
Cost centers	29	—	29
Corporate costs	(121)	—	(121)
Timing	12	—	12
Restructuring costs	(323)	(1)	(324)
Methodology differences:			—
Inventory/cost of sales	19	—	19
Postretirement benefit expense	37	—	37
Stock-based compensation expense	(40)	(1)	(41)
Financing costs	(129)	—	(129)
Currency	(10)	—	(10)
Other income/expense methodology differences	(60)	—	(60)
Other methodology differences	(11)	—	(11)
Total consolidated profit before taxes	$ 202	$ 181	$ 383

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Reconciliation of Consolidated profit before taxes:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidated Total
Nine Months Ended September 30, 2017			
Total profit from reportable segments	$ 4,903	$ 559	$ 5,462
All Other operating segments	(27)	—	(27)
Cost centers	13	—	13
Corporate costs	(447)	—	(447)
Timing	(128)	—	(128)
Restructuring costs	(1,009)	(2)	(1,011)
Methodology differences:			
Inventory/cost of sales	(80)	—	(80)
Postretirement benefit expense	111	—	111
Stock-based compensation expense	(158)	(7)	(165)
Financing costs	(369)	—	(369)
Currency	(195)	—	(195)
Other income/expense methodology differences	(105)	—	(105)
Other methodology differences	(91)	3	(88)
Total consolidated profit before taxes	$ 2,418	$ 553	$ 2,971
Nine Months Ended September 30, 2016			
Total profit from reportable segments	$ 2,564	$ 553	$ 3,117
All Other operating segments	(43)	—	(43)
Cost centers	68	—	68
Corporate costs	(429)	—	(429)
Timing	53	—	53
Restructuring costs	(619)	(5)	(624)
Methodology differences:			
Inventory/cost of sales	—	—	—
Postretirement benefit expense	148	—	148
Stock-based compensation expense	(180)	(7)	(187)
Financing costs	(396)	—	(396)
Currency	(22)	—	(22)
Other income/expense methodology differences	(170)	—	(170)
Other methodology differences	(34)	6	(28)
Total consolidated profit before taxes	$ 940	$ 547	$ 1,487

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Reconciliation of Restructuring costs:

As noted above, restructuring costs are a reconciling item between Segment profit and Consolidated profit before taxes. Had we included the amounts in the segments' results, the profit would have been as shown below:

Reconciliation of Restructuring costs:

(Millions of dollars)	Segment profit (loss)	Restructuring costs	Segment profit (loss) with restructuring costs
Three Months Ended September 30, 2017			
Construction Industries	$884	$ (15)	$ 869
Resource Industries	226	(59)	167
Energy & Transportation	750	(28)	722
Financial Products Segment	185	—	185
All Other operating segments	6	(13)	(7)
Total	$2,051	$ (115)	$ 1,936
Three Months Ended September 30, 2016			
Construction Industries	$326	$ (9)	$ 317
Resource Industries	(77)	(254)	(331)
Energy & Transportation	572	(39)	533
Financial Products Segment	183	(1)	182
All Other operating segments	(22)	(15)	(37)
Total	$982	$ (318)	$ 664

Reconciliation of Restructuring costs:

(Millions of dollars)	Segment profit (loss)	Restructuring costs	Segment profit (loss) with restructuring costs
Nine Months Ended September 30, 2017			
Construction Industries	$2,420	$ (709)	$ 1,711
Resource Industries	481	(229)	252
Energy & Transportation	2,002	(86)	1,916
Financial Products Segment	559	(2)	557
All Other operating segments	(27)	(32)	(59)
Total	$5,435	$ (1,058)	$ 4,377
Nine Months Ended September 30, 2016			
Construction Industries	$1,316	$ (34)	$ 1,282
Resource Industries	(336)	(348)	(684)
Energy & Transportation	1,584	(194)	1,390
Financial Products Segment	553	(5)	548
All Other operating segments	(43)	(29)	(72)
Total	$3,074	$ (610)	$ 2,464

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Reconciliation of Assets:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidating Adjustments	Consolidated Total
September 30, 2017				
Total assets from reportable segments	$ 18,837	$35,415	$ —	$ 54,252
All Other operating segments	1,345	—	—	1,345
Items not included in segment assets:				
Cash and short-term investments	8,736	—	—	8,736
Intercompany receivables	1,567	—	(1,567)	—
Investment in Financial Products	4,435	—	(4,435)	—
Deferred income taxes	3,595	—	(855)	2,740
Goodwill and intangible assets	4,203	—	—	4,203
Property, plant and equipment – net and other assets	1,979	—	—	1,979
Operating lease methodology difference	(189)	—	—	(189)
Inventory methodology differences	(2,207)	—	—	(2,207)
Intercompany loan included in Financial Products' assets	—	—	(1,000)	(1,000)
Liabilities included in segment assets	9,153	—	—	9,153
Other	(378)	(29)	(45)	(452)
Total assets	$ 51,076	$35,386	$ (7,902)	$ 78,560
December 31, 2016				
Total assets from reportable segments	$ 20,293	$35,224	$ —	$ 55,517
All Other operating segments	1,381	—	—	1,381
Items not included in segment assets:				
Cash and short-term investments	5,257	—	—	5,257
Intercompany receivables	1,713	—	(1,713)	—
Investment in Financial Products	3,638	—	(3,638)	—
Deferred income taxes	3,648	—	(947)	2,701
Goodwill and intangible assets	3,883	—	—	3,883
Property, plant and equipment – net and other assets	1,645	—	—	1,645
Operating lease methodology difference	(186)	—	—	(186)
Inventory methodology differences	(2,373)	—	—	(2,373)
Liabilities included in segment assets	7,400	—	—	7,400
Other	(436)	(29)	(56)	(521)
Total assets	$ 45,863	$35,195	$ (6,354)	$ 74,704

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Reconciliations of Depreciation and amortization:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidated Total
Three Months Ended September 30, 2017			
Total depreciation and amortization from reportable segments	$ 393	$ 204	$ 597
Items not included in segment depreciation and amortization:			
All Other operating segments	52	—	52
Cost centers	36	—	36
Other	28	10	38
Total depreciation and amortization	$ 509	$ 214	$ 723
Three Months Ended September 30, 2016			
Total depreciation and amortization from reportable segments	$ 437	$ 215	$ 652
Items not included in segment depreciation and amortization:			
All Other operating segments	53	—	53
Cost centers	39	—	39
Other	6	11	17
Total depreciation and amortization	$ 535	$ 226	$ 761

Reconciliations of Depreciation and amortization:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidated Total
Nine Months Ended September 30, 2017			
Total depreciation and amortization from reportable segments	$ 1,172	$ 616	$ 1,788
Items not included in segment depreciation and amortization:			
All Other operating segments	162	—	162
Cost centers	106	—	106
Other	67	30	97
Total depreciation and amortization	$ 1,507	$ 646	$ 2,153
Nine Months Ended September 30, 2016			
Total depreciation and amortization from reportable segments	$ 1,309	$ 633	$ 1,942
Items not included in segment depreciation and amortization:			
All Other operating segments	158	—	158
Cost centers	117	—	117
Other	7	31	38
Total depreciation and amortization	$ 1,591	$ 664	$ 2,255

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Reconciliations of Capital expenditures:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidating Adjustments	Consolidated Total
Three Months Ended September 30, 2017				
Total capital expenditures from reportable segments	$ 204	$ 308	$ —	$ 512
Items not included in segment capital expenditures:				
All Other operating segments	26	—	—	26
Cost centers	17	—	—	17
Timing	(21)	—	—	(21)
Other	(31)	19	(9)	(21)
Total capital expenditures	$ 195	$ 327	$ (9)	$ 513
Three Months Ended September 30, 2016				
Total capital expenditures from reportable segments	$ 211	$ 357	$ —	$ 568
Items not included in segment capital expenditures:				
All Other operating segments	35	—	—	35
Cost centers	20	—	—	20
Timing	4	—	—	4
Other	(30)	22	(24)	(32)
Total capital expenditures	$ 240	$ 379	$ (24)	$ 595

Reconciliations of Capital expenditures:

(Millions of dollars)	Machinery, Energy & Transportation	Financial Products	Consolidating Adjustments	Consolidated Total
Nine Months Ended September 30, 2017				
Total capital expenditures from reportable segments	$ 520	$ 1,018	$ —	$ 1,538
Items not included in segment capital expenditures:				
All Other operating segments	71	—	—	71
Cost centers	40	—	—	40
Timing	58	—	—	58
Other	(115)	62	(17)	(70)
Total capital expenditures	$ 574	$ 1,080	$ (17)	$ 1,637
Nine Months Ended September 30, 2016				
Total capital expenditures from reportable segments	$ 616	$ 1,266	$ —	$ 1,882
Items not included in segment capital expenditures:				
All Other operating segments	102	—	—	102
Cost centers	48	—	—	48
Timing	221	—	—	221
Other	(129)	117	(41)	(53)
Total capital expenditures	$ 858	$ 1,383	$ (41)	$ 2,200

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16. Cat Financial financing activities

Allowance for credit losses

The allowance for credit losses is an estimate of the losses inherent in Cat Financial's finance receivable portfolio and includes consideration of accounts that have been individually identified as impaired, as well as pools of finance receivables where it is probable that certain receivables in the pool are impaired but the individual accounts cannot yet be identified. In identifying and measuring impairment, management takes into consideration past loss experience, known and inherent risks in the portfolio, adverse situations that may affect the borrower's ability to repay, estimated value of underlying collateral and current economic conditions.

Accounts are identified for individual review based on past-due status and using information available about the customer, such as financial statements, news reports and published credit ratings, as well as general information regarding industry trends and the economic environment in which Cat Financial's customers operate. The allowance for credit losses attributable to finance receivables that are individually evaluated and determined to be impaired is based either on the present value of expected future cash flows discounted at the receivables' effective interest rate or the fair value of the collateral for collateral-dependent receivables, or the observable market price of the receivable. In determining collateral value, Cat Financial estimates the current fair market value of the collateral less selling costs. Cat Financial also considers credit enhancements such as additional collateral and contractual third-party guarantees. The allowance for credit losses attributable to the remaining accounts not yet individually identified as impaired is estimated based on loss forecast models utilizing probabilities of default, our estimate of the loss emergence period and the estimated loss given default. In addition, qualitative factors not able to be fully captured in the loss forecast models including industry trends, macroeconomic factors and model imprecision are considered in the evaluation of the adequacy of the allowance for credit losses. These qualitative factors are subjective and require a degree of management judgment.

Cat Financial's allowance for credit losses is segregated into two portfolio segments:

- Customer - Finance receivables with retail customers.
- Dealer - Finance receivables with Caterpillar dealers.

A portfolio segment is the level at which the company develops a systematic methodology for determining its allowance for credit losses.

Cat Financial further evaluates portfolio segments by the class of finance receivables, which is defined as a level of information (below a portfolio segment) in which the finance receivables have the same initial measurement attribute and a similar method for assessing and monitoring credit risk. Typically, Cat Financial's finance receivables within a geographic area have similar credit risk profiles and methods for assessing and monitoring credit risk. Cat Financial's classes, which align with management reporting for credit losses, are as follows:

- North America - Includes finance receivables originated in the United States or Canada.
- Europe - Includes finance receivables originated in Europe, Africa, Middle East and the Commonwealth of Independent States.
- Asia Pacific - Includes finance receivables originated in Australia, New Zealand, China, Japan and Southeast Asia.
- Mining - Includes finance receivables related to large mining customers worldwide and project financing in various countries.
- Latin America - Includes finance receivables originated in Central and South American countries and Mexico.
- Caterpillar Power Finance - Includes finance receivables related to marine vessels with Caterpillar engines worldwide and Caterpillar electrical power generation, gas compression and co-generation systems and non-Caterpillar

equipment that is powered by these systems worldwide.

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An analysis of the allowance for credit losses was as follows:

(Millions of dollars)	September 30, 2017		
Allowance for Credit Losses:	Customer	Dealer	Total
Balance at beginning of year	$331	$10	$341
Receivables written off	(119)	—	(119)
Recoveries on receivables previously written off	31	—	31
Provision for credit losses	80	—	80
Other	8	—	8
Balance at end of period	$331	$10	$341
Individually evaluated for impairment	$100	$—	$100
Collectively evaluated for impairment	231	10	241
Ending Balance	$331	$10	$341
Recorded Investment in Finance Receivables:			
Individually evaluated for impairment	$869	$—	$869
Collectively evaluated for impairment	18,086	3,533	21,619
Ending Balance	$18,955	$3,533	$22,488

(Millions of dollars)	December 31, 2016		
Allowance for Credit Losses:	Customer	Dealer	Total
Balance at beginning of year	$327	$9	$336
Receivables written off	(158)	—	(158)
Recoveries on receivables previously written off	35	—	35
Provision for credit losses	132	1	133
Other	(5)	—	(5)
Balance at end of year	$331	$10	$341
Individually evaluated for impairment	$85	$—	$85
Collectively evaluated for impairment	246	10	256
Ending Balance	$331	$10	$341
Recorded Investment in Finance Receivables:			
Individually evaluated for impairment	$786	$—	$786
Collectively evaluated for impairment	18,236	3,375	21,611
Ending Balance	$19,022	$3,375	$22,397

Credit quality of finance receivables

At origination, Cat Financial evaluates credit risk based on a variety of credit quality factors including prior payment experience, customer financial information, credit-rating agency ratings, loan-to-value ratios and other internal metrics. On an ongoing basis, Cat Financial monitors credit quality based on past-due status and collection experience as there is a meaningful correlation between the past-due status of customers and the risk of loss.

In determining past-due status, Cat Financial considers the entire recorded investment in finance receivables past due when any installment is over 30 days past due. The tables below summarize the recorded investment in finance receivables by aging category.

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	September 30, 2017						
(Millions of dollars)	31-60 Days Past Due	61-90 Days Past Due	91+ Days Past Due	Total Past Due	Current	Recorded Investment in Finance Receivables	91+ Still Accruing
Customer							
North America	$64	$17	$49	$ 130	$7,820	$ 7,950	$ 8
Europe	27	9	56	92	2,642	2,734	4
Asia Pacific	26	13	17	56	1,793	1,849	9
Mining	8	4	52	64	1,682	1,746	1
Latin America	53	28	180	261	1,657	1,918	—
Caterpillar Power Finance	11	34	124	169	2,589	2,758	11
Dealer							
North America	—	—	—	—	2,129	2,129	—
Europe	—	—	—	—	132	132	—
Asia Pacific	—	—	—	—	555	555	—
Mining	—	—	—	—	3	3	—
Latin America	5	—	3	8	704	712	—
Caterpillar Power Finance	—	—	—	—	2	2	—
Total	$194	$105	$481	$ 780	$21,708	$ 22,488	$ 33

	December 31, 2016						
(Millions of dollars)	31-60 Days Past Due	61-90 Days Past Due	91+ Days Past Due	Total Past Due	Current	Recorded Investment in Finance Receivables	91+ Still Accruing
Customer							
North America	$50	$ 16	$59	$ 125	$7,938	$ 8,063	$ 5
Europe	16	12	39	67	2,388	2,455	6
Asia Pacific	17	7	15	39	1,435	1,474	4
Mining	3	2	63	68	1,756	1,824	2
Latin America	40	33	214	287	1,808	2,095	—
Caterpillar Power Finance	11	9	73	93	3,018	3,111	1
Dealer							
North America	—	—	—	—	1,916	1,916	—
Europe	—	—	—	—	161	161	—
Asia Pacific	—	—	—	—	541	541	—
Mining	—	—	—	—	3	3	—
Latin America	—	—	—	—	752	752	—
Caterpillar Power Finance	—	—	—	—	2	2	—
Total	$137	$ 79	$463	$ 679	$21,718	$ 22,397	$ 18

Impaired finance receivables

For all classes, a finance receivable is considered impaired, based on current information and events, if it is probable that Cat Financial will be unable to collect all amounts due according to the contractual terms. Impaired finance receivables include finance receivables that have been restructured and are considered to be troubled debt restructurings.

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There were no impaired finance receivables as of September 30, 2017 or December 31, 2016, for the Dealer portfolio segment. Cat Financial's recorded investment in impaired finance receivables and the related unpaid principal balances and allowance for the Customer portfolio segment were as follows:

	September 30, 2017			December 31, 2016		
(Millions of dollars)	Recorded Investment	Unpaid Principal Balance	Related Allowance	Recorded Investment	Unpaid Principal Balance	Related Allowance
Impaired Finance Receivables With No Allowance Recorded						
North America	$16	$ 21	$ —	$10	$ 10	$ —
Europe	47	47	—	49	48	—
Asia Pacific	32	31	—	3	2	—
Mining	127	125	—	129	129	—
Latin America	60	60	—	68	68	—
Caterpillar Power Finance	187	200	—	271	271	—
Total	$469	$ 484	$ —	$530	$ 528	$ —
Impaired Finance Receivables With An Allowance Recorded						
North America	$36	$ 35	$ 13	$61	$ 60	$ 22
Europe	8	8	5	7	7	3
Asia Pacific	25	25	3	50	50	8
Mining	—	—	—	—	—	—
Latin America	92	104	35	93	104	34
Caterpillar Power Finance	239	241	44	45	44	18
Total	$400	$ 413	$ 100	$256	$ 265	$ 85
Total Impaired Finance Receivables						
North America	$52	$ 56	$ 13	$71	$ 70	$ 22
Europe	55	55	5	56	55	3
Asia Pacific	57	56	3	53	52	8
Mining	127	125	—	129	129	—
Latin America	152	164	35	161	172	34
Caterpillar Power Finance	426	441	44	316	315	18
Total	$869	$ 897	$ 100	$786	$ 793	$ 85

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(Millions of dollars)	Three Months Ended September 30, 2017 Average Recorded Investment	Interest Income Recognized	Three Months Ended September 30, 2016 Average Recorded Investment	Interest Income Recognized
Impaired Finance Receivables With No Allowance Recorded				
North America	$ 14	$ 1	$ 24	$ —
Europe	47	—	49	1
Asia Pacific	30	1	1	—
Mining	128	1	90	2
Latin America	68	1	58	—
Caterpillar Power Finance	171	1	282	3
Total	$ 458	$ 5	$ 504	$ 6
Impaired Finance Receivables With An Allowance Recorded				
North America	$ 44	$ —	$ 42	$ —
Europe	6	—	10	—
Asia Pacific	28	1	35	—
Mining	—	—	19	—
Latin America	102	1	67	1
Caterpillar Power Finance	251	3	43	—
Total	$ 431	$ 5	$ 216	$ 1
Total Impaired Finance Receivables				
North America	$ 58	$ 1	$ 66	$ —
Europe	53	—	59	1
Asia Pacific	58	2	36	—
Mining	128	1	109	2
Latin America	170	2	125	1
Caterpillar Power Finance	422	4	325	3
Total	$ 889	$ 10	$ 720	$ 7

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(Millions of dollars)	Nine Months Ended September 30, 2017 Average Recorded Investment	Interest Income Recognized	Nine Months Ended September 30, 2016 Average Recorded Investment	Interest Income Recognized
Impaired Finance Receivables With No Allowance Recorded				
North America	$ 12	$ 1	$ 19	$ 1
Europe	48	1	45	1
Asia Pacific	22	2	2	—
Mining	128	5	84	3
Latin America	69	2	39	—
Caterpillar Power Finance	233	7	269	8
Total	$ 512	$ 18	$ 458	$ 13
Impaired Finance Receivables With An Allowance Recorded				
North America	$ 52	$ 1	$ 28	$ —
Europe	6	—	11	—
Asia Pacific	35	2	34	2
Mining	—	—	15	—
Latin America	101	3	59	2
Caterpillar Power Finance	141	4	50	1
Total	$ 335	$ 10	$ 197	$ 5
Total Impaired Finance Receivables				
North America	$ 64	$ 2	$ 47	$ 1
Europe	54	1	56	1
Asia Pacific	57	4	36	2
Mining	128	5	99	3
Latin America	170	5	98	2
Caterpillar Power Finance	374	11	319	9
Total	$ 847	$ 28	$ 655	$ 18

Recognition of income is suspended and the finance receivable is placed on non-accrual status when management determines that collection of future income is not probable (generally after 120 days past due). Recognition is resumed and previously suspended income is recognized when the finance receivable becomes current and collection of remaining amounts is considered probable. Payments received while the finance receivable is on non-accrual status are applied to interest and principal in accordance with the contractual terms.

As of September 30, 2017, there were finance receivables on non-accrual status for the Dealer portfolio segment of $3 million, all of which were in the Latin America finance receivable class. As of December 31, 2016, there were no finance receivables on non-accrual status for the Dealer portfolio segment. The recorded investment in customer finance receivables on non-accrual status was as follows:

(Millions of dollars)	September 30, 2017	December 31, 2016
North America	$ 48	$ 66
Europe	56	35
Asia Pacific	11	12

Mining	55	69
Latin America	242	307
Caterpillar Power Finance	277	90
Total	$ 689	$ 579

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Troubled Debt Restructurings

A restructuring of a finance receivable constitutes a troubled debt restructuring (TDR) when the lender grants a concession it would not otherwise consider to a borrower experiencing financial difficulties. Concessions granted may include extended contract maturities, inclusion of interest only periods, below market interest rates, extended skip payment periods and reduction of principal and/or accrued interest.

As of September 30, 2017, there were no additional funds committed to lend to a borrower whose terms have been modified in a TDR. As of December 31, 2016, there was $11 million of additional funds committed to lend to a borrower whose terms have been modified in a TDR.

There were no finance receivables modified as TDRs during the three and nine months ended September 30, 2017 or 2016 for the Dealer portfolio segment. Our recorded investment in finance receivables in the Customer portfolio segment modified as TDRs during the three and nine months ended September 30, 2017 and 2016, were as follows:

	Three Months Ended September 30, 2017			Three Months Ended September 30, 2016		
(Millions of dollars)	Number of Contracts	Pre-TDR Recorded Investment	Post-TDR Recorded Investment	Number of Contracts	Pre-TDR Recorded Investment	Post-TDR Recorded Investment
North America	11	$ 4	$ 5	2	$ —	$ —
Europe	1	—	—	—	—	—
Asia Pacific	—	—	—	4	1	1
Mining	—	—	—	1	33	30
Latin America[1]	3	21	22	341	105	74
Caterpillar Power Finance	5	51	44	4	13	13
Total	20	$ 76	$ 71	352	$ 152	$ 118

	Nine Months Ended September 30, 2017			Nine Months Ended September 30, 2016		
	Number of Contracts	Pre-TDR Recorded Investment	Post-TDR Recorded Investment	Number of Contracts	Pre-TDR Recorded Investment	Post-TDR Recorded Investment
North America	37	$ 13	$ 13	15	$ 16	$ 16
Europe	2	—	—	3	11	8
Asia Pacific	6	39	30	8	4	4
Mining	2	57	56	2	43	35
Latin America	17	26	27	431	117	87
Caterpillar Power Finance[2]	59	319	305	34	196	177
Total	123	$ 454	$ 431	493	$ 387	$ 327

1 For the three months ended September 30, 2016, 321 contracts with a pre-TDR recorded investment of $94 million and a post-TDR recorded investment of $64 million are related to four customers.

2 For the nine months ended September 30, 2017, 44 contracts with a pre-TDR recorded investment of $200 million and a post-TDR recorded investment of $200 million are related to four customers.

17. Fair value disclosures

A. Fair value measurements

The guidance on fair value measurements defines fair value as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants. This guidance also specifies a fair value hierarchy based upon the observability of inputs used in valuation techniques. Observable inputs (highest level) reflect market data obtained from independent sources, while unobservable inputs (lowest level) reflect internally developed market assumptions. In accordance with this guidance, fair value measurements are classified under the following hierarchy:

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- Level 1 – Quoted prices for identical instruments in active markets.

- Level 2 – Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs or significant value-drivers are observable in active markets.

- Level 3 – Model-derived valuations in which one or more significant inputs or significant value-drivers are unobservable.

When available, we use quoted market prices to determine fair value, and we classify such measurements within Level 1. In some cases where market prices are not available, we make use of observable market based inputs to calculate fair value, in which case the measurements are classified within Level 2. If quoted or observable market prices are not available, fair value is based upon valuations in which one or more significant inputs are unobservable, including internally developed models that use, where possible, current market-based parameters such as interest rates, yield curves and currency rates. These measurements are classified within Level 3.

Fair value measurements are classified according to the lowest level input or value-driver that is significant to the valuation. A measurement may therefore be classified within Level 3 even though there may be significant inputs that are readily observable.

Fair value measurement includes the consideration of nonperformance risk. Nonperformance risk refers to the risk that an obligation (either by a counterparty or Caterpillar) will not be fulfilled. For financial assets traded in an active market (Level 1 and certain Level 2), the nonperformance risk is included in the market price. For certain other financial assets and liabilities (certain Level 2 and Level 3), our fair value calculations have been adjusted accordingly.

Investments in debt and equity securities
Investments in certain debt and equity securities, primarily at Insurance Services, have been classified as available-for-sale and recorded at fair value. Fair values for our U.S. treasury bonds and large capitalization value and smaller company growth equity securities are based upon valuations for identical instruments in active markets. Fair values for other government bonds, corporate bonds and mortgage-backed debt securities are based upon models that take into consideration such market-based factors as recent sales, risk-free yield curves and prices of similarly rated bonds.

In addition, Insurance Services has an equity investment in a real estate investment trust (REIT) which is recorded at fair value based on the net asset value (NAV) of the investment.

See Note 8 for additional information on our investments in debt and equity securities.

Derivative financial instruments
The fair value of interest rate contracts is primarily based on models that utilize the appropriate market-based forward swap curves and zero-coupon interest rates to determine discounted cash flows. The fair value of foreign currency and commodity forward, option and cross currency contracts is based on a valuation model that discounts cash flows resulting from the differential between the contract price and the market-based forward rate.

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Assets and liabilities measured on a recurring basis at fair value, primarily related to Financial Products, included in our Consolidated Statement of Financial Position as of September 30, 2017 and December 31, 2016 are summarized below:

	September 30, 2017			
(Millions of dollars)	Level 1	Level 2	Level 3	Total Assets / Liabilities, at Fair Value
Assets				
Available-for-sale securities				
Government debt				
U.S. treasury bonds	$10	$ —	$ —	$ 10
Other U.S. and non-U.S. government bonds	—	48	—	48
Corporate bonds				
Corporate bonds	—	532	—	532
Asset-backed securities	—	76	—	76
Mortgage-backed debt securities				
U.S. governmental agency	—	243	—	243
Residential	—	8	—	8
Commercial	—	17	—	17
Equity securities				
Large capitalization value	349	—	—	349
Smaller company growth	65	—	—	65
Total available-for-sale securities	424	924	—	1,348
REIT	—	—	109	109
Derivative financial instruments, net	—	28	—	28
Total Assets	$424	$ 952	$ 109	$ 1,485

	December 31, 2016			
(Millions of dollars)	Level 1	Level 2	Level 3	Total Assets / Liabilities, at Fair Value
Assets				
Available-for-sale securities				
Government debt				
U.S. treasury bonds	$9	$ —	$ —	$ 9
Other U.S. and non-U.S. government bonds	—	60	—	60
Corporate bonds				
Corporate bonds	—	492	—	492
Asset-backed securities	—	90	—	90
Mortgage-backed debt securities				
U.S. governmental agency	—	223	—	223
Residential	—	10	—	10
Commercial	—	36	—	36
Equity securities				
Large capitalization value	312	—	—	312
Smaller company growth	56	—	—	56
Total available-for-sale securities	377	911	—	1,288

REIT	—	—	79	79
Total Assets	$377	$ 911	$ 79	$ 1,367
Liabilities				
Derivative financial instruments, net	$—	$ 72	$ —	$ 72
Total Liabilities	$—	$ 72	$ —	$ 72

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The fair value of our REIT investment is measured based on NAV, which is considered a Level 3 input. A roll-forward for the nine months ended September 30, 2017 of our REIT investment is as follows:

(Millions of dollars)	REIT
Balance at December 31, 2016	$79
Purchases of securities	27
Sale of securities	—
Gains (losses) included in Accumulated other comprehensive income (loss)	3
Balance at September 30, 2017	$109

In addition to the amounts above, Cat Financial impaired loans are subject to measurement at fair value on a nonrecurring basis and are classified as Level 3 measurements. A loan is considered impaired when management determines that collection of contractual amounts due is not probable. In these cases, an allowance for credit losses may be established based either on the present value of expected future cash flows discounted at the receivables' effective interest rate, or the fair value of the collateral for collateral-dependent receivables. In determining collateral value, Cat Financial estimates the current fair market value of the collateral less selling costs. Cat Financial had impaired loans with a fair value of $251 million and $137 million as of September 30, 2017 and December 31, 2016, respectively.

B. Fair values of financial instruments

In addition to the methods and assumptions we use to record the fair value of financial instruments as discussed in the Fair value measurements section above, we used the following methods and assumptions to estimate the fair value of our financial instruments:

Cash and short-term investments
Carrying amount approximated fair value.

Restricted cash and short-term investments
Carrying amount approximated fair value. Restricted cash and short-term investments are included in Prepaid expenses and other current assets in the Consolidated Statement of Financial Position.

Finance receivables
Fair value was estimated by discounting the future cash flows using current rates, representative of receivables with similar remaining maturities.

Wholesale inventory receivables
Fair value was estimated by discounting the future cash flows using current rates, representative of receivables with similar remaining maturities.

Short-term borrowings
Carrying amount approximated fair value.

Long-term debt
Fair value for fixed and floating rate debt was estimated based on quoted market prices.

Guarantees

The fair value of guarantees is based upon our estimate of the premium a market participant would require to issue the same guarantee in a stand-alone arms-length transaction with an unrelated party. If quoted or observable market prices are not available, fair value is based upon internally developed models that utilize current market-based assumptions.

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Please refer to the table below for the fair values of our financial instruments.

(Millions of dollars)	Fair Value of Financial Instruments September 30, 2017 Carrying Amount	Fair Value	December 31, 2016 Carrying Amount	Fair Value	Fair Value Levels	Reference
Assets						
Cash and short-term investments	$9,591	$9,591	$7,168	$7,168	1	
Restricted cash and short-term investments	$202	$202	$31	$31	1	
Investments in debt and equity securities	$1,457	$1,457	$1,367	$1,367	1, 2 & 3	Note 8
Finance receivables – net (excluding finance leases[1])	$15,583	$15,604	$16,172	$16,056	3	Note 16
Wholesale inventory receivables – net (excluding finance leases [1])	$1,393	$1,362	$1,500	$1,464	3	Note 16
Foreign currency contracts – net	$14	$14	$—	$—	2	Note 4
Interest rate contracts – net	$2	$2	$3	$3	2	Note 4
Commodity contracts – net	$12	$12	$10	$10	2	Note 4
Liabilities						
Short-term borrowings	$5,470	$5,470	$7,303	$7,303	1	
Long-term debt (including amounts due within one year)						
Machinery, Energy & Transportation	$8,825	$10,708	$8,943	$10,348	2	
Financial Products	$21,629	$21,854	$20,537	$20,724	2	
Foreign currency contracts – net	$—	$—	$85	$85	2	Note 4
Guarantees	$8	$8	$8	$8	3	Note 10

[1] Total excluded items have a net carrying value at September 30, 2017 and December 31, 2016 of $6,800 million and $6,111 million, respectively.

18. Restructuring costs

Our accounting for employee separations is dependent upon how the particular program is designed. For voluntary programs, eligible separation costs are recognized at the time of employee acceptance unless the acceptance requires explicit approval by the company. For involuntary programs, eligible costs are recognized when management has approved the program, the affected employees have been properly notified and the costs are estimable.

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Restructuring costs for the three and nine months ended September 30, 2017 and 2016 were as follows:

(Millions of dollars)	Three Months Ended September 30	
	2017	2016
Employee separations [1]	$8	$99
Contract terminations [1]	6	9
Long-lived asset impairments [1]	31	158
Other [2]	45	58
Total restructuring costs	$90	$324

	Nine Months Ended September 30	
	2017	2016
Employee separations [1]	$514	$175
Contract terminations [1]	32	55
Long-lived asset impairments [1]	306	254
Defined benefit plan curtailments and termination benefits [1]	29	—
Other [2]	130	140
Total restructuring costs	$1,011	$624

[1] Recognized in Other operating (income) expenses.
[2] Represents costs related to our restructuring programs, primarily for accelerated depreciation, inventory write-downs, equipment relocation and project management costs and also LIFO inventory decrement benefits from inventory liquidations at closed facilities (all of which are primarily included in Cost of goods sold).

In March 2017, Caterpillar informed Belgian authorities of the decision to proceed to a collective dismissal, which will lead to the closure of the Gosselies site, impacting about 2,000 employees. Production of Caterpillar products at the Gosselies site ended during the second quarter of 2017. The other operations and functions at the Gosselies site are expected to be gradually phased out by the end of the second quarter of 2018. We estimate restructuring costs incurred under this program to be about $700 million. For the first nine months of 2017, we recognized $649 million of restructuring costs which included $443 million of employee separation costs, $201 million for long-lived asset impairments and $67 million of other costs partially offset by a $62 million LIFO inventory decrement benefit. The majority of the remaining costs are expected to be recognized in 2017. The remaining restructuring costs for the first nine months of 2017 were primarily related to restructuring actions in Resource Industries.

The restructuring costs for the first nine months of 2016 were primarily related to actions in Resource Industries in response to continued weakness in the mining industry. In addition, costs resulted from our decision to discontinue production of on-highway vocational trucks, as discussed below, and other restructuring actions across the company.

Restructuring costs are a reconciling item between Segment profit and Consolidated profit before taxes. See Note 15 for more information.

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The following table summarizes the 2016 and 2017 employee separation activity:

(Millions of dollars)	
Liability balance at December 31, 2015	$483
Increase in liability (separation charges)	297
Reduction in liability (payments)	(633)
Liability balance at December 31, 2016	$147
Increase in liability (separation charges)	514
Reduction in liability (payments)	(339)
Liability balance at September 30, 2017	$322

Most of the liability balance at September 30, 2017 is expected to be paid in 2017 and 2018 and primarily includes employee separation payments related to closure of the Gosselies facility.

Restructuring costs for the year ended December 31, 2016 were $1,019 million. Throughout 2016, we initiated the following restructuring plans:

- In February 2016, we made the decision to discontinue production of on-highway vocational trucks. Based on the business climate in the truck industry and a thorough evaluation of the business, the company decided it would withdraw from this market. We recognized $104 million of restructuring costs, primarily related to long-lived asset impairments and sales discounts, which is substantially all the costs expected under this program.
- In the second half of 2016, we took additional restructuring actions in Resource Industries, including ending the production of track drills; pursuing strategic alternatives related to room and pillar products; consolidation of two product development divisions; and additional actions in response to ongoing weakness in the mining industry. For the year ended December 31, 2016, we incurred $369 million of restructuring costs for these plans primarily related to long-lived asset impairments, employee separation costs and inventory write-downs.

In September 2015, we announced a large scale restructuring plan (the Plan) including a voluntary retirement enhancement program for qualifying U.S. employees, several voluntary separation programs outside of the U.S., additional involuntary programs throughout the company and manufacturing facility consolidations and closures expected to occur through 2018. The largest action among those included in the Plan was related to our European manufacturing footprint, which led to the Gosselies facility closure as discussed above. In the first nine months of 2017, we incurred $772 million of restructuring costs related to the Plan, and we incurred $281 million and $569 million in 2016 and 2015, respectively, for a total of $1,622 million through September 30, 2017. We expect to recognize approximately $70 million of additional restructuring costs related to the Plan in 2017.

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Item 2. Management’s Discussion and Analysis of Financial Condition and Results of Operations

Overview

Third-quarter 2017 sales and revenues were $11.413 billion, a 25 percent increase from third-quarter 2016 sales and revenues of $9.160 billion. The increase was primarily due to higher sales volume, with about half of the increase due to improved end-user demand and about half of the increase due to favorable changes in dealer inventories. The improvement in end-user demand was across all regions and most end markets. The favorable change in dealer inventories was primarily due to a decrease in dealer inventories during the third quarter of 2016. By segment, the most significant increase in sales volume was in Construction Industries, mostly due to the favorable impact of changes in dealer inventories and higher end-user demand for construction equipment. Sales volume for Resource Industries increased due to the favorable impact of changes in dealer inventories and higher end-user demand for aftermarket parts. Energy & Transportation's sales volume increased due to higher demand across all applications.

Profit per share for the third quarter of 2017 was $1.77, an increase from $0.48 profit per share in the third quarter of 2016. Profit was $1.059 billion in the third quarter of 2017, an increase from $283 million in the third quarter of 2016. Profit increased primarily due to higher sales volume. Improved price realization, lower restructuring costs and variable manufacturing costs were partially offset by higher period costs.

Sales and revenues for the nine months ended September 30, 2017, were $32.566 billion, up $3.603 billion, or 12 percent, from $28.963 billion for the nine months ended September 30, 2016. Profit per share for the nine months ended September 30, 2017, was $3.44, an increase of 83 percent from profit per share of $1.88 for the same period last year. Profit was $2.053 billion for the nine months ended September 30, 2017, an increase of 86 percent from $1.104 billion for the nine months ended September 30, 2016.

Highlights for the third quarter of 2017 include:

- Third-quarter sales and revenues were $11.413 billion, compared with $9.160 billion in the third quarter of 2016. Sales increased in Construction Industries, Resource Industries and Energy & Transportation. Financial Products’ revenues were about flat.
- Profit per share was $1.77 in the third quarter of 2017, compared with $0.48 in the third quarter of 2016. Excluding restructuring costs of $0.18 per share, third-quarter 2017 adjusted profit per share was $1.95, compared to third-quarter 2016 adjusted profit per share of $0.85.
- Machinery, Energy & Transportation (ME&T) debt-to-capital ratio was 36.1 percent at September 30, 2017, compared to 41.0 percent at the end of 2016.
- As a result of increasing sales volume during 2017, we are increasing production levels and working with our supply chain to reduce lead times in response to improved end-user demand in a number of end markets.

Highlights for the nine months ended September 30, 2017, include:

- Sales and revenues for the nine months ended September 30, 2017, were $32.566 billion, compared with $28.963 billion for the nine months ended September 30, 2016. Sales increased in Construction Industries, Resource Industries and Energy & Transportation. Financial Products’ revenues were about flat.
- Restructuring costs were $1.011 billion for the nine months ended September 30, 2017, with an after-tax impact of $1.37 per share, compared with restructuring costs of $624 million for the nine months ended September 30, 2016, with an after-tax impact of $0.70 per share.
- Profit per share was $3.44 for the nine months ended September 30, 2017, compared with $1.88 in the nine months ended September 30, 2016. Excluding restructuring costs of $1.37 per share and a gain on the sale of an equity investment of $0.09 per share, adjusted profit per share for the nine months ended September 30, 2017 was $4.72, compared to $2.58 per share in the nine months ended September 30, 2016.
- ME&T operating cash flow was $4.164 billion for the nine months ended September 30, 2017, compared to $1.795 billion for the nine months ended September 30, 2016.

Restructuring Costs

In the third quarter of 2017, we continued our focus on structural cost reduction to help improve our long-term cost structure. Restructuring costs of $90 million were primarily related to restructuring programs in Resource Industries and Energy & Transportation. During the first nine months of 2017, we incurred $1.011 billion of restructuring costs,

primarily related to the closure of the facility in Gosselies, Belgium. For the full year of 2017, we anticipate restructuring costs of about $1.3 billion.

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Notes:

- Glossary of terms is included on pages 73-75; first occurrence of terms shown in bold italics.
- Information on non-GAAP financial measures is included on page 83.

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Consolidated Results of Operations

THREE MONTHS ENDED SEPTEMBER 30, 2017 COMPARED WITH THREE MONTHS ENDED SEPTEMBER 30, 2016

CONSOLIDATED SALES AND REVENUES
The chart above graphically illustrates reasons for the change in Consolidated Sales and Revenues between the third quarter of 2016 (at left) and the third quarter of 2017 (at right). Items favorably impacting sales and revenues appear as upward stair steps with the corresponding dollar amounts above each bar, while items negatively impacting sales and revenues appear as downward stair steps with dollar amounts reflected in parentheses above each bar. Caterpillar management utilizes these charts internally to visually communicate with the company's board of directors and employees.

Sales and Revenues
Total sales and revenues were $11.413 billion in the third quarter of 2017, an increase of $2.253 billion, or 25 percent, compared with $9.160 billion in the third quarter of 2016. The increase was primarily due to higher sales volume, with about half of the increase due to improved end-user demand and about half of the increase due to favorable changes in dealer inventories. The improvement in end-user demand was across all regions and most end markets. The favorable change in dealer inventories was primarily due to a decrease in dealer inventories during the third quarter of 2016. By segment, the largest sales volume increase was in Construction Industries mostly due to the favorable impact of changes in dealer inventories and higher end-user demand for construction equipment. Sales volume for Resource Industries increased due to the favorable impact of changes in dealer inventories and higher end-user demand for aftermarket parts. Energy & Transportation’s sales volume increased due to higher demand across all applications. Favorable price realization, primarily in Construction Industries, also contributed to the sales improvement. Financial Products’ revenues were about flat.
Sales increased across all regions with the largest increase in North America. Sales improved 27 percent in North America primarily due to higher end-user demand for both equipment and aftermarket parts, as well as favorable changes in dealer inventories. Dealer inventories decreased during the third quarter of 2016 and were about flat in the third quarter of 2017. Asia/Pacific sales increased 31 percent primarily due to higher end-user demand for construction equipment. About half of the sales improvement in Asia/Pacific was in China resulting from increased building construction and infrastructure investment. EAME sales increased 22 percent primarily due to the favorable impact of changes in dealer inventories as dealers decreased inventories in the third quarter of 2016 and increased dealer inventories in the third quarter of 2017. Sales increased 24 percent in Latin America due to stabilizing economic conditions in several countries in the region that resulted in improved end-user demand from low levels. Dealer machine and engine inventories increased about $200 million in the three months ended September 30, 2017, compared to a decrease of $700 million during the three months ended September 30, 2016. Dealers are independent, and there could be many reasons for changes in their inventory levels, including their expectations of future demand and product delivery times. Dealers’ demand expectations take into account seasonal changes, macroeconomic conditions, machine rental rates and other

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factors. Delivery times can vary based on availability of product from Caterpillar factories and product distribution centers. We believe the level of dealer inventories at the end of 2017 will depend on dealer expectations for business in 2018.

CONSOLIDATED OPERATING PROFIT

The chart above graphically illustrates reasons for the change in Consolidated Operating Profit between the third quarter of 2016 (at left) and the third quarter of 2017 (at right). Items favorably impacting operating profit appear as upward stair steps with the corresponding dollar amounts above each bar, while items negatively impacting operating profit appear as downward stair steps with dollar amounts reflected in parentheses above each bar. Caterpillar management utilizes these charts internally to visually communicate with the company's board of directors and employees. The bar entitled Other includes consolidating adjustments and Machinery, Energy & Transportation other operating (income) expenses.

Operating profit for the third quarter of 2017 was $1.577 billion, compared with $481 million in the third quarter of 2016. The increase of $1.096 billion was primarily due to higher sales volume. Favorable price realization, lower restructuring costs and variable manufacturing costs were partially offset by higher period costs. Price realization was favorable, primarily in Construction Industries.

Variable manufacturing costs were lower primarily due to the favorable impact from cost absorption as inventory increased in the third quarter of 2017 due to higher production volumes and was about flat in the third quarter of 2016. Material costs were slightly unfavorable due to increases in steel prices. Period costs were higher primarily due to higher short-term incentive compensation expense. Despite a significant increase in sales volume, period costs excluding short-term incentive compensation expense were about flat.

Restructuring costs were $90 million in the third quarter of 2017 were primarily related to restructuring programs in Resources Industries and Energy & Transportation, compared with $324 million in the third quarter of 2016.

Short-term incentive compensation expense for the three months ended September 30, 2017, was about $400 million and no short-term incentive compensation expense was recognized during the third quarter of 2016.

Other Profit/Loss Items

Other income/expense in the third quarter of 2017 was income of $64 million, compared with income of $28 million in the third quarter of 2016. The favorable change was primarily a result of gains on the sale of securities.

The provision for income taxes in the third quarter reflects an estimated annual tax rate of 32 percent, which excludes the discrete item discussed in the following paragraph, compared with 25 percent for the third quarter of 2016. The increase is primarily due to higher non-U.S. restructuring costs in 2017 that are taxed at relatively lower non-U.S. tax rates, along with other changes in the geographic mix of profits from a tax perspective. Under the terms of a manufacturing service agreement, Caterpillar SARL (CSARL) will bear substantially all of the restructuring costs related to the closure of our Gosselies, Belgium, facility, reducing CSARL's profits taxable in Switzerland.

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In addition, a discrete tax benefit of $18 million was recorded for the settlement of stock-based compensation awards with associated tax deductions in excess of cumulative U.S. GAAP compensation expense.

Excluding restructuring costs, gain on the sale of Caterpillar's equity investment in IronPlanet in the second quarter of 2017, and discrete items, the 2017 estimated annual tax rate is expected to be 29 percent.

Segment Information

Sales and Revenues by Geographic Region

(Millions of dollars)	Total	% Change	North America	% Change	Latin America	% Change	EAME	% Change	Asia/ Pacific	% Change
Third Quarter 2017										
Construction Industries [1]	$4,854	37 %	$2,165	31 %	$390	36 %	$1,008	28 %	$1,291	57 %
Resource Industries [2]	1,870	36 %	581	28 %	329	30 %	488	61 %	472	29 %
Energy & Transportation [3]	3,961	12 %	1,928	22 %	300	7 %	1,166	7 %	567	(2)%
All Other Segments [4]	56	100 %	30	400 %	1	— %	13	160 %	12	(29)%
Corporate Items and Eliminations	(28)	—	(25)		(1)		(2)		—	
Machinery, Energy & Transportation Sales	10,713	27 %	4,679	27 %	1,019	24 %	2,673	22 %	2,342	31 %
Financial Products Segment	774	3 %	510	9 %	64	(24)%	110	9 %	90	(8)%
Corporate Items and Eliminations	(74)		(51)		(5)		(4)		(14)	
Financial Products Revenues	700	— %	459	5 %	59	(20)%	106	9 %	76	(14)%
Consolidated Sales and Revenues	$11,413	25 %	$5,138	25 %	$1,078	20 %	$2,779	22 %	$2,418	29 %
Third Quarter 2016										
Construction Industries [1]	$3,554		$1,655		$287		$789		$823	
Resource Industries [2]	1,377		454		254		303		366	
Energy & Transportation [3]	3,534		1,583		280		1,094		577	
All Other Segments [4]	28		6		—		5		17	
Corporate Items and Eliminations	(30)		(26)		—		(3)		(1)	
Machinery, Energy & Transportation Sales	8,463		3,672		821		2,188		1,782	
Financial Products Segment	749		466		84		101		98	
Corporate Items and Eliminations	(52)		(28)		(10)		(4)		(10)	
Financial Products Revenues	697		438		74		97		88	
Consolidated Sales and Revenues	$9,160		$4,110		$895		$2,285		$1,870	

[1] Does not include inter-segment sales of $32 million and $27 million in third quarter 2017 and 2016, respectively.

[2] Does not include inter-segment sales of $86 million and $69 million in third quarter 2017 and 2016, respectively.

[3] Does not include inter-segment sales of $877 million and $629 million in third quarter 2017 and 2016, respectively.

[4] Does not include inter-segment sales of $89 million and $95 million in third quarter 2017 and 2016, respectively.

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Sales and Revenues by Segment

(Millions of dollars)	Third Quarter 2016	Sales Volume	Price Realization	Currency	Other	Third Quarter 2017	$ Change	% Change
Construction Industries	$3,554	$1,002	$ 291	$ 7	$ —	$4,854	$1,300	37 %
Resource Industries	1,377	410	73	10	—	1,870	493	36 %
Energy & Transportation	3,534	419	(21)	29	—	3,961	427	12 %
All Other Segments	28	28	—	—	—	56	28	100 %
Corporate Items and Eliminations	(30)	2	—	—	—	(28)	2	
Machinery, Energy & Transportation Sales	8,463	1,861	343	46	—	10,713	2,250	27 %
Financial Products Segment	749	—	—	—	25	774	25	3 %
Corporate Items and Eliminations	(52)	—	—	—	(22)	(74)	(22)	
Financial Products Revenues	697	—	—	—	3	700	3	— %
Consolidated Sales and Revenues	$9,160	$1,861	$ 343	$ 46	$ 3	$11,413	$2,253	25 %

Operating Profit / (Loss) by Segment

(Millions of dollars)	Third Quarter 2017	Third Quarter 2016	$ Change	% Change
Construction Industries	$884	$ 326	$558	171 %
Resource Industries	226	(77)	303	n/a
Energy & Transportation	750	572	178	31 %
All Other Segments	6	(22)	28	n/a
Corporate Items and Eliminations	(359)	(433)	74	
Machinery, Energy & Transportation	1,507	366	1,141	312 %
Financial Products Segment	185	183	2	1 %
Corporate Items and Eliminations	(37)	(12)	(25)	
Financial Products	148	171	(23)	(13)%
Consolidating Adjustments	(78)	(56)	(22)	
Consolidated Operating Profit / (Loss)	$1,577	$ 481	$1,096	228 %

Construction Industries

Construction Industries' sales were $4.854 billion in the third quarter of 2017, compared with $3.554 billion in the third quarter of 2016. The increase was due to higher sales volume and favorable price realization.

About half of the sales volume increase was due to the impact of favorable changes in dealer inventories as inventories decreased significantly in the third quarter of 2016 and increased in the third quarter of 2017. In addition, sales volume improved due to higher end-user demand for construction equipment.

Although market conditions remain competitive, price realization was favorable due to a particularly weak pricing environment in the third quarter of 2016 and previously implemented price increases.

Sales increased across all regions with the largest increases in North America and Asia/Pacific.

In North America, the sales increase was primarily due to a favorable impact of changes in dealer inventories, which decreased in the third quarter of 2016 and were about flat in the third quarter of 2017. Favorable price realization also contributed to increased sales. In addition, end-user demand for construction equipment increased primarily due to

improved oil and gas, residential and nonresidential construction activities.

Sales in Asia/Pacific were higher as a result of an increase in end-user demand across the region, but, primarily in China, stemming from increased building construction and infrastructure investment. Favorable price realization also contributed to increased sales.

Sales increased in EAME primarily due to the favorable impact of changes in dealer inventories, which decreased in the third quarter of 2016 and increased in the third quarter of 2017. Favorable price realization also contributed to increased sales.

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Although construction activity remained weak in Latin America, sales were higher as end-user demand increased from low levels due to stabilizing economic conditions in several countries in the region.

Construction Industries' profit was $884 million in the third quarter of 2017, compared with $326 million in the third quarter of 2016. The increase in profit was primarily due to higher sales volume and favorable price realization, partially offset by unfavorable period costs. The increase in period costs was due to higher short-term incentive compensation expense.

Resource Industries

Resource Industries' sales were $1.870 billion in the third quarter of 2017, an increase of $493 million from the third quarter of 2016. The increase was primarily due to the favorable impact of changes in dealer inventories, an increase in end-user demand for aftermarket parts and favorable price realization. Dealer inventories were about flat in the third quarter of 2017, compared with a decrease in the third quarter of 2016. Dealer deliveries for new equipment increased slightly. Increases in certain commodity prices over the past year, along with continued commodity consumption, have resulted in increased mining activity and maintenance and rebuild activities, which is a positive for aftermarket parts sales. Although commodity prices remain volatile, they have improved and are generally above investment threshold prices, which is a positive for end-user demand.

Resource Industries' profit was $226 million in the third quarter of 2017, compared with a loss of $77 million in the third quarter of 2016. The improvement was due to higher sales volume, favorable price realization and lower variable manufacturing costs primarily due to cost absorption. Cost absorption was favorable as inventory increased in the third quarter of 2017 to support higher production volumes and was about flat in the third quarter of 2016. Period costs were about flat as an increase in short-term incentive compensation expense was offset by the favorable impact of restructuring and cost reduction actions.

Energy & Transportation

Energy & Transportation's sales were $3.961 billion in the third quarter of 2017, compared with $3.534 billion in the third quarter of 2016. The increase was primarily due to higher sales volume across all applications.

Industrial - Sales were higher in all regions, reflecting increased demand for equipment across end-user applications and aftermarket parts.

Oil and Gas - Sales increased in North America due to higher demand for aftermarket parts supporting rebuild activity and for reciprocating engines used in well servicing applications. This was partially offset by a decrease in equipment sold in EAME due to the absence of several large gas compression projects that occurred during the third quarter of 2016.

Power Generation - Sales increased in North America and EAME due to the timing of projects. Asia/Pacific and Latin America were about flat.

Transportation - Sales were higher in North America for rail services as rail traffic has increased.

Energy & Transportation's profit was $750 million in the third quarter of 2017, compared with $572 million in the third quarter of 2016. The increase was primarily due to higher sales volume and lower variable manufacturing costs, partially offset by higher period costs. Variable manufacturing costs were favorable primarily due to cost absorption as inventory increased in the third quarter of 2017 to support higher production volumes and was about flat in the third quarter of 2016. The increase in period costs was primarily due to higher short-term incentive compensation expense.

Financial Products Segment

Financial Products' segment revenues were $774 million in the third quarter of 2017, an increase of $25 million, or 3 percent, from the third quarter of 2016. The increase was primarily due to higher average financing rates in North America and a favorable impact from intercompany lending activity in North America. These favorable impacts were partially offset by lower average earning assets in North America and lower average financing rates in Asia/Pacific.

Financial Products' segment profit was $185 million in the third quarter of 2017, compared with $183 million in the third quarter of 2016. The increase was primarily due to higher gains on sales of securities at Insurance Services, increased intercompany lending activity and an increase in net yield on average earning assets. These favorable impacts were mostly offset by an increase in the provision for credit losses at Cat Financial and an increase in selling, general and administrative (SG&A) expenses due to higher short-term incentive compensation expense.

At the end of the third quarter of 2017, past dues at Cat Financial were 2.73 percent, compared with 2.77 percent at the end of the third quarter of 2016. Write-offs, net of recoveries, were $47 million for the third quarter of 2017, compared with $29 million for the third quarter of 2016. The increase in write-offs, net of recoveries, was primarily due to the Latin America and marine portfolios.

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As of September 30, 2017, Cat Financial's allowance for credit losses totaled $343 million, or 1.27 percent of finance receivables, compared with $346 million, or 1.28 percent of finance receivables as of September 30, 2016. The allowance for credit losses at year-end 2016 was $343 million, or 1.29 percent of finance receivables.

Corporate Items and Eliminations

Expense for corporate items and eliminations was $396 million in the third quarter of 2017, a decrease of $49 million from the third quarter of 2016. Corporate items and eliminations include: restructuring costs; corporate-level expenses; timing differences, as some expenses are reported in segment profit on a cash basis; retirement benefit costs other than service cost; currency differences for ME&T, as segment profit is reported using annual fixed exchange rates; cost of sales methodology differences, as segments use a current cost methodology; and inter-segment eliminations.

The decrease in expense from the third quarter of 2016 was primarily due to lower restructuring costs, partially offset by methodology differences and higher short-term incentive compensation expense.

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NINE MONTHS ENDED SEPTEMBER 30, 2017 COMPARED WITH NINE MONTHS ENDED SEPTEMBER 30, 2016

CONSOLIDATED SALES AND REVENUES

The chart above graphically illustrates reasons for the change in Consolidated Sales and Revenues between the nine months ended September 30, 2016 (at left) and the nine months ended September 30, 2017 (at right). Items favorably impacting sales and revenues appear as upward stair steps with the corresponding dollar amounts above each bar, while items negatively impacting sales and revenues appear as downward stair steps with dollar amounts reflected in parentheses above each bar. Caterpillar management utilizes these charts internally to visually communicate with the company's board of directors and employees.

Total sales and revenues were $32.566 billion in the nine months ended September 30, 2017, an increase of $3.603 billion, or 12 percent, compared with $28.963 billion in the nine months ended September 30, 2016. The increase was primarily due to higher sales volume, with the largest increase in Construction Industries mostly due to higher end-user demand for construction equipment. Resource Industries sales volume increased due to the favorable impact of changes in dealer inventories and improved end-user demand for aftermarket parts. Energy & Transportation’s sales volume was higher mostly due to increased demand for aftermarket parts for reciprocating engines. Favorable price realization in Construction Industries also contributed to the sales improvement while price realization in Resource Industries and Energy & Transportation was about flat. Financial Products’ revenues were about flat.

Sales increased in all regions. In North America, sales increased 11 percent primarily due to higher demand in Energy & Transportation for oil and gas applications, favorable price realization in Construction Industries, and increased sales of aftermarket parts in Resource Industries. Asia/Pacific sales increased 23 percent primarily due to an increase in construction equipment sales, mostly in China resulting from increased building construction and infrastructure investment. EAME sales increased 9 percent mostly due to the favorable change in dealer inventories as dealers increased inventories in the nine months ended September 30, 2017, compared to a decrease in the nine months ended September 30, 2016. Sales increased 19 percent in Latin America primarily due to stabilizing economic conditions in several countries in the region that resulted in improved end-user demand for aftermarket parts and the favorable impact of changes in dealer inventories as inventories were about flat in the nine months ended September 30, 2017, compared to a decrease in the nine months ended September 30, 2016.

Dealer machine and engine inventories increased about $100 million in the nine months ended September 30, 2017, compared to a decrease of $800 million during the nine months ended September 30, 2016. Dealers are independent, and there could be many reasons for changes in their inventory levels, including their expectations of future demand and product delivery times. Dealers’ demand expectations take into account seasonal changes, macroeconomic conditions, machine rental rates and other factors. Delivery times can vary based on availability of product from Caterpillar factories and product distribution centers. We believe the level of dealer inventories at the end of 2017 will depend on dealer expectations for business in 2018.

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CONSOLIDATED OPERATING PROFIT

The chart above graphically illustrates reasons for the change in Consolidated Operating Profit between the nine months ended September 30, 2016 (at left) and the nine months ended September 30, 2017 (at right). Items favorably impacting operating profit appear as upward stair steps with the corresponding dollar amounts above each bar, while items negatively impacting operating profit appear as downward stair steps with dollar amounts reflected in parentheses above each bar. Caterpillar management utilizes these charts internally to visually communicate with the company's board of directors and employees. The bar entitled Other includes consolidating adjustments and Machinery, Energy & Transportation other operating (income) expenses.

Operating profit for the nine months ended September 30, 2017, was $3.245 billion, compared with $1.760 billion for the nine months ended September 30, 2016. The increase of $1.485 billion was primarily due to higher sales volume, including a favorable mix of products. Improved price realization and lower variable manufacturing costs were mostly offset by higher period costs and restructuring costs. Price realization was favorable in Construction Industries and about flat in Resource Industries and Energy & Transportation.

Variable manufacturing costs were lower primarily due to the favorable impact from cost absorption. Cost absorption was favorable as inventory increased during the nine months ended September 30, 2017, and was about flat during the nine months ended September 30, 2016. We expect material costs to be higher during the remainder of 2017 and into 2018, primarily due to anticipated increases in costs for steel.

Period costs increased primarily due to higher short-term incentive compensation expense, partially offset by the favorable impact of restructuring and cost reduction actions over the past year. These actions primarily impacted depreciation expense and research and development (R&D) expenses. During the remainder of 2017, we anticipate higher period costs due to making targeted investments in initiatives that are important to our future competitiveness, including enhanced digital capabilities and accelerating technology updates to our products.

Restructuring costs of $1.011 billion for the nine months ended September 30, 2017, were primarily related to the closure of the facility in Gosselies, Belgium and restructuring actions in Resource Industries, compared to $624 million for the nine months ended September 30, 2016.

Short-term incentive compensation expense is directly related to financial and operational performance, measured against targets set annually. Expense for the nine months ended September 30, 2017, was about $1.050 billion compared to about $200 million for the nine months ended September 30, 2016. We expect that short-term incentive compensation expense will be significantly higher in 2017 than in 2016 and above targeted levels.

Other Profit/Loss Items

Other income/expense for the nine months ended September 30, 2017, was income of $88 million, compared with income of $112 million for the nine months ended September 30, 2016. The unfavorable change was primarily a result of currency translation and hedging net losses during the nine months ended September 30, 2017, which were mostly due to the euro and Brazilian real. The impact from currency translation and hedging was about flat during the nine months ended September 30, 2016. The unfavorable change was partially offset by a pretax gain of $85 million on the

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sale of Caterpillar's equity investment in IronPlanet and gains on the sale of securities during the nine months ended September 30, 2017.

The provision for income taxes for the first nine months of 2017 reflects an estimated annual tax rate of 32 percent, which excludes the discrete items discussed in the following paragraph, compared with 25 percent for the first nine months of 2016. The increase is primarily due to higher non-U.S. restructuring costs in 2017 that are taxed at relatively lower non-U.S. tax rates along with other changes in the geographic mix of profits from a tax perspective. Under the terms of a manufacturing service agreement, Caterpillar SARL (CSARL) will bear substantially all of the restructuring costs related to the closure of our Gosselies, Belgium, facility, reducing CSARL's profits taxable in Switzerland.

In addition, during the first nine months of 2017, a discrete tax benefit of $45 million was recorded for the settlement of stock-based compensation awards with associated tax deductions in excess of cumulative U.S. GAAP compensation expense. This benefit was partially offset by a $15 million increase to prior year taxes related to the Gosselies, Belgium, facility, restructuring costs.

Excluding restructuring costs, gain on the sale of Caterpillar's equity investment and discrete items, the 2017 estimated annual tax rate is expected to be 29 percent.

Segment Information

Sales and Revenues by Geographic Region

(Millions of dollars)	Total	% Change	North America	% Change	Latin America	% Change	EAME	% Change	Asia/ Pacific	% Change
Nine Months Ended September 30, 2017										
Construction Industries [1]	$13,875	15 %	$6,396	7 %	$1,004	26 %	$2,784	5 %	$3,691	41 %
Resource Industries [2]	5,299	24 %	1,791	12 %	897	15 %	1,300	47 %	1,311	28 %
Energy & Transportation [3]	11,258	7 %	5,632	14 %	887	17 %	3,145	— %	1,594	(7)%
All Other Segments [4]	126	18 %	48	37 %	2	(33)%	40	74 %	36	(22)%
Corporate Items and Eliminations	(76)		(70)		(1)		(6)		1	
Machinery, Energy & Transportation Sales	30,482	13 %	13,797	11 %	2,789	19 %	7,263	9 %	6,633	23 %
Financial Products Segment	2,310	3 %	1,501	7 %	226	(11)%	311	3 %	272	(9)%
Corporate Items and Eliminations	(226)		(140)		(34)		(13)		(39)	
Financial Products Revenues	2,084	— %	1,361	5 %	192	(12)%	298	3 %	233	(13)%
Consolidated Sales and Revenues	$32,566	12 %	$15,158	10 %	$2,981	17 %	$7,561	8 %	$6,866	21 %
Nine Months Ended September 30, 2016										
Construction Industries [1]	$12,023		$5,960		$795		$2,646		$2,622	
Resource Industries [2]	4,283		1,597		780		882		1,024	
Energy & Transportation [3]	10,562		4,958		757		3,138		1,709	
All Other Segments [4]	107		35		3		23		46	
Corporate Items and Eliminations	(87)		(75)		(1)		(7)		(4)	
Machinery, Energy & Transportation Sales	26,888		12,475		2,334		6,682		5,397	

Financial Products Segment	2,251	1,398	253	302	298
Corporate Items and Eliminations	(176)	(96)	(36)	(13)	(31)
Financial Products Revenues	2,075	1,302	217	289	267
Consolidated Sales and Revenues	$28,963	$13,777	$2,551	$6,971	$5,664

1 Does not include inter-segment sales of $70 million and $47 million for the nine months ended September 30, 2017 and 2016, respectively.

2 Does not include inter-segment sales of $254 million and $197 million for the nine months ended September 30, 2017 and 2016, respectively.

3 Does not include inter-segment sales of $2,484 million and $1,919 million for the nine months ended September 30, 2017 and 2016, respectively.

4 Does not include inter-segment sales of $289 million and $288 million for the nine months ended September 30, 2017 and 2016, respectively.

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Sales and Revenues by Segment

(Millions of dollars)	Nine Months Ended September 30, 2016	Sales Volume	Price Realization	Currency	Other	Nine Months Ended September 30, 2017	$ Change	% Change
Construction Industries	$ 12,023	$ 1,308	$ 605	$ (61)	$ —	$ 13,875	$ 1,852	15 %
Resource Industries	4,283	969	34	13	—	5,299	1,016	24 %
Energy & Transportation	10,562	748	(25)	(27)	—	11,258	696	7 %
All Other Segments	107	19	—	—	—	126	19	18 %
Corporate Items and Eliminations	(87)	11	—	—	—	(76)	11	
Machinery, Energy & Transportation Sales	26,888	3,055	614	(75)	—	30,482	3,594	13 %
Financial Products Segment	2,251	—	—	—	59	2,310	59	3 %
Corporate Items and Eliminations	(176)	—	—	—	(50)	(226)	(50)	
Financial Products Revenues	2,075	—	—	—	9	2,084	9	— %
Consolidated Sales and Revenues	$ 28,963	$ 3,055	$ 614	$ (75)	$ 9	$ 32,566	$ 3,603	12 %

Operating Profit / (Loss) by Segment

(Millions of dollars)	Nine Months Ended September 30, 2017	Nine Months Ended September 30, 2016	$ Change	% Change
Construction Industries	$ 2,420	$ 1,316	$ 1,104	84 %
Resource Industries	481	(336)	817	n/a
Energy & Transportation	2,002	1,584	418	26 %
All Other Segments	(27)	(43)	16	(37)%
Corporate Items and Eliminations	(1,915)	(1,087)	(828)	
Machinery, Energy & Transportation	2,961	1,434	1,527	106 %
Financial Products Segment	559	553	6	1 %
Corporate Items and Eliminations	(39)	(44)	5	
Financial Products	520	509	11	2 %
Consolidating Adjustments	(236)	(183)	(53)	
Consolidated Operating Profit / (Loss)	$ 3,245	$ 1,760	$ 1,485	84 %

Construction Industries

Construction Industries' sales were $13.875 billion in the nine months ended September 30, 2017, compared with $12.023 billion in the nine months ended September 30, 2016. The increase was due to higher sales volume and favorable price realization.

- Sales volume increased due to higher end-user demand, primarily for equipment in Asia/Pacific.
- Although market conditions remain competitive, price realization was favorable due to a particularly weak pricing environment in the nine months ended September 30, 2016, and previously implemented price increases impacting the nine months ended September 30, 2017.

Sales increased across all regions with the largest increases in Asia/Pacific and North America.

- Sales in Asia/Pacific were higher as a result of an increase in end-user demand, primarily in China, stemming from increased building construction and infrastructure investment, which we expect to continue through the end of 2017. We believe that some demand may have been pulled forward into 2017 in advance of upcoming regulatory actions in China, which would have a negative impact for end-user demand in 2018.
- In North America, sales increased primarily due to favorable price realization and higher end-user demand for construction equipment, mostly due to improved oil and gas, residential and nonresidential construction activities.
- Although construction activity remained weak in Latin America, sales were higher as end-user demand increased from low levels due to stabilizing economic conditions in several countries in the region.

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- Sales in EAME increased slightly as lower end-user demand was about offset by favorable price realization. The decline in end-user demand was primarily in Africa/Middle East due to volatile financial and economic conditions, as well as continued tight construction spending in oil producing countries.

Construction Industries' profit was $2.420 billion in the nine months ended September 30, 2017, compared with $1.316 billion in the nine months ended September 30, 2016. The increase in profit was primarily due to favorable price realization and higher sales volume, including a favorable mix of products. Period costs were unfavorable as higher short-term incentive compensation expense was partially offset by the impact of restructuring and cost reduction actions.

Resource Industries

Resource Industries' sales were $5.299 billion in the nine months ended September 30, 2017, an increase of $1.016 billion, or 24 percent, from the nine months ended September 30, 2016. Sales increased due to the favorable impact of changes in dealer inventories and higher end-user demand for aftermarket parts. Dealer inventories were about flat in the nine months ended September 30, 2017, compared with a decrease in the nine months ended September 30, 2016. We believe that mining companies are beginning to increase capital spending from low levels and this is expected to favorably impact sales for new equipment during the remainder of the year. Increases in certain commodity prices over the past year, along with continued commodity consumption, have resulted in increased mining activity and maintenance and rebuild activities, which is a positive for aftermarket parts sales. We believe a decrease in idle mining trucks on customer sites is also having a positive impact on end-user demand.

Resource Industries' profit was $481 million in the nine months ended September 30, 2017, compared with a loss of $336 million in the nine months ended September 30, 2016. The favorable change was due to higher sales volume and lower period costs and variable manufacturing costs. Period costs were lower primarily due to the favorable impact of restructuring and cost reduction actions, partially offset by an increase in short-term incentive compensation expense. Variable manufacturing costs were lower primarily due to a favorable impact from cost absorption and efficiencies. Cost absorption was favorable as inventory increased in the nine months ended September 30, 2017, to support higher production volumes and decreased in the nine months ended September 30, 2016.

Energy & Transportation

Energy & Transportation's sales were $11.258 billion in the nine months ended September 30, 2017, compared with $10.562 billion in the nine months ended September 30, 2016. The increase was primarily due to higher sales of aftermarket parts for reciprocating engines.

- Oil and Gas - Sales increased in North America due to higher sales of aftermarket parts as a result of strong rebuild activity in well servicing and gas compression applications and due to higher demand for reciprocating engines used in gas compression as natural gas infrastructure build-out continues and new wells come online that have higher concentration of natural gas than previous wells. This was partially offset by a decrease in sales of equipment in EAME due to the absence of several large gas compression projects, and a decrease in equipment sales in Asia/Pacific primarily for production applications. Sales for equipment used in gas compression applications in North America are expected to be higher during the remainder of 2017.
- Industrial - Sales were higher in all regions, reflecting increased sales for equipment across end-user applications and aftermarket parts. Sales for equipment used in industrial compression applications is expected to be higher during the remainder of 2017 as many industrial end-markets are experiencing improved conditions.
- Power Generation - Sales were about flat as an increase in North America was about offset by a decrease in EAME.
- Transportation - Sales were about flat as an increase in sales for rail services in North America due to higher rail traffic was partially offset by a decline in sales for marine applications attributable primarily to lower demand for work boats and offshore vessels. We believe higher rail traffic will result in increased demand for rail services during the remainder of 2017.

Energy & Transportation's profit was $2.002 billion in the nine months ended September 30, 2017, compared with $1.584 billion in the nine months ended September 30, 2016. The increase was primarily due to higher sales volume and lower variable manufacturing costs, partially offset by higher period costs. Variable manufacturing costs were lower primarily due to a favorable impact from cost absorption. Cost absorption was favorable as inventory increased in the nine months ended September 30, 2017, and was about flat in the nine months ended September 30, 2016. The

increase in period costs was primarily due to higher short-term incentive compensation expense.

Financial Products Segment

Financial Products' segment revenues were $2.310 billion for the nine months ended September 30, 2017, an increase of $59 million, or 3 percent, from the nine months ended September 30, 2016. The increase was primarily due to higher average financing rates in North America and a favorable impact from intercompany lending activity in North America. These favorable impacts

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were partially offset by lower average earning assets in North America, Latin America and Asia/Pacific and lower average financing rates in Asia/Pacific.

Financial Products' segment profit was $559 million for the nine months ended September 30, 2017, compared with $553 million for the nine months ended September 30, 2016. The increase was primarily due to increased intercompany lending activity, an increase in net yield on average earning assets and a decrease in the provision for credit losses at Cat Financial. These favorable impacts were mostly offset by an increase in SG&A expenses due to higher short-term incentive compensation expense and an unfavorable impact from lower average earning assets.

Corporate Items and Eliminations

Expense for corporate items and eliminations was $1.954 billion in the nine months ended September 30, 2017, an increase of $823 million from the nine months ended September 30, 2016. Corporate items and eliminations include: restructuring costs; corporate-level expenses; timing differences, as some expenses are reported in segment profit on a cash basis; retirement benefit costs other than service cost; currency differences for ME&T, as segment profit is reported using annual fixed exchange rates; cost of sales methodology differences, as segments use a current cost methodology; and inter-segment eliminations.

The increase in expense from the nine months ended September 30, 2016, was primarily due to a $387 million increase in restructuring costs and unfavorable changes for timing and methodology differences.

RESTRUCTURING COSTS

Restructuring costs for the three and nine months ended September 30, 2017 and 2016 were as follows:

(Millions of dollars)	Three Months Ended September 30	
	2017	2016
Employee separations [1]	$8	$99
Contract terminations [1]	6	9
Long-lived asset impairments [1]	31	158
Other [2]	45	58
Total restructuring costs	$90	$324

	Nine Months Ended September 30	
	2017	2016
Employee separations [1]	$514	$175
Contract terminations [1]	32	55
Long-lived asset impairments [1]	306	254
Defined benefit plan curtailments and termination benefits [1]	29	—
Other [2]	130	140
Total restructuring costs	$1,011	$624

[1] Recognized in Other operating (income) expenses.

[2] Represents costs related to our restructuring programs, primarily for accelerated depreciation, inventory write-downs, equipment relocation and project management costs and also LIFO inventory decrement benefits from inventory liquidations at closed facilities (all of which are primarily included in Cost of goods sold).

In March 2017, Caterpillar informed Belgian authorities of the decision to proceed to a collective dismissal, which will lead to the closure of the Gosselies site, impacting about 2,000 employees. Production of Caterpillar products at the Gosselies site ended during the second quarter of 2017. The other operations and functions at the Gosselies site are expected to be gradually phased out by the end of the second quarter of 2018. We estimate restructuring costs incurred under this program to be about $700 million. For the first nine months of 2017, we recognized $649 million of restructuring costs which included $443 million of employee separation costs, $201 million for long-lived asset impairments and $67 million of other costs partially offset by a $62 million

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LIFO inventory decrement benefit. The majority of the remaining costs are expected to be recognized in 2017. The remaining restructuring costs for the first nine months of 2017 were primarily related to restructuring actions in Resources Industries.

The restructuring costs for the first nine months of 2016 were primarily related to actions in Resource Industries in response to continued weakness in the mining industry. In addition, costs resulted from our decision to discontinue production of on-highway vocational trucks, as discussed below, and other restructuring actions across the company.

Restructuring costs are a reconciling item between Segment profit and Consolidated profit before taxes.

The following table summarizes the 2016 and 2017 employee separation activity:

(Millions of dollars)	
Liability balance at December 31, 2015	$483
Increase in liability (separation charges)	297
Reduction in liability (payments)	(633)
Liability balance at December 31, 2016	$147
Increase in liability (separation charges)	514
Reduction in liability (payments)	(339)
Liability balance at September 30, 2017	$322

Most of the liability balance at September 30, 2017 is expected to be paid in 2017 and 2018 and primarily includes employee separation payments related to closure of the Gosselies facility.

Restructuring costs for the year ended December 31, 2016 were $1,019 million. Throughout 2016, we initiated the following restructuring plans:

- In February 2016, we made the decision to discontinue production of on-highway vocational trucks. Based on the business climate in the truck industry and a thorough evaluation of the business, the company decided it would withdraw from this market. We recognized $104 million of restructuring costs, primarily related to long-lived asset impairments and sales discounts which is substantially all the costs expected under this program.
- In the second half of 2016, we took additional restructuring actions in Resource Industries, including ending the production of track drills; pursuing strategic alternatives related to room and pillar products; consolidation of two product development divisions; and additional actions in response to ongoing weakness in the mining industry. For the year ended December 31, 2016, we incurred $369 million of restructuring costs for these plans primarily related to long-lived asset impairments, employee separation costs and inventory write-downs.
- In September 2015, we announced a large scale restructuring plan (the Plan) including a voluntary retirement enhancement program for qualifying U.S. employees, several voluntary separation programs outside of the U.S., additional involuntary programs throughout the company and manufacturing facility consolidations and closures expected to occur through 2018. The largest action among those included in the Plan was related to our European manufacturing footprint, which led to the Gosselies facility closure as discussed above. In the first nine months of 2017, we incurred $772 million of restructuring costs related to the Plan, and we incurred $281 million and $569

million in 2016 and 2015, respectively, for a total of $1,622 million through September 30, 2017. We expect to recognize approximately $70 million of additional restructuring costs related to the Plan in 2017.

We expect 2017 restructuring costs will be approximately $1.3 billion, slightly higher than the previous estimate of about $1.2 billion. We expect that restructuring actions will result in a benefit to operating costs, primarily SG&A expenses and Cost of goods sold of about $450 million in 2017 compared with 2016.

GLOSSARY OF TERMS

1. Adjusted Profit Per Share - Profit per share excluding restructuring costs for 2017 and 2016. For 2017, adjusted profit per share also excludes a gain on the sale of an equity investment in IronPlanet recognized in the second quarter.
2. All Other Segments - Primarily includes activities such as: business strategy, product management and development, and manufacturing of filters and fluids, undercarriage, tires and rims, ground engaging tools, fluid transfer products, precision seals, and rubber sealing and connecting components primarily for Cat® products; parts distribution; distribution services responsible for dealer development and administration including a wholly owned dealer in Japan, dealer portfolio management

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and ensuring the most efficient and effective distribution of machines, engines and parts; digital investments for new customer and dealer solutions that integrate data analytics with state-of-the-art digital technologies while transforming the buying experience.

3. Consolidating Adjustments - Elimination of transactions between Machinery, Energy & Transportation and Financial Products.

Construction Industries - A segment primarily responsible for supporting customers using machinery in infrastructure, forestry and building construction applications. Responsibilities include business strategy, product design, product management and development, manufacturing, marketing and sales and product support. The

4. product portfolio includes backhoe loaders, small wheel loaders, small track-type tractors, skid steer loaders, compact track loaders, multi-terrain loaders, mini excavators, compact wheel loaders, telehandlers, select work tools, small, medium and large track excavators, wheel excavators, medium wheel loaders, medium track-type tractors, track-type loaders, motor graders, pipelayers, forestry and paving products and related parts.

Currency - With respect to sales and revenues, currency represents the translation impact on sales resulting from changes in foreign currency exchange rates versus the U.S. dollar. With respect to operating profit, currency represents the net translation impact on sales and operating costs resulting from changes in foreign currency exchange rates versus the U.S. dollar. Currency only includes the impact on sales and operating profit for the

5. Machinery, Energy & Transportation lines of business excluding restructuring costs; currency impacts on Financial Products' revenues and operating profit are included in the Financial Products' portions of the respective analyses. With respect to other income/expense, currency represents the effects of forward and option contracts entered into by the company to reduce the risk of fluctuations in exchange rates (hedging) and the net effect of changes in foreign currency exchange rates on our foreign currency assets and liabilities for consolidated results (translation).

Debt-to-Capital Ratio - A key measure of Machinery, Energy & Transportation's financial strength used by management. The metric is defined as Machinery, Energy & Transportation's short-term borrowings, long-term debt

6. due within one year and long-term debt due after one year (debt) divided by the sum of Machinery, Energy & Transportation's debt and shareholders' equity. Debt also includes Machinery, Energy & Transportation's long-term borrowings from Financial Products.

7. EAME - A geographic region including Europe, Africa, the Middle East and the Commonwealth of Independent States (CIS).

8. Earning Assets - Assets consisting primarily of total finance receivables net of unearned income, plus equipment on operating leases, less accumulated depreciation at Cat Financial.

Energy & Transportation - A segment primarily responsible for supporting customers using reciprocating engines, turbines, diesel-electric locomotives and related parts across industries serving power generation, industrial, oil and gas and transportation applications, including marine and rail-related businesses. Responsibilities include business strategy, product design, product management and development, manufacturing, marketing and sales and product support of turbines and turbine-related services, reciprocating engine-powered generator sets, integrated systems

9. used in the electric power generation industry, reciprocating engines and integrated systems and solutions for the marine and oil and gas industries; reciprocating engines supplied to the industrial industry as well as Cat machinery; the remanufacturing of Cat engines and components and remanufacturing services for other companies; the business strategy, product design, product management and development, manufacturing, remanufacturing, leasing and service of diesel-electric locomotives and components and other rail-related products and services and product support of on-highway vocational trucks for North America.

10. Financial Products Segment - Provides financing alternatives to customers and dealers around the world for Caterpillar products, as well as financing for vehicles, power generation facilities and marine vessels that, in most cases, incorporate Caterpillar products. Financing plans include operating and finance leases, installment sale contracts, working capital loans and wholesale financing plans. The segment also provides insurance and risk management products and services that help customers and dealers manage their business risk. Insurance and risk management products offered include physical damage insurance, inventory protection plans, extended service coverage for machines and engines, and dealer property and casualty insurance. The various forms of financing, insurance and risk management products offered to customers and dealers help support the purchase and lease of

our equipment. Financial Products segment profit is determined on a pretax basis and includes other income/expense items.

11. Latin America - A geographic region including Central and South American countries and Mexico.

12. LIFO Inventory Decrement Benefits - A significant portion of Caterpillar's inventory is valued using the last-in, first-out (LIFO) method. With this method, the cost of inventory is comprised of "layers" at cost levels for years when inventory increases occurred. A LIFO decrement occurs when inventory decreases, depleting layers added in earlier, generally lower cost years. A LIFO decrement benefit represents the impact on operating profit of charging cost of goods sold with prior-year cost levels rather than current period costs.

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13. Machinery, Energy & Transportation (ME&T) - Represents the aggregate total of Construction Industries, Resource Industries, Energy & Transportation and All Other Segments and related corporate items and eliminations.

14. Machinery, Energy & Transportation Other Operating (Income) Expenses - Comprised primarily of gains/losses on disposal of long-lived assets, gains/losses on divestitures and legal settlements and accruals. Restructuring costs classified as other operating expenses on the Results of Operations are presented separately on the Operating Profit Comparison.

15. Period Costs - Includes period manufacturing costs, ME&T selling, general and administrative (SG&A) and research and development (R&D) expenses excluding the impact of currency and exit-related costs that are included in restructuring costs (see definition below). Period manufacturing costs support production but are defined as generally not having a direct relationship to short-term changes in volume. Examples include machinery and equipment repair, depreciation on manufacturing assets, facility support, procurement, factory scheduling, manufacturing planning and operations management. SG&A and R&D costs are not linked to the production of goods or services and include marketing, legal and finance services and the development of new and significant improvements in products or processes.

16. Price Realization - The impact of net price changes excluding currency and new product introductions. Price realization includes geographic mix of sales, which is the impact of changes in the relative weighting of sales prices between geographic regions.

17. Resource Industries - A segment primarily responsible for supporting customers using machinery in mining, quarry, waste and material handling applications. Responsibilities include business strategy, product design, product management and development, manufacturing, marketing and sales and product support. The product portfolio includes large track-type tractors, large mining trucks, hard rock vehicles, longwall miners, electric rope shovels, draglines, hydraulic shovels, track and rotary drills, highwall miners, large wheel loaders, off-highway trucks, articulated trucks, wheel tractor scrapers, wheel dozers, landfill compactors, soil compactors, material handlers, continuous miners, scoops and haulers, hardrock continuous mining systems, select work tools, machinery components, electronics and control systems and related parts. In addition to equipment, Resource Industries also develops and sells technology products and services to provide customers fleet management, equipment management analytics and autonomous machine capabilities. Resource Industries also manages areas that provide services to other parts of the company, including integrated manufacturing and research and development.

18. Restructuring Costs - Primarily costs for employee separation, long-lived asset impairments and contract terminations. These costs are included in Other Operating (Income) Expenses. Restructuring costs also include other exit-related costs primarily for accelerated depreciation, inventory write-downs, equipment relocation and project management costs and also LIFO inventory decrement benefits from inventory liquidations at closed facilities (all of which are primarily included in Cost of goods sold).

19. Sales Volume - With respect to sales and revenues, sales volume represents the impact of changes in the quantities sold for Machinery, Energy & Transportation as well as the incremental revenue impact of new product introductions, including emissions-related product updates. With respect to operating profit, sales volume represents the impact of changes in the quantities sold for Machinery, Energy & Transportation combined with product mix as well as the net operating profit impact of new product introductions, including emissions-related product updates. Product mix represents the net operating profit impact of changes in the relative weighting of Machinery, Energy & Transportation sales with respect to total sales. The impact of sales volume on segment profit includes inter-segment sales.

20. Variable Manufacturing Costs - Represents volume-adjusted costs excluding the impact of currency and restructuring costs (see definition above). Variable manufacturing costs are defined as having a direct relationship with the volume of production. This includes material costs, direct labor and other costs that vary directly with production volume such as freight, power to operate machines and supplies that are consumed in the manufacturing process.

LIQUIDITY AND CAPITAL RESOURCES

Sources of funds

We generate significant capital resources from operating activities, which are the primary source of funding for our ME&T operations. Funding for these businesses is also available from commercial paper and long-term debt issuances. Financial Products' operations are funded primarily from commercial paper, term debt issuances and collections from its existing portfolio. During the first nine months of 2017, we experienced favorable liquidity conditions globally in both our ME&T and Financial Products' operations. On a consolidated basis, we ended the first nine months of 2017 with $9.59 billion of cash, an increase of $2.42 billion from year-end 2016. We intend to maintain a strong cash and liquidity position.

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Our cash balances are held in numerous locations throughout the world with approximately $8.8 billion held by our non-U.S. subsidiaries. If non-U.S. earnings were repatriated in excess of the amount previously taxed in the United States, U.S. tax would generally be payable net of any available foreign tax credits.

Consolidated operating cash flow for the first nine months of 2017 was $5.16 billion, up from $3.98 billion for the same period last year. The increase was primarily due to higher profit adjusted for non-cash expenses, including restructuring costs and short-term incentive compensation expense, in the first nine months of 2017, compared with the first nine months of 2016. In the first nine months of 2017 restructuring costs were primarily for severance costs that have not yet been paid and for non-cash charges. In addition, there were lower severance and short-term incentive compensation payments in the first nine months of 2017 versus the first nine months of 2016. Partially offsetting these items was an unfavorable impact from working capital, primarily due to a decrease in working capital during the first nine months of 2016. See further discussion of operating cash flow under ME&T and Financial Products.

Total debt as of September 30, 2017 was $35.92 billion, a decrease of $859 million from year-end 2016. Debt related to Financial Products decreased $543 million. Debt related to ME&T decreased $316 million in the first nine months of 2017. This decrease was due to the maturity of a long-term debt issuance and lower commercial paper borrowings compared to year-end 2016 partially offset by a financing transaction in Japan in 2017. On October 10, 2017, we called for redemption of all $900 million in aggregate principal amount of our outstanding 7.90% senior notes due in December 2018, payable in cash. The redemption date will be November 10, 2017.

We have three global credit facilities with a syndicate of banks totaling $10.50 billion (Credit Facility) available in the aggregate to both Caterpillar and Cat Financial for general liquidity purposes. Based on management's allocation decision, which can be revised from time to time, the portion of the Credit Facility available to ME&T as of September 30, 2017 was $2.75 billion. Information on our Credit Facility is as follows:

- In September 2017, we entered into a new 364-day facility. The 364-day facility of $3.15 billion (of which $0.82 billion is available to ME&T) expires in September 2018.
- In September 2017, we amended and extended the three-year facility. The three-year facility of $2.73 billion (of which $0.72 billion is available to ME&T) expires in September 2020.
- In September 2017, we amended and extended the five-year facility. The five-year facility of $4.62 billion (of which $1.21 billion is available to ME&T) expires in September 2022.

At September 30, 2017, Caterpillar's consolidated net worth was $15.69 billion, which was above the $9.00 billion required under the Credit Facility. The consolidated net worth is defined as the consolidated shareholders' equity including preferred stock but excluding the pension and other postretirement benefits balance within Accumulated other comprehensive income (loss).

At September 30, 2017, Cat Financial's covenant interest coverage ratio was 1.88 to 1. This is above the 1.15 to 1 minimum ratio calculated as (1) profit excluding income taxes, interest expense and net gain/(loss) from interest rate derivatives to (2) interest expense calculated at the end of each calendar quarter for the rolling four quarter period then most recently ended, required by the Credit Facility.

In addition, at September 30, 2017, Cat Financial's covenant leverage ratio was 7.20 to 1. This is below the maximum ratio of debt to net worth of 10 to 1, calculated (1) on a monthly basis as the average of the leverage ratios determined on the last day of each of the six preceding calendar months and (2) at each December 31, required by the Credit Facility.

In the event Caterpillar or Cat Financial does not meet one or more of their respective financial covenants under the Credit Facility in the future (and are unable to obtain a consent or waiver), the syndicate of banks may terminate the commitments allocated to the party that does not meet its covenants. Additionally, in such event, certain of Cat Financial's other lenders under other loan agreements where similar financial covenants or cross default provisions are applicable, may, at their election, choose to pursue remedies under those loan agreements, including accelerating the repayment of outstanding borrowings. At September 30, 2017, there were no borrowings under the Credit Facility.

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Our total credit commitments and available credit as of September 30, 2017 were:

	September 30, 2017		
(Millions of dollars)	Consolidated	Machinery, Energy & Transportation	Financial Products
Credit lines available:			
Global credit facilities	$10,500	$ 2,750	$ 7,750
Other external	4,597	11	4,586
Total credit lines available	15,097	2,761	12,336
Less: Commercial paper outstanding	(4,227)	—	(4,227)
Less: Utilized credit	(1,567)	(11)	(1,556)
Available credit	$9,303	$ 2,750	$ 6,553

The other external consolidated credit lines with banks as of September 30, 2017 totaled $4.60 billion. These committed and uncommitted credit lines, which may be eligible for renewal at various future dates or have no specified expiration date, are used primarily by our subsidiaries for local funding requirements. Caterpillar or Cat Financial may guarantee subsidiary borrowings under these lines.

We receive debt ratings from the major rating agencies. In December 2016, Moody's Investors Service downgraded our long-term ratings to A3 from A2, and short-term ratings to Prime-2 from Prime-1. The Moody's downgrade did not have a material impact on our borrowing costs or our overall financial health. A further downgrade of our credit ratings by Moody's or one of the other major credit rating agencies would result in increased borrowing costs and could make access to certain credit markets more difficult. However, our long-term ratings with Fitch and S&P continue to be "mid-A". In the event economic conditions deteriorate such that access to debt markets becomes unavailable, ME&T's operations would rely on cash flow from operations, use of existing cash balances, borrowings from Cat Financial and access to our Credit Facility. Our Financial Products' operations would rely on cash flow from its existing portfolio, existing cash balances, access to our Credit Facility and other credit line facilities of Cat Financial and potential borrowings from Caterpillar. In addition, we maintain a support agreement with Cat Financial, which requires Caterpillar to remain the sole owner of Cat Financial and may, under certain circumstances, require Caterpillar to make payments to Cat Financial should Cat Financial fail to maintain certain financial ratios.

Machinery, Energy & Transportation

Net cash provided by operating activities was $4.16 billion in the first nine months of 2017, compared with $1.80 billion for the same period in 2016. The increase was primarily due to higher profit adjusted for non-cash expenses, including restructuring costs and short-term incentive compensation expense, in the first nine months of 2017, compared with the first nine months of 2016. In the first nine months of 2017, restructuring costs were primarily for severance costs that have not yet been paid and for non-cash charges. In addition, there were lower severance and short-term incentive compensation payments in the first nine months of 2017 versus the first nine months of 2016. Partially offsetting these items was an unfavorable impact from working capital, primarily due to a decrease in working capital during the first nine months of 2016.

Net cash used for investing activities in the first nine months of 2017 was $333 million, compared with net cash used of $1.54 billion in the first nine months of 2016. The change was primarily due to the absence of ME&T lending activity with Financial Products that occurred in the first nine months of 2016.

Net cash used for financing activities during the first nine months of 2017 was $361 million, compared with $676 million in the same period of 2016. Higher proceeds received from common stock issued from stock options exercised and proceeds received related to a financing transaction in Japan in 2017 were offset by lower commercial paper borrowings in 2017 as compared to 2016.

Although our short-term priorities for the use of cash may vary from time to time as business needs and conditions dictate, our long-term cash deployment strategy remains unchanged: maintain a strong financial position in support of our credit rating, provide capital to support growth, appropriately fund employee benefit plans, pay dividends and

repurchase common stock.

Strong financial position – A key measure of ME&T's financial strength used by management is ME&T's debt-to-capital ratio. Debt-to-capital is defined as short-term borrowings, long-term debt due within one year and long-term debt due after one year (debt) divided by the sum of debt and shareholders' equity. Debt also includes ME&T's long-term borrowings from Financial Products. The debt-to-capital ratio for ME&T was 36.1 percent at September 30, 2017, within our target range of 30 to 45 percent. ME&T's debt-to-capital ratio was 41.0 percent at December 31, 2016. The decrease in the debt-to-capital ratio was driven by an increase in equity, which was primarily due to higher profit employed in the business and favorable foreign currency translation adjustments, and a decrease in debt.

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Capital to support growth – Capital expenditures were $574 million during the first nine months of 2017, compared to $858 million for the same period in 2016. We expect ME&T's capital expenditures in 2017 to be about the same as 2016.

Appropriately funded employee benefit plans – We made $324 million and $522 million of contributions to our pension and other postretirement benefit plans during the three and nine months ended September 30, 2017. We currently anticipate full-year 2017 contributions of approximately $610 million. We made $71 million and $270 million of contributions to our pension and other postretirement benefit plans during the three and nine months ended September 30, 2016.

Paying dividends – Dividends totaled $1.37 billion in the first nine months of 2017, representing 77 cents per share paid in the first and second quarters and 78 cents per share paid in the third quarter. Each quarter, our Board of Directors reviews the company's dividend for the applicable quarter. The Board evaluates the financial condition of the company and considers the economic outlook, corporate cash flow, the company's liquidity needs, and the health and stability of global credit markets to determine whether to maintain or change the quarterly dividend.

Common stock repurchases – In January 2014, the Board of Directors approved an authorization to repurchase up to $10 billion of Caterpillar common stock (the 2014 Authorization), which will expire on December 31, 2018. We did not purchase any Caterpillar common stock in the first nine months of 2017. As of September 30, 2017, $5.47 billion remained available under the 2014 Authorization. Caterpillar's basic shares outstanding as of September 30, 2017 were approximately 595 million.

Financial Products

Financial Products operating cash flow was $1.02 billion in the first nine months of 2017, compared with $1.26 billion for the same period a year ago. Net cash used for investing activities was $994 million for the first nine months of 2017, compared with $872 million for the same period in 2016. The change was primarily due to the impact of intercompany purchased receivables, partially offset by higher proceeds from disposal of equipment and lower capital expenditures for equipment on operating leases. Net cash used for financing activities for the first nine months of 2017 was $1.11 billion, compared with $302 million for the same period in 2016. The change was primarily due to the impact of borrowings with ME&T.

CRITICAL ACCOUNTING POLICIES

For a discussion of the Company's critical accounting policies, see Part II, Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations in our 2016 Annual Report on Form 10-K. Critical accounting policies that have been revised since our 2016 Annual Report on Form 10-K are as follows.

Fair values for goodwill impairment tests - We test goodwill for impairment annually, at the reporting unit level, and whenever events or circumstances make it likely that an impairment may have occurred, such as a significant adverse change in the business climate or a decision to sell all or a portion of a reporting unit. We perform our annual goodwill impairment test as of October 1 and monitor for interim triggering events on an ongoing basis.

Goodwill is reviewed for impairment utilizing either a qualitative assessment or a quantitative goodwill impairment test. If we choose to perform a qualitative assessment and determine the fair value more likely than not exceeds the carrying value, no further evaluation is necessary. For reporting units where we perform the quantitative goodwill impairment test, we compare the fair value of each reporting unit, which we primarily determine using an income approach based on the present value of discounted cash flows, to the respective carrying value, which includes goodwill. If the fair value of the reporting unit exceeds its carrying value, the goodwill is not considered impaired. Beginning in 2017, if the carrying value is higher than the fair value, the difference is recognized as an impairment loss. Prior to 2017, a two-step process was used. For reporting units where we performed the two-step process, the first step required us to compare the fair value of each reporting unit, which we primarily determined using an income approach based on the present value of discounted cash flows, to the respective carrying value, which includes

goodwill. If the fair value of the reporting unit exceeded its carrying value, the goodwill was not considered impaired. If the carrying value was higher than the fair value, there was an indication that an impairment may have existed and the second step was required. In step two, the implied fair value of goodwill was calculated as the excess of the fair value of a reporting unit over the fair values assigned to its assets and liabilities. If the implied fair value of goodwill was less than the carrying value of the reporting unit's goodwill, the difference was recognized as an impairment loss.

The impairment test process requires valuation of the respective reporting unit, which we primarily determine using an income approach based on a discounted five year forecasted cash flow with a year-five residual value. The residual value is computed using the constant growth method, which values the forecasted cash flows in perpetuity. The income approach is supported by a reconciliation of our calculated fair value for Caterpillar to the company's market capitalization. The assumptions about future cash flows and growth rates are based on each reporting unit's long-term forecast and are subject to review and approval by senior management. A reporting unit’s discount rate is a risk-adjusted weighted average cost of capital, which we believe approximates

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the rate from a market participant's perspective. The estimated fair value could be impacted by changes in market conditions, interest rates, growth rates, tax rates, costs, pricing and capital expenditures. The fair value determination is categorized as Level 3 in the fair value hierarchy due to its use of internal projections and unobservable measurement inputs.

An unfavorable change in our expectations for the financial performance of our reporting units, particularly long-term growth and profitability, would reduce the fair value of our reporting units. The demand for our equipment and related parts is highly cyclical and significantly impacted by commodity prices, although the impact may vary by reporting unit. The energy and mining industries are major users of our products, including the coal, iron ore, gold, copper, oil and natural gas industries. Decisions to purchase our products are dependent upon the performance of those industries, which in turn are dependent in part on commodity prices. Lower commodity prices or industry specific circumstances that have a negative impact to the valuation assumptions may reduce the fair value of our reporting units. Should such events occur and it becomes more likely than not that a reporting unit's fair value has fallen below its carrying value, we will perform an interim goodwill impairment test(s), in addition to the annual impairment test. Future impairment tests may result in a goodwill impairment, depending on the outcome of the quantitative impairment test. A goodwill impairment would be reported as a non-cash charge to earnings.

Stock-based compensation - We use a lattice-based option-pricing model to calculate the fair value of our stock options and SARs. The calculation of the fair value of the awards using the lattice-based option-pricing model is affected by our stock price on the date of grant as well as assumptions regarding the following:

- Volatility is a measure of the amount by which the stock price is expected to fluctuate each year during the expected term of the award and is based on historical Caterpillar stock price movement and current implied volatilities from traded options on Caterpillar stock. The implied volatilities from traded options are impacted by changes in market conditions. An increase in the volatility would result in an increase in our expense.
- The expected term represents the period of time that awards granted are expected to be outstanding and is an output of the lattice-based option-pricing model. In determining the expected term of the award, future exercise and forfeiture patterns are estimated from Caterpillar employee historical exercise behavior. These patterns are also affected by the vesting conditions of the award. Changes in the future exercise behavior of employees or in the vesting period of the award could result in a change in the expected term. An increase in the expected term would result in an increase to our expense.
- The weighted-average dividend yield is based on Caterpillar's historical dividend yields. As holders of stock options and SARs do not receive dividend payments, this could result in employees retaining the award for a longer period of time if dividend yields decrease or exercising the award sooner if dividend yields increase. A decrease in the dividend yield would result in an increase in our expense.
- The risk-free interest rate is based on the U.S. Treasury yield curve in effect at time of grant. As the risk-free interest rate increases, the expected term increases, resulting in an increase in our expense.

The fair value of our RSUs and PRSUs is determined by reducing the stock price on the date of grant by the present value of the estimated dividends to be paid during the vesting period. The estimated dividends are based on Caterpillar's quarterly dividend per share at the time of grant. A decrease in the dividend per share would result in an increase in our expense.

Stock-based compensation expense is recognized based on the grant date fair value. Forfeitures are accounted for in the period they occur as a reduction to expense. Stock-based compensation expense for PRSUs is based on the probable number of shares expected to vest. Changes in the expected probability of achieving performance targets in future periods may result in an increase or decrease in our expense.

Income taxes – We are subject to the income tax laws of the many jurisdictions in which we operate. These tax laws are complex, and the manner in which they apply to our facts is sometimes open to interpretation. In establishing the provision for income taxes, we must make judgments about the application of these inherently complex tax laws.

Despite our belief that our tax return positions are consistent with applicable tax laws, we believe that taxing authorities could challenge certain positions. Settlement of any challenge can result in no change, a complete disallowance, or some partial adjustment reached through negotiations or litigation. We record tax benefits for uncertain tax positions based upon management's evaluation of the information available at the reporting date. To be recognized in the financial statements, a tax benefit must be at least more likely than not of being sustained based on technical merits. The benefit for positions meeting the recognition threshold is measured as the largest benefit more likely than not of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. Significant judgment is required in making these determinations and adjustments to unrecognized tax benefits may be necessary to reflect actual taxes payable upon settlement. Adjustments related to positions impacting the effective

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tax rate affect the provision for income taxes. Adjustments related to positions impacting the timing of deductions impact deferred tax assets and liabilities.

Our income tax positions and analysis are based on currently enacted tax law. Future changes in tax law could significantly impact the provision for income taxes, the amount of taxes payable, and the deferred tax asset and liability balances. Deferred tax assets generally represent tax benefits for tax deductions or credits available in future tax returns. Certain estimates and assumptions are required to determine whether it is more likely than not that all or some portion of the benefit of a deferred tax asset will not be realized. In making this assessment, management analyzes the trend of U.S. GAAP earnings and estimates the impact of future taxable income, reversing temporary differences and available prudent and feasible tax planning strategies. Should a change in facts or circumstances lead to a change in judgment about the ultimate realizability of a deferred tax asset, we record or adjust the related valuation allowance in the period that the change in facts and circumstances occurs, along with a corresponding increase or decrease in the provision for income taxes. The provision for income taxes for 2016 included an increase in the valuation allowance for U.S. state deferred tax assets resulting in a $141 million non-cash charge, net of federal deferred tax adjustment at 35 percent. The primary driver of the increase was recent U.S. GAAP losses expected to recur in 2017 in certain state jurisdictions and the weight given this negative objective evidence under income tax accounting guidance. Reversal of the valuation allowance in the future is dependent on U.S. GAAP profitability in these state jurisdictions giving less weight in the analysis to mark-to-market adjustments to remeasure our pension and OPEB plans as we do not consider these adjustments indicative of ongoing earnings trends. Due to better than previously forecasted 2017 U.S. GAAP results in certain U.S. state jurisdictions, it is reasonably possible the valuation allowance for U.S. state deferred tax assets will decrease in the next twelve months.

A provision for U.S. income taxes has not been recorded on undistributed profits of our non-U.S. subsidiaries that we have determined to be indefinitely reinvested outside the U.S. If management intentions or U.S. tax law changes in the future, there could be a significant negative impact on the provision for income taxes to record an incremental tax liability in the period the change occurs. A deferred tax asset is recognized only if we have definite plans to generate a U.S. tax benefit by repatriating earnings in the foreseeable future.

Income taxes are based on the statutory tax rate of the jurisdiction in which earnings are subject to taxation. That statutory rate may differ from the statutory tax rate of the jurisdiction in which that entity is incorporated. Taxes are paid in the jurisdictions where earnings are subject to taxation. The effective tax rate differs from the U.S. statutory rate in part due to indefinitely reinvested profits of non-U.S. subsidiaries being subject to statutory tax rates which are generally lower than the U.S. rate of 35 percent. The indefinitely reinvested profits of Caterpillar SARL (CSARL), primarily taxable in Switzerland, contribute the most significant amount of this difference. For tax years 2007 to 2012 including the impact of a loss carryback to 2005, the IRS has proposed to tax in the United States profits earned from certain parts transactions by CSARL based on the IRS examination team’s application of “substance-over-form” or “assignment-of-income” judicial doctrines. We are vigorously contesting the proposed increases to tax and penalties for these years of approximately $2 billion. We believe that the relevant transactions complied with applicable tax laws and did not violate judicial doctrines. The purchase of parts by CSARL from unrelated parties and the subsequent sale of those parts to unrelated dealers outside the United States have substantial legal, commercial, and economic consequences for the parties involved. Therefore, we have concluded that the largest amount of benefit that is more likely than not to be sustained related to this position is the entire benefit. As a result, no amount related to these IRS adjustments is reflected in unrecognized tax benefits. We have filed U.S. income tax returns on this same basis for years after 2012. We currently believe the ultimate disposition of this matter will not have a material adverse effect on our consolidated financial position, liquidity or results of operations.

OTHER MATTERS

Environmental and Legal Matters

The Company is regulated by federal, state and international environmental laws governing our use, transport and disposal of substances and control of emissions. In addition to governing our manufacturing and other operations, these laws often impact the development of our products, including, but not limited to, required compliance with air emissions standards applicable to internal combustion engines. We have made, and will continue to make, significant research and development and capital expenditures to comply with these emissions standards.

We are engaged in remedial activities at a number of locations, often with other companies, pursuant to federal and state laws. When it is probable we will pay remedial costs at a site, and those costs can be reasonably estimated, the investigation, remediation, and operating and maintenance costs are accrued against our earnings. Costs are accrued based on consideration of currently available data and information with respect to each individual site, including available technologies, current applicable laws and regulations, and prior remediation experience. Where no amount within a range of estimates is more likely, we accrue the minimum.

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Where multiple potentially responsible parties are involved, we consider our proportionate share of the probable costs. In formulating the estimate of probable costs, we do not consider amounts expected to be recovered from insurance companies or others. We reassess these accrued amounts on a quarterly basis. The amount recorded for environmental remediation is not material and is included in Accrued expenses. We believe there is no more than a remote chance that a material amount for remedial activities at any individual site, or at all the sites in the aggregate, will be required.

On January 7, 2015, the Company received a grand jury subpoena from the U.S. District Court for the Central District of Illinois. The subpoena requests documents and information from the Company relating to, among other things, financial information concerning U.S. and non-U.S. Caterpillar subsidiaries (including undistributed profits of non-U.S. subsidiaries and the movement of cash among U.S. and non-U.S. subsidiaries). The Company has received additional subpoenas relating to this investigation requesting additional documents and information relating to, among other things, the purchase and resale of replacement parts by Caterpillar Inc. and non-U.S. Caterpillar subsidiaries, dividend distributions of certain non-U.S. Caterpillar subsidiaries, and Caterpillar SARL and related structures. On March 2-3, 2017, agents with the Department of Commerce, the Federal Deposit Insurance Corporation and the Internal Revenue Service executed search and seizure warrants at three facilities of the Company in the Peoria, Illinois area, including its corporate headquarters. The warrants identify, and agents seized, documents and information related to, among other things, the export of products from the United States, the movement of products between the United States and Switzerland, the relationship between Caterpillar Inc. and Caterpillar SARL, and sales outside the United States. It is the Company’s understanding that the warrants, which concern both tax and export activities, are related to the ongoing grand jury investigation. The Company is continuing to cooperate with this investigation. The Company is unable to predict the outcome or reasonably estimate any potential loss; however, we currently believe that this matter will not have a material adverse effect on the Company’s consolidated results of operations, financial position or liquidity.

On March 20, 2014, Brazil’s Administrative Council for Economic Defense (CADE) published a Technical Opinion which named 18 companies and over 100 individuals as defendants, including two subsidiaries of Caterpillar Inc., MGE - Equipamentos e Serviços Ferroviários Ltda. (MGE) and Caterpillar Brasil Ltda. The publication of the Technical Opinion opened CADE's official administrative investigation into allegations that the defendants participated in anticompetitive bid activity for the construction and maintenance of metro and train networks in Brazil. While companies cannot be held criminally liable for anticompetitive conduct in Brazil, criminal charges have been brought against two current employees of MGE and one former employee of MGE involving the same conduct alleged by CADE. The Company has responded to all requests for information from the authorities. The Company is unable to predict the outcome or reasonably estimate the potential loss; however, we currently believe that this matter will not have a material adverse effect on the Company's consolidated results of operations, financial position or liquidity.

On October 24, 2013, Progress Rail received a grand jury subpoena from the U.S. District Court for the Central District of California. The subpoena requests documents and information from Progress Rail, United Industries Corporation, a wholly-owned subsidiary of Progress Rail, and Caterpillar Inc. relating to allegations that Progress Rail conducted improper or unnecessary railcar inspections and repairs and improperly disposed of parts, equipment, tools and other items. In connection with this subpoena, Progress Rail was informed by the U.S. Attorney for the Central District of California that it is a target of a criminal investigation into potential violations of environmental laws and alleged improper business practices. The Company is cooperating with the authorities and is currently in discussions regarding a potential resolution of the matter. Although the Company believes a loss is probable, we currently believe that this matter will not have a material adverse effect on the Company's consolidated results of operations, financial position or liquidity.

In addition, we are involved in other unresolved legal actions that arise in the normal course of business. The most prevalent of these unresolved actions involve disputes related to product design, manufacture and performance

liability (including claimed asbestos and welding fumes exposure), contracts, employment issues, environmental matters, intellectual property rights, and securities laws. The aggregate range of reasonably possible losses in excess of accrued liabilities, if any, associated with these unresolved legal actions is not material. In some cases, we cannot reasonably estimate a range of loss because there is insufficient information regarding the matter. However, we believe there is no more than a remote chance that any liability arising from these matters would be material. Although it is not possible to predict with certainty the outcome of these unresolved legal actions, we believe that these actions will not individually or in the aggregate have a material adverse effect on our consolidated results of operations, financial position or liquidity.

Retirement Benefits

Based on market conditions as of September 30, 2017, we would be required to recognize an increase in our underfunded status of approximately $650 million at December 31, 2017. This would result in an increase in our Liability for postemployment benefits and the recognition in earnings of net mark-to-market losses of approximately $650 million pre-tax, $440 million net of tax or $0.75 per share. The increase in our underfunded status and the net mark-to-market losses are primarily due to lower discount rates at September 30, 2017 (approximately 3.67 percent for our U.S. pension plans) as compared to the discount rates

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used at December 31, 2016 (approximately 3.97 percent for our U.S. pension plans) and anticipated changes in our U.S. mortality assumption. These losses are partially offset by the difference between the actual return on plan assets compared to the expected return on plan assets. It is difficult to predict the adjustment amount, as it is dependent on several factors including the discount rate, actual returns on plan assets and other actuarial assumptions. Final determination will only be known as of the measurement date, which is December 31, 2017.

Order Backlog

At the end of the third quarter of 2017, the dollar amount of backlog believed to be firm was approximately $15.4 billion, an increase of about $600 million from the end of the second quarter of 2017. Construction Industries' order backlog increased about $500 million, Resource Industries' increased about $300 million and Energy & Transportation's decreased about $200 million. Compared with the third quarter of 2016, the order backlog increased about $3.8 billion. The increase was across all segments, most significantly in Construction Industries and Resource Industries. Of the total backlog at September 30, 2017, approximately $2.6 billion was not expected to be filled in the following twelve months.

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NON-GAAP FINANCIAL MEASURES

The following definitions are provided for the non-GAAP financial measures used in this report. These non-GAAP financial measures have no standardized meaning prescribed by U.S. GAAP and therefore are unlikely to be comparable to the calculation of similar measures for other companies. Management does not intend for these items to be considered in isolation or as a substitute for the related GAAP measures.

We believe it is important to separately quantify the profit impact of two special items in order for the company's results to be meaningful to readers. These items consist of restructuring costs, which are incurred in the current year to generate longer-term benefits, and a gain on sale of an equity investment. We do not consider these items indicative of earnings from ongoing business activities and believe the non-GAAP measure will provide useful perspective on underlying business results and trends, and a means to assess the company's period-over-period results. Reconciliation of adjusted profit per share to the most directly comparable GAAP measure, profit per share - diluted are as follows:

	Three Months Ended September 30		Nine Months Ended September 30	
	2017	2016	2017	2016
Profit per share - diluted	$1.77	$0.48	$3.44	$1.88
Per share restructuring costs [1]	0.18	0.37	1.37	0.70
Per share gain on sale of equity investment[2]	$—	$—	$(0.09)	$—
Adjusted profit per share	$1.95	$0.85	$4.72	$2.58

[1] At estimated annual tax rate based on full-year outlook for per share restructuring costs at statutory tax rates. Three and nine months ended September 30, 2017 at estimated annual tax rate of 20 percent. Nine months ended September 30, 2017 also includes $15 million increase to prior year taxes related to non-U.S. restructuring costs recognized in the first quarter of 2017. Third-quarter 2017 includes an unfavorable interim adjustment of $0.06 per share and nine months ended September 30, 2017 includes a favorable interim adjustment of $0.01 per share resulting from the difference in the estimated annual tax rate for consolidated reporting of 32 percent and the estimated annual tax rate for profit per share excluding restructuring costs, gain on sale of equity investment and discrete items of 29 percent.

[2] At U.S. statutory tax rate of 35 percent.

Supplemental Consolidating Data

We are providing supplemental consolidating data for the purpose of additional analysis. The data has been grouped as follows:

Consolidated – Caterpillar Inc. and its subsidiaries.

Machinery, Energy & Transportation – Caterpillar defines Machinery, Energy & Transportation as it is presented in the supplemental data as Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis. Machinery, Energy & Transportation information relates to the design, manufacturing and marketing of our products. Financial Products' information relates to the financing to customers and dealers for the purchase and lease of

Caterpillar and other equipment. The nature of these businesses is different, especially with regard to the financial position and cash flow items. Caterpillar management utilizes this presentation internally to highlight these differences. We also believe this presentation will assist readers in understanding our business.

Financial Products – Our finance and insurance subsidiaries, primarily Cat Financial and Insurance Services.

Consolidating Adjustments – Eliminations of transactions between Machinery, Energy & Transportation and Financial Products.

Pages 84 to 91 reconcile Machinery, Energy & Transportation with Financial Products on the equity basis to Caterpillar Inc. consolidated financial information.

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Caterpillar Inc.
Supplemental Data for Results of Operations
For the Three Months Ended September 30, 2017
(Unaudited)
(Millions of dollars)

	Consolidated	Supplemental Consolidating Data			
		Machinery, Energy & Transportation [1]	Financial Products	Consolidating Adjustments	
Sales and revenues:					
Sales of Machinery, Energy & Transportation	$ 10,713	$10,713	$ —	$ —	
Revenues of Financial Products	700	—	793	(93)	[2]
Total sales and revenues	11,413	10,713	793	(93)	
Operating costs:					
Cost of goods sold	7,633	7,633	—	—	
Selling, general and administrative expenses	1,237	1,067	173	(3)	[3]
Research and development expenses	455	455	—	—	
Interest expense of Financial Products	163	—	169	(6)	[4]
Other operating (income) expenses	348	51	303	(6)	[3]
Total operating costs	9,836	9,206	645	(15)	
Operating profit	1,577	1,507	148	(78)	
Interest expense excluding Financial Products	118	143	—	(25)	[4]
Other income (expense)	64	(22)	33	53	[5]
Consolidated profit before taxes	1,523	1,342	181	—	
Provision (benefit) for income taxes	470	413	57	—	
Profit of consolidated companies	1,053	929	124	—	
Equity in profit (loss) of unconsolidated affiliated companies	8	8	—	—	
Equity in profit of Financial Products' subsidiaries	—	122	—	(122)	[6]
Profit of consolidated and affiliated companies	1,061	1,059	124	(122)	
Less: Profit (loss) attributable to noncontrolling interests	2	—	2	—	
Profit [7]	$ 1,059	$1,059	$ 122	$ (122)	

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of Financial Products' revenues earned from Machinery, Energy & Transportation.
[3] Elimination of net expenses recorded by Machinery, Energy & Transportation paid to Financial Products.
[4] Elimination of interest expense recorded between Financial Products and Machinery, Energy & Transportation.
[5]

Elimination of discount recorded by Machinery, Energy & Transportation on receivables sold to Financial Products and of interest earned between Machinery, Energy & Transportation and Financial Products.

6 Elimination of Financial Products' profit due to equity method of accounting.

7 Profit attributable to common shareholders.

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Caterpillar Inc.
Supplemental Data for Results of Operations
For the Nine Months Ended September 30, 2017
(Unaudited)
(Millions of dollars)

	Consolidated	Supplemental Consolidating Data			
		Machinery, Energy & Transportation [1]	Financial Products	Consolidating Adjustments	
Sales and revenues:					
Sales of Machinery, Energy & Transportation	$ 30,482	$30,482	$ —	$ —	
Revenues of Financial Products	2,084	—	2,363	(279)	[2]
Total sales and revenues	32,566	30,482	2,363	(279)	
Operating costs:					
Cost of goods sold	22,160	22,160	—	—	
Selling, general and administrative expenses	3,571	3,145	438	(12)	[3]
Research and development expenses	1,326	1,326	—	—	
Interest expense of Financial Products	484	—	499	(15)	[4]
Other operating (income) expenses	1,780	890	906	(16)	[3]
Total operating costs	29,321	27,521	1,843	(43)	
Operating profit	3,245	2,961	520	(236)	
Interest expense excluding Financial Products	362	433	—	(71)	[4]
Other income (expense)	88	(110)	33	165	[5]
Consolidated profit before taxes	2,971	2,418	553	—	
Provision (benefit) for income taxes	921	750	171	—	
Profit of consolidated companies	2,050	1,668	382	—	
Equity in profit (loss) of unconsolidated affiliated companies	8	8	—	—	
Equity in profit of Financial Products' subsidiaries	—	377	—	(377)	[6]
Profit of consolidated and affiliated companies	2,058	2,053	382	(377)	
Less: Profit (loss) attributable to noncontrolling interests	5	—	5	—	
Profit [7]	$ 2,053	$2,053	$ 377	$ (377)	

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of Financial Products' revenues earned from Machinery, Energy & Transportation.
[3] Elimination of net expenses recorded by Machinery, Energy & Transportation paid to Financial Products.
[4] Elimination of interest expense recorded between Financial Products and Machinery, Energy & Transportation.

[5] Elimination of discount recorded by Machinery, Energy & Transportation on receivables sold to Financial Products and of interest earned between Machinery, Energy & Transportation and Financial Products.

[6] Elimination of Financial Products' profit due to equity method of accounting.

[7] Profit attributable to common shareholders.

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Caterpillar Inc.
Supplemental Data for Results of Operations
For the Three Months Ended September 30, 2016
(Unaudited)
(Millions of dollars)

	Consolidated	Supplemental Consolidating Data			
		Machinery, Energy & Transportation [1]	Financial Products	Consolidating Adjustments	
Sales and revenues:					
Sales of Machinery, Energy & Transportation	$ 8,463	$8,463	$ —	$ —	
Revenues of Financial Products	697	—	768	(71)	[2]
Total sales and revenues	9,160	8,463	768	(71)	
Operating costs:					
Cost of goods sold	6,527	6,528	—	(1)	[3]
Selling, general and administrative expenses	992	858	138	(4)	[3]
Research and development expenses	453	453	—	—	
Interest expense of Financial Products	147	—	151	(4)	[4]
Other operating (income) expenses	560	258	308	(6)	[3]
Total operating costs	8,679	8,097	597	(15)	
Operating profit	481	366	171	(56)	
Interest expense excluding Financial Products	126	139	—	(13)	[4]
Other income (expense)	28	(25)	10	43	[5]
Consolidated profit before taxes	383	202	181	—	
Provision (benefit) for income taxes	96	36	60	—	
Profit of consolidated companies	287	166	121	—	
Equity in profit (loss) of unconsolidated affiliated companies	(4)	(4)	—	—	
Equity in profit of Financial Products' subsidiaries	—	120	—	(120)	[6]
Profit of consolidated and affiliated companies	283	282	121	(120)	
Less: Profit (loss) attributable to noncontrolling interests	—	(1)	1	—	
Profit [7]	$ 283	$283	$ 120	$ (120)	

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of Financial Products' revenues earned from Machinery, Energy & Transportation.
[3] Elimination of net expenses recorded by Machinery, Energy & Transportation paid to Financial Products.
[4] Elimination of interest expense recorded between Financial Products and Machinery, Energy & Transportation.
[5]

Elimination of discount recorded by Machinery, Energy & Transportation on receivables sold to Financial Products and of interest earned between Machinery, Energy & Transportation and Financial Products.

6 Elimination of Financial Products' profit due to equity method of accounting.

7 Profit attributable to common shareholders.

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Caterpillar Inc.
Supplemental Data for Results of Operations
For the Nine Months Ended September 30, 2016
(Unaudited)
(Millions of dollars)

	Consolidated	Supplemental Consolidating Data			
		Machinery, Energy & Transportation [1]	Financial Products	Consolidating Adjustments	
Sales and revenues:					
Sales of Machinery, Energy & Transportation	$ 26,888	$26,888	$ —	$ —	
Revenues of Financial Products	2,075	—	2,305	(230)	[2]
Total sales and revenues	28,963	26,888	2,305	(230)	
Operating costs:					
Cost of goods sold	20,768	20,769	—	(1)	[3]
Selling, general and administrative expenses	3,203	2,794	424	(15)	[3]
Research and development expenses	1,429	1,429	—	—	
Interest expense of Financial Products	447	—	458	(11)	[4]
Other operating (income) expenses	1,356	462	914	(20)	[3]
Total operating costs	27,203	25,454	1,796	(47)	
Operating profit	1,760	1,434	509	(183)	
Interest expense excluding Financial Products	385	422	—	(37)	[4]
Other income (expense)	112	(72)	38	146	[5]
Consolidated profit before taxes	1,487	940	547	—	
Provision (benefit) for income taxes	372	198	174	—	
Profit of consolidated companies	1,115	742	373	—	
Equity in profit (loss) of unconsolidated affiliated companies	(7)	(7)	—	—	
Equity in profit of Financial Products' subsidiaries	—	369	—	(369)	[6]
Profit of consolidated and affiliated companies	1,108	1,104	373	(369)	
Less: Profit (loss) attributable to noncontrolling interests	4	—	4	—	
Profit [7]	$ 1,104	$1,104	$ 369	$ (369)	

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of Financial Products' revenues earned from Machinery, Energy & Transportation.
[3] Elimination of net expenses recorded by Machinery, Energy & Transportation paid to Financial Products.
[4] Elimination of interest expense recorded between Financial Products and Machinery, Energy & Transportation.

[5] Elimination of discount recorded by Machinery, Energy & Transportation on receivables sold to Financial Products and of interest earned between Machinery, Energy & Transportation and Financial Products.

[6] Elimination of Financial Products' profit due to equity method of accounting.

[7] Profit attributable to common shareholders.

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Caterpillar Inc.
Supplemental Data for Financial Position
At September 30, 2017
(Unaudited)
(Millions of dollars)

	Consolidated	Supplemental Consolidating Data			
		Machinery, Energy & Transportation[1]	Financial Products	Consolidating Adjustments	
Assets					
Current assets:					
Cash and short-term investments	$ 9,591	$ 8,736	$ 855	$ —	
Receivables – trade and other	6,691	4,123	1,326	1,242	[2,3]
Receivables – finance	8,984	—	12,796	(3,812)	[3]
Prepaid expenses and other current assets	1,707	940	779	(12)	[4]
Inventories	10,212	10,212	—	—	
Total current assets	37,185	24,011	15,756	(2,582)	
Property, plant and equipment – net	14,187	9,851	4,336	—	
Long-term receivables – trade and other	969	208	153	608	[2,3]
Long-term receivables – finance	13,192	—	13,830	(638)	[3]
Investments in Financial Products subsidiaries	—	4,435	—	(4,435)	[5]
Noncurrent deferred and refundable income taxes	2,845	3,595	105	(855)	[6]
Intangible assets	2,175	2,170	5	—	
Goodwill	6,196	6,179	17	—	
Other assets	1,811	627	1,184	—	
Total assets	$ 78,560	$ 51,076	$ 35,386	$ (7,902)	
Liabilities					
Current liabilities:					
Short-term borrowings	$ 5,470	$ 11	$ 5,459	$ —	
Short-term borrowings with consolidated companies	—	1,000	1,481	(2,481)	[7]
Accounts payable	6,113	6,009	193	(89)	[8]
Accrued expenses	3,114	2,808	306	—	
Accrued wages, salaries and employee benefits	2,333	2,286	47	—	
Customer advances	1,510	1,510	—	—	
Dividends payable	—	—	—	—	
Other current liabilities	1,744	1,240	516	(12)	[6,9]
Long-term debt due within one year	5,619	5	5,614	—	
Total current liabilities	25,903	14,869	13,616	(2,582)	
Long-term debt due after one year	24,835	8,850	16,015	(30)	[7]
Liability for postemployment benefits	8,973	8,973	—	—	
Other liabilities	3,152	2,687	1,320	(855)	[6]
Total liabilities	62,863	35,379	30,951	(3,467)	
Commitments and contingencies					
Shareholders’ equity					

Common stock	5,460	5,460	918	(918) [5]
Treasury stock	(17,130)	(17,130)	—	—
Profit employed in the business	28,530	28,530	3,962	(3,962) [5]
Accumulated other comprehensive income (loss)	(1,233)	(1,233)	(581)	581 [5]
Noncontrolling interests	70	70	136	(136) [5]
Total shareholders' equity	15,697	15,697	4,435	(4,435)
Total liabilities and shareholders' equity	$ 78,560	$ 51,076	$ 35,386	$ (7,902)

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of receivables between Machinery, Energy & Transportation and Financial Products.
[3] Reclassification of Machinery, Energy & Transportation's trade receivables purchased by Financial Products and Financial Products' wholesale inventory receivables.
[4] Elimination of Machinery, Energy & Transportation's insurance premiums that are prepaid to Financial Products.
[5] Elimination of Financial Products' equity which is accounted for by Machinery, Energy & Transportation on the equity basis.
[6] Reclassification reflecting required netting of deferred tax assets / liabilities by taxing jurisdiction.
[7] Elimination of debt between Machinery, Energy & Transportation and Financial Products.
[8] Elimination of payables between Machinery, Energy & Transportation and Financial Products.
[9] Elimination of prepaid insurance in Financial Products' other liabilities.

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Caterpillar Inc.
Supplemental Data for Financial Position
At December 31, 2016
(Unaudited)
(Millions of dollars)

	Consolidated	Supplemental Consolidating Data			
		Machinery, Energy & Transportation[1]	Financial Products	Consolidating Adjustments	
Assets					
Current assets:					
Cash and short-term investments	$ 7,168	$ 5,257	$ 1,911	$ —	
Receivables – trade and other	5,981	3,910	377	1,694	[2,3]
Receivables – finance	8,522	—	11,934	(3,412)	[3]
Prepaid expenses and other current assets	1,682	764	926	(8)	[4]
Inventories	8,614	8,614	—	—	
Total current assets	31,967	18,545	15,148	(1,726)	
Property, plant and equipment – net	15,322	10,899	4,423	—	
Long-term receivables – trade and other	1,029	177	138	714	[2,3]
Long-term receivables – finance	13,556	—	14,300	(744)	[3]
Investments in Financial Products subsidiaries	—	3,638	—	(3,638)	[5]
Noncurrent deferred and refundable income taxes	2,790	3,648	89	(947)	[6]
Intangible assets	2,349	2,344	5	—	
Goodwill	6,020	6,003	17	—	
Other assets	1,671	609	1,075	(13)	[4]
Total assets	$ 74,704	$ 45,863	$ 35,195	$ (6,354)	
Liabilities					
Current liabilities:					
Short-term borrowings	$ 7,303	$ 209	$ 7,094	$ —	
Short-term borrowings with consolidated companies	—	—	1,637	(1,637)	[7]
Accounts payable	4,614	4,506	189	(81)	[8]
Accrued expenses	3,003	2,744	259	—	
Accrued wages, salaries and employee benefits	1,296	1,268	28	—	
Customer advances	1,167	1,167	—	—	
Dividends payable	452	452	—	—	
Other current liabilities	1,635	1,245	399	(9)	[6,9]
Long-term debt due within one year	6,662	507	6,155	—	
Total current liabilities	26,132	12,098	15,761	(1,727)	
Long-term debt due after one year	22,818	8,466	14,382	(30)	[7]
Liability for postemployment benefits	9,357	9,357	—	—	
Other liabilities	3,184	2,729	1,414	(959)	[6,9]
Total liabilities	61,491	32,650	31,557	(2,716)	
Commitments and contingencies					
Shareholders’ equity					

Common stock	5,277	5,277	918	(918) [5]
Treasury stock	(17,478)	(17,478)	—	—
Profit employed in the business	27,377	27,377	3,585	(3,585) [5]
Accumulated other comprehensive income (loss)	(2,039)	(2,039)	(990)	990 [5]
Noncontrolling interests	76	76	125	(125) [5]
Total shareholders' equity	13,213	13,213	3,638	(3,638)
Total liabilities and shareholders' equity	$ 74,704	$ 45,863	$ 35,195	$ (6,354)

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of receivables between Machinery, Energy & Transportation and Financial Products.
[3] Reclassification of Machinery, Energy & Transportation's trade receivables purchased by Financial Products and Financial Products' wholesale inventory receivables.
[4] Elimination of Machinery, Energy & Transportation's insurance premiums that are prepaid to Financial Products.
[5] Elimination of Financial Products' equity which is accounted for by Machinery, Energy & Transportation on the equity basis.
[6] Reclassification reflecting required netting of deferred tax assets / liabilities by taxing jurisdiction.
[7] Elimination of debt between Machinery, Energy & Transportation and Financial Products.
[8] Elimination of payables between Machinery, Energy & Transportation and Financial Products.
[9] Elimination of prepaid insurance in Financial Products' other liabilities.

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Caterpillar Inc.
Supplemental Data for Cash Flow
For the Nine Months Ended September 30, 2017
(Unaudited)
(Millions of dollars)

	Consolidated	Supplemental Consolidating Data			
		Machinery, Energy & Transportation [1]	Financial Products	Consolidating Adjustments	
Cash flow from operating activities:					
Profit of consolidated and affiliated companies	$ 2,058	$ 2,053	$ 382	$ (377)	[2]
Adjustments for non-cash items:					
Depreciation and amortization	2,153	1,507	646	—	
Undistributed profit of Financial Products	—	(377)	—	377	[3]
Other	592	524	(111)	179	[4]
Changes in assets and liabilities, net of acquisitions and divestitures:					
Receivables - trade and other	(455)	(324)	62	(193)	[4, 5]
Inventories	(1,489)	(1,487)	—	(2)	[4]
Accounts payable	1,371	1,412	(33)	(8)	[4]
Accrued expenses	121	118	3	—	
Accrued wages, salaries and employee benefits	962	943	19	—	
Customer advances	310	310	—	—	
Other assets – net	(137)	18	(54)	(101)	[4]
Other liabilities – net	(325)	(533)	107	101	[4]
Net cash provided by (used for) operating activities	5,161	4,164	1,021	(24)	
Cash flow from investing activities:					
Capital expenditures - excluding equipment leased to others	(566)	(561)	(6)	1	[4]
Expenditures for equipment leased to others	(1,071)	(13)	(1,074)	16	[4]
Proceeds from disposals of leased assets and property, plant and equipment	864	142	733	(11)	[4]
Additions to finance receivables	(8,246)	—	(9,765)	1,519	[5]
Collections of finance receivables	8,532	—	10,194	(1,662)	[5]
Net intercompany purchased receivables	—	—	(161)	161	[5]
Proceeds from sale of finance receivables	98	—	98	—	
Net intercompany borrowings	—	165	(1,000)	835	[6]
Investments and acquisitions (net of cash acquired)	(47)	(47)	—	—	
Proceeds from sale of businesses and investments (net of cash sold)	93	93	—	—	
Proceeds from sale of securities	431	36	395	—	
Investments in securities	(594)	(165)	(429)	—	
Other – net	38	17	21	—	
Net cash provided by (used for) investing activities	(468)	(333)	(994)	859	
Cash flow from financing activities:					

Dividends paid	(1,367)	(1,367)	—	—
Distribution to noncontrolling interests	(7)	(7)	—	—
Common stock issued, including treasury shares reissued	353	353	—	—
Net intercompany borrowings	—	1,000	(165)	(835) [6]
Proceeds from debt issued (original maturities greater than three months)	7,334	362	6,972	—
Payments on debt (original maturities greater than three months)	(6,220)	(506)	(5,714)	—
Short-term borrowings – net (original maturities three months or less)	(2,403)	(196)	(2,207)	—
Net cash provided by (used for) financing activities	(2,310)	(361)	(1,114)	(835)
Effect of exchange rate changes on cash	40	9	31	—
Increase (decrease) in cash and short-term investments	2,423	3,479	(1,056)	—
Cash and short-term investments at beginning of period	7,168	5,257	1,911	—
Cash and short-term investments at end of period	$ 9,591	$ 8,736	$ 855	$ —

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of Financial Products’ profit after tax due to equity method of accounting.
[3] Elimination of non-cash adjustment for the undistributed earnings from Financial Products.
[4] Elimination of non-cash adjustments and changes in assets and liabilities related to consolidated reporting.
[5] Reclassification of Financial Products' cash flow activity from investing to operating for receivables that arose from the sale of inventory.
[6] Elimination of net proceeds and payments to/from Machinery, Energy & Transportation and Financial Products.

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Caterpillar Inc.
Supplemental Data for Cash Flow
For the Nine Months Ended September 30, 2016
(Unaudited)
(Millions of dollars)

		Supplemental Consolidating Data			
	Consolidated	Machinery, Energy & Transportation [1]	Financial Products	Consolidating Adjustments	
Cash flow from operating activities:					
Profit of consolidated and affiliated companies	$ 1,108	$ 1,104	$ 373	$ (369)	[2]
Adjustments for non-cash items:					
Depreciation and amortization	2,255	1,591	664	—	
Undistributed profit of Financial Products	—	(362)	—	362	[3]
Other	640	503	(11)	148	[4]
Changes in assets and liabilities, net of acquisitions and divestitures:					
Receivables - trade and other	1,128	252	42	834	[4, 5]
Inventories	331	335	—	(4)	[4]
Accounts payable	(163)	(130)	16	(49)	[4]
Accrued expenses	(153)	(93)	(60)	—	
Accrued wages, salaries and employee benefits	(727)	(713)	(14)	—	
Customer advances	(24)	(24)	—	—	
Other assets – net	(141)	(278)	102	35	[4]
Other liabilities – net	(279)	(390)	146	(35)	[4]
Net cash provided by (used for) operating activities	3,975	1,795	1,258	922	
Cash flow from investing activities:					
Capital expenditures - excluding equipment leased to others	(807)	(802)	(6)	1	[4]
Expenditures for equipment leased to others	(1,393)	(56)	(1,377)	40	[4]
Proceeds from disposals of leased assets and property, plant and equipment	572	89	510	(27)	[4]
Additions to finance receivables	(6,911)	—	(8,888)	1,977	[5]
Collections of finance receivables	6,968	—	9,308	(2,340)	[5]
Net intercompany purchased receivables	—	—	580	(580)	[5]
Proceeds from sale of finance receivables	55	—	55	—	
Net intercompany borrowings	—	(716)	(999)	1,715	[6]
Investments and acquisitions (net of cash acquired)	(72)	(72)	—	—	
Proceeds from sale of securities	304	25	279	—	
Investments in securities	(339)	(22)	(317)	—	
Other – net	5	15	(17)	7	[8]
Net cash provided by (used for) investing activities	(1,618)	(1,539)	(872)	793	
Cash flow from financing activities:					
Dividends paid	(1,348)	(1,348)	(7)	7	[7]
Distribution to noncontrolling interests	(8)	(8)	—	—	
Common stock issued, including treasury shares reissued	(54)	(54)	7	(7)	[8]

Net intercompany borrowings	—	999	716	(1,715) [6]
Proceeds from debt issued (original maturities greater than three months)	4,430	6	4,424	—
Payments on debt (original maturities greater than three months)	(5,602)	(525)	(5,077)	—
Short-term borrowings – net (original maturities three months or less)	(111)	254	(365)	—
Net cash provided by (used for) financing activities	(2,693)	(676)	(302)	(1,715)
Effect of exchange rate changes on cash	(11)	(26)	15	—
Increase (decrease) in cash and short-term investments	(347)	(446)	99	—
Cash and short-term investments at beginning of period	6,460	5,340	1,120	—
Cash and short-term investments at end of period	$ 6,113	$ 4,894	$ 1,219	$ —

[1] Represents Caterpillar Inc. and its subsidiaries with Financial Products accounted for on the equity basis.
[2] Elimination of Financial Products' profit after tax due to equity method of accounting.
[3] Elimination of non-cash adjustment for the undistributed earnings from Financial Products.
[4] Elimination of non-cash adjustments and changes in assets and liabilities related to consolidated reporting.
[5] Reclassification of Financial Products' cash flow activity from investing to operating for receivables that arose from the sale of inventory.
[6] Elimination of net proceeds and payments to/from Machinery, Energy & Transportation and Financial Products.
[7] Elimination of dividend from Financial Products to Machinery, Energy & Transportation.
[8] Elimination of change in investment and common stock related to Financial Products.

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Forward-looking Statements

Certain statements in this Form 10-Q relate to future events and expectations and are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Words such as “believe,” “estimate,” “will be,” “will,” “would,” “expect,” “anticipate,” “plan,” “project,” “intend,” “could,” “should” or other similar words or expressions oft forward-looking statements. All statements other than statements of historical fact are forward-looking statements, including, without limitation, statements regarding our outlook, projections, forecasts or trend descriptions. These statements do not guarantee future performance and speak only as of the date they are made, and we do not undertake to update our forward-looking statements.

Caterpillar’s actual results may differ materially from those described or implied in our forward-looking statements based on a number of factors, including, but not limited to: (i) global and regional economic conditions and economic conditions in the industries we serve; (ii) commodity price changes, material price increases, fluctuations in demand for our products or significant shortages of material; (iii) government monetary or fiscal policies; (iv) political and economic risks, commercial instability and events beyond our control in the countries in which we operate; (v) our ability to develop, produce and market quality products that meet our customers’ needs; (vi) the impact of the highly competitive environment in which we operate on our sales and pricing; (vii) information technology security threats and computer crime; (viii) additional restructuring costs or a failure to realize anticipated savings or benefits from past or future cost reduction actions; (ix) failure to realize all of the anticipated benefits from initiatives to increase our productivity, efficiency and cash flow and to reduce costs; (x) inventory management decisions and sourcing practices of our dealers and our OEM customers; (xi) a failure to realize, or a delay in realizing, all of the anticipated benefits of our acquisitions, joint ventures or divestitures; (xii) union disputes or other employee relations issues; (xiii) adverse effects of unexpected events including natural disasters; (xiv) disruptions or volatility in global financial markets limiting our sources of liquidity or the liquidity of our customers, dealers and suppliers; (xv) failure to maintain our credit ratings and potential resulting increases to our cost of borrowing and adverse effects on our cost of funds, liquidity, competitive position and access to capital markets; (xvi) our Financial Products segment’s risks associated with the financial services industry; (xvii) changes in interest rates or market liquidity conditions; (xviii) an increase in delinquencies, repossessions or net losses of Cat Financial’s customers; (xix) currency fluctuations; (xx) our or Cat Financial’s compliance with financial and other restrictive covenants in debt agreements; (xxi) increased pension plan funding obligations; (xxii) alleged or actual violations of trade or anti-corruption laws and regulations; (xxiii) international trade policies and their impact on demand for our products and our competitive position; (xxiv) additional tax expense or exposure; (xxv) significant legal proceedings, claims, lawsuits or government investigations; (xxvi) new regulations or changes in financial services regulations; (xxvii) compliance with environmental laws and regulations; and (xxviii) other factors described in more detail in Caterpillar’s Forms 10-Q, 10-K and other filings with the Securities and Exchange Commission.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

The information required by this Item is incorporated by reference from Note 4 – “Derivative financial instruments and risk management” included in Part I, Item 1 and Management’s Discussion and Analysis included in Part I, Item 2 of this Form 10-Q.

Item 4. Controls and Procedures

Evaluation of disclosure controls and procedures

An evaluation was performed under the supervision and with the participation of the company’s management, including the Chief Executive Officer (CEO) and Chief Financial Officer (CFO), of the effectiveness of the design and operation of the company’s disclosure controls and procedures, as that term is defined in Rule 13a-15(e) under the

Securities Exchange Act of 1934, as amended, as of the end of the period covered by this quarterly report. Based on that evaluation, the CEO and CFO concluded that the company's disclosure controls and procedures are effective as of the end of the period covered by this quarterly report.

Changes in internal control over financial reporting

During the third quarter of 2017, there has been no change in the company's internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the company's internal control over financial reporting.

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PART II. OTHER INFORMATION

Item 1. Legal Proceedings

The information required by this Item is incorporated by reference from Note 13 – "Environmental and legal matters" included in Part I, Item 1 of this Form 10-Q.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

Issuer Purchases of Equity Securities
No shares were repurchased during the third quarter of 2017.

Other Purchases of Equity Securities

Period	Total Number of Shares Purchased [1]	Average Price Paid per Share	Total Number of Shares Purchased Under the Program	Approximate Dollar Value of Shares that may yet be Purchased under the Program
July 1-31, 2017	414	$ 114.18	N/A	N/A
August 1-31, 2017	—	$ —	N/A	N/A
September 1-30, 2017	9,129	$ 118.48	N/A	N/A
Total	9,543	$ 118.29		

[1] Represents shares delivered back to issuer for the payment of taxes resulting from the vesting of restricted stock units for employees and Directors.

Non-U.S. Employee Stock Purchase Plans

As of September 30, 2017, we had 27 employee stock purchase plans (the "EIP Plans") that are administered outside the United States for our non-U.S. employees, which had approximately 12,000 active participants in the aggregate. During the third quarter of 2017, approximately 112,000 shares of Caterpillar common stock were purchased by the EIP Plans pursuant to the terms of such plans.

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Item 6. Exhibits

10.1	364-Day Facility dated as of September 7, 2017 (incorporated by reference from Exhibit 99.1 to the Company's Current Report on Form 8-K filed September 12, 2017).
10.2	Local Currency Addendum to the 364-Day Facility dated as of September 7, 2017 (incorporated by reference from Exhibit 99.2 to the Company's Current Report on Form 8-K filed September 12, 2017).
10.3	Japan Local Currency Addendum to the 364-Day Facility dated as of September 7, 2017 (incorporated by reference from Exhibit 99.3 to the Company's Current Report on Form 8-K filed September 12, 2017).
10.4	Omnibus Amendment No. 2 to Amended and Restated Credit Agreement (Three-Year Facility) and Amendment No. 2 to Japan Local Currency Addendum dated as of September 8, 2017 (incorporated by reference from Exhibit 99.4 to the Company's Current Report on Form 8-K filed September 12, 2017).
10.5	Omnibus Amendment No. 2 to Amended and Restated Credit Agreement (Five-Year Facility) and Amendment No. 2 to Japan Local Currency Addendum dated as of September 8, 2017 (incorporated by reference from Exhibit 99.5 to the Company's Current Report on Form 8-K filed September 12, 2017).
10.6	Retention and Retirement Agreement, dated July 31, 2017 (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K filed August 1, 2017).
11	Computations of Earnings per Share (included in Note 11 of this Form 10-Q filed for the quarter ended September 30, 2017).
31.1	Certification of D. James Umpleby III, Chief Executive Officer of Caterpillar Inc., as required pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Bradley M. Halverson, Group President and Chief Financial Officer of Caterpillar Inc., as required pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32	Certification of D. James Umpleby III, Chief Executive Officer of Caterpillar Inc. and Bradley M. Halverson, Group President and Chief Financial Officer of Caterpillar Inc., as required pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

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SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

CATERPILLAR INC.

November 1, 2017	/s/ D. James Umpleby III (D. James Umpleby III)	Chief Executive Officer
November 1, 2017	/s/ Bradley M. Halverson (Bradley M. Halverson)	Group President and Chief Financial Officer
November 1, 2017	/s/ Suzette M. Long (Suzette M. Long)	General Counsel & Corporate Secretary
November 1, 2017	/s/ Jananne A. Copeland (Jananne A. Copeland)	Chief Accounting Officer