
**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549**

FORM 10-K

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

For the fiscal year ended December 31, 2017.

or

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

For the transition period from ____ to ____.

Commission file number: 000-26966

ADVANCED ENERGY INDUSTRIES, INC.

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of incorporation or organization)

1625 Sharp Point Drive, Fort Collins, CO

(Address of principal executive offices)

84-0846841

(I.R.S. Employer Identification No.)

80525

(Zip Code)

Registrant's telephone number, including area code: (970) 221-4670

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

| Title of each class | Name of each exchange on which registered |
|--|---|
| Common Stock, \$0.001 par value | NASDAQ Global Select Market |

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

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

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

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

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

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

Large accelerated filer

Accelerated filer

Non-accelerated filer
(Do not check if a smaller reporting company)

Smaller reporting company

Emerging growth company

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes No

The aggregate market value of voting and non-voting common stock held by non-affiliates of the registrant was \$2,568,911,641 as of June 30, 2017, based upon the price at which such common stock was last sold on such date.

As of February 13, 2018, there was 39,629,120 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of this Annual Report on Form 10-K incorporates information by reference from the registrant's definitive proxy statement for its 2018 Annual Meeting of Stockholders (to be filed with the Commission under Regulation 14A no later than 120 days after the end of the registrant's fiscal year ended December 31, 2017).

ADVANCED ENERGY INDUSTRIES, INC.
FORM 10-K
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PART I

Unless the context otherwise requires, as used in this Form 10-K, references to "Advanced Energy", "the Company", "we", "us" or "our" refer to Advanced Energy Industries, Inc. and its consolidated subsidiaries.

ITEM 1. BUSINESS

Overview

Advanced Energy provides highly-engineered, mission-critical, precision power conversion, measurement and control solutions to our global customers. We design, manufacture, sell and support precision power products that transform electrical power into various usable forms. Our power conversion products refine, modify and control the raw electrical power from a utility and convert it into power that is predictable, repeatable and customizable. Our products enable thin film manufacturing processes such as plasma enhanced chemical and physical deposition and etch for various semiconductor and industrial products, industrial thermal applications for material and chemical processes, and specialty power for critical industrial applications. We also supply thermal instrumentation products for advanced temperature measurement and control in these markets. Our network of global service support centers provide local repair and field service capability in key regions as well as provide upgrades and refurbishment services, and sales of used equipment to businesses that use our products.

On July 3, 2017, Advanced Energy acquired all of the issued and outstanding shares of capital stock of Excelsys Holdings Limited ("Excelsys"), an electronics manufacturer in Cork, Ireland. This acquisition is part of Advanced Energy's strategy to continue to grow and diversify its revenue through organic and inorganic opportunities. The high-efficiency, low voltage, configurable power supplies that Excelsys manufactures for medical and industrial applications will further enhance Advanced Energy's product portfolio. See *Note 2. Business Acquisition* in Item 8 "Financial Statements and Supplementary Data."

We incorporated in Colorado in 1981 and reincorporated in Delaware in 1995. Our executive offices are located at 1625 Sharp Point Drive, Fort Collins, Colorado 80525, and our telephone number is 970-407-4670.

Products and Services

Our products are designed to enable new process technologies, improve productivity, and lower the cost of ownership for our customers. We also provide repair and maintenance services for all of our products.

We principally serve original equipment manufacturers ("OEM") and end customers in the semiconductor, flat panel display, high voltage, solar panel, and other industrial capital equipment markets. Our products are used in diverse markets, applications, and processes including the manufacture of capital equipment for semiconductor device manufacturing, thin film applications for thin film renewables and architectural glass, and for other thin film applications including flat panel displays, and industrial coatings. These markets can be cyclical in nature. Therefore, demand for our products and our financial results can change as demand for manufacturing equipment and repair and maintenance services change in response to consumer demand. Other factors, such as global economic and market conditions and technological advances in the applications we serve can also have an impact on our financial results, both positively and negatively.

Our process power systems include direct current ("DC"), pulsed DC, low frequency, high voltage, and radio frequency ("RF") power supplies, matching networks, remote plasma sources for reactive gas applications and RF instrumentation. These power conversion systems refine, modify, and control the raw electrical power from a utility and convert it into power that may be customized and is predictable and repeatable.

Our power control modules and thermal instrumentation products are used in the semiconductor industry, including adjacent thin film applications for solar PV and light emitting diode ("LED") industries, and heavy industries, for thermal control and temperature measurement solutions for applications in which time-temperature cycles affect material properties, productivity, and yield. These products are used in rapid thermal processing, chemical vapor deposition, crystal growing, and other semiconductor and solar applications requiring non-contact temperature measurement. They are also used in chemical processing, glass manufacturing and numerous other general industrial power applications.

Our high voltage products are designed to meet the demanding requirements of OEMs worldwide. Our high voltage power solutions and custom-built power conversion products offer high frequency, high voltage topology, providing wide input and output operating ranges while retaining excellent stability and efficiencies ranging from benchtop and rackmount systems to micro-size printed circuit board mount modules. The products target applications including semiconductor wafer

processing and metrology, scientific instrumentation, mass spectrometry, industrial printing and analytical x-ray systems for industrial and analytical applications.

Our solutions are designed to meet the demanding requirements of global OEMs in the Industrial, Medical and MIL-COTS (Commercial-off-the-shelf) verticals. Our low voltage products deliver excellence in efficiency, flexibility, performance and reliability. In the Medical industry our solutions are used in a variety of applications including: clinical diagnostic equipment, lasers, X-ray machines, CT-scanners and MRI scanners. In the Industrial vertical our products are commonly used in test and measurement, lasers, optical inspection equipment and scientific instrumentation. We design and manufacture MIL-COTS power supplies that meet the high reliability and often harsh operating environments of the military electronics industry and are ideal for use in a variety of applications including: radar systems, data acquisition, communications equipment, test and measurement equipment.

Our global support services group offers in-warranty and out-of-warranty repair services in the regions in which we operate, providing us with preventive maintenance opportunities. Our customers continue to pursue low cost of ownership of their capital equipment and are increasingly sensitive to the significant costs of system downtime. They expect that suppliers offer comprehensive local repair service and customer support. To meet these market requirements, we maintain a worldwide support organization comprising of both direct and indirect activities through partnership with local distributors primarily in the United States ("U.S."), the People's Republic of China ("PRC"), Japan, South Korea, Taiwan, Germany, and United Kingdom.

As of December 31, 2015, we discontinued our Inverter production, engineering, and sales product line representing a strategic shift in our business. As such, all Inverter revenues, costs, assets and liabilities are reported in Discontinued Operations for all periods presented herein and we currently report as a single unit. However, extended warranties historically sold and reflected as "Deferred Revenue" on our Consolidated Balance Sheets, represent future revenue and service costs to be incurred by our global services group and are reflected as continuing operations for historical periods and future periods. See *Note 3. Discontinued Operations* in Item 8 "Financial Statements and Supplementary Data."

Markets

Our products compete in markets for high tech applications using capital equipment. Our markets are not generally subject to seasonality; however, these markets are cyclical due to sudden changes in customers' manufacturing capacity requirements and spending, which depend in part on capacity utilization, demand for customers' products, inventory levels relative to demand, government incentives and subsidies, and access to affordable capital. For more information related to the markets in which we compete and the current environment in those markets, see *Business Environment and Trends* in Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations."

SEMICONDUCTOR CAPITAL EQUIPMENT

Customers in the semiconductor capital equipment market incorporate our products into equipment that make integrated circuits. Our power conversion systems provide the energy to enable thin film processes, such as deposition and etch, and high voltage applications such as ion implant, wafer inspection and metrology.

Our thermal instrumentation products measure the temperature of the processed substrate or the process chamber. Our power control modules are used in rapid thermal processing applications and for epitaxial growth applications for use in photonics, microelectronics, and photovoltaics. Our remote plasma sources deliver ionized gases for reactive chemical processes used in cleaning, surface treatment, and gas abatement. Precise control over the energy delivered to plasma-based processes enables the production of integrated circuits with reduced feature sizes and increased speed and performance.

INDUSTRIAL POWER

Our industrial power capital market is comprised of products for Thin Films Industrial Power and Specialty Power applications.

- Thin Films Industrial Power applications include glass coating, glass manufacturing, flat panel displays, solar cell manufacturing, and similar thin film manufacturing, including data storage, decorative, hard and optical coating.
- Specialty Power applications include power control modules and thermal instrumentation products for metal fabrication and treatment, and material and chemical processing. Our high voltage industrial applications

include scanning electron microscopy, medical equipment, and instrumentation applications such as x-ray and mass spectroscopy, as well as general electron gun sources for scientific and industrial applications.

GLOBAL SUPPORT

Our network of global service support centers provides local repair and field service capability in key regions as well as provides upgrades and refurbishment services, and sales of used equipment to businesses that use our products.

Customers

Our products are sold worldwide to approximately 280 OEMs and integrators and directly to more than 1,600 end users. Our ten largest customers accounted for approximately 70.4% of our sales in 2017, 67.7% of our sales in 2016, and 61.2% of our sales in 2015. We expect that the sale of products to our largest customers will continue to account for a significant percentage of our sales for the foreseeable future.

Applied Materials Inc., our largest customer, accounted for 33.5% of our sales in 2017, 35.2% of our sales in 2016, and 29.8% of our sales in 2015. Lam Research accounted for 23.1% of our sales in 2017, 20.7% of our sales in 2016, and 20.3% of our sales in 2015. No other customer accounted for greater than 10% of our sales in 2017, 2016, or 2015. The loss of Applied Materials, Inc. or Lam Research as a customer could have a material adverse effect on our results of operations.

Backlog

Our backlog was approximately \$131.3 million at December 31, 2017, an 89.7% increase from \$69.2 million at December 31, 2016. This increase resulted primarily due to increased demand in the semiconductor and industrial thin film markets. For more information related to our expectations for the markets we serve, see *Business Environment and Trends* in Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations." Backlog orders are firm orders scheduled to be filled and shipped in the next 12 months.

Backlog orders are not necessarily an indicator of future sales levels because of variations in lead times and customer production demand pull systems. Customers may delay delivery of products or cancel orders prior to shipment, subject to possible cancellation penalties. Delays in delivery schedules and/or customer changes to backlog orders during any particular period could cause a decrease in sales and have a material adverse effect on our business and results of operations.

Marketing, Sales and Distribution

We sell our products through direct and indirect sales channels in North America, Europe and Asia. Our sales operations are primarily located in the United States, the PRC, the United Kingdom, Germany, Japan, South Korea, India, Singapore and Taiwan. In addition to a direct sales force, we have independent sales representatives and distributors that support our selling efforts. We maintain customer service offices at many of the locations listed above, as well as other sites near our customers' locations. We believe that customer service and technical support are important competitive factors and are essential to building and maintaining close, long-term relationships with our customers.

The following table presents our net sales by geographic region for the years ended December 31, 2017, 2016, and 2015. Sales are attributed to individual countries based on customer location.

| Sales to external customers: | Years ended December 31, | | |
|------------------------------|--------------------------|------------|------------|
| | 2017 | 2016 | 2015 |
| United States | \$ 453,095 | \$ 327,397 | \$ 268,257 |
| Canada | 37 | 161 | 195 |
| North America | 453,132 | 327,558 | 268,452 |
| People's Republic of China | 34,045 | 16,207 | 12,687 |
| Other Asian countries | 104,595 | 77,638 | 61,839 |
| Asia | 138,640 | 93,845 | 74,526 |
| Germany | 57,351 | 48,589 | 46,719 |
| United Kingdom | 14,299 | 13,712 | 25,100 |
| Other European Countries | 7,590 | — | 14 |
| Europe | 79,240 | 62,301 | 71,833 |
| Total sales | \$ 671,012 | \$ 483,704 | \$ 414,811 |

Total sales to all countries outside of the U.S. totaled \$217.9 million, \$156.3 million, and \$146.6 million in the years ended December 31, 2017, 2016, and 2015, respectively.

See Item 1A "Risk Factors" for a discussion of certain risks related to our foreign operations.

Manufacturing

The manufacturing of our products is performed in Shenzhen, PRC; Ronkonkoma, New York; Littlehampton, United Kingdom; and Vancouver, Washington. Manufacturing in these locations, primarily the PRC, exposes us to risks, such as exchange controls and currency restrictions, changes in local economic conditions, changes in PRC laws and regulations, government actions, inability to meet customer demands if one of our facilities becomes impaired, and unsettled political conditions.

Manufacturing requires raw materials, including a wide variety of mechanical and electrical components, to be manufactured to our specifications. We use numerous companies, including contract manufacturers, to supply parts for the manufacture and support of our products. Although we make reasonable efforts to assure that parts are available from multiple qualified suppliers, some key parts may be obtained from a sole supplier or a limited group of suppliers. We seek to reduce costs and to lower the risks of production and service interruptions, as well as shortages of key parts by:

- selecting and qualifying alternate suppliers for key parts using rigorous technical and commercial evaluation of suppliers' products and business processes including testing their components' performance, quality, and reliability on our power conversion product at our customers' and their customer's processes. The qualification process for Precision Power, particularly as it pertains to semiconductor customers, follows semiconductor industry standard practices, such as "copy exact";
- monitoring the financial condition of key suppliers;
- maintaining appropriate inventories of key parts, including making last time purchases of key parts when notified by suppliers that they are ending the supply of those parts;
- qualifying new parts on a timely basis and in geographies that reduce costs without degradation in quality;
- locating certain manufacturing operations in areas that are closer to suppliers and customers; and
- competitively sourcing parts through electronic bidding tools to ensure the lowest total cost is achieved for the parts needed in our products.

Intellectual Property

We seek patent protection for inventions governing new products or technologies as part of our ongoing research and development. We currently hold 121 United States patents and 91 foreign-issued patents, and have 79 patent applications pending in the United States, Europe and Asia. A substantial majority of our patents relate to our Process Power business. Generally, our efforts to obtain international patents have been concentrated in the industrialized countries within Europe and Asia because there are other manufacturers and developers of power conversion and control systems in those countries, as well as customers for those systems for which our intellectual property applies.

Litigation may, from time to time, be necessary to enforce patents issued to us, to protect trade secrets or know-how owned by us, to defend us against claimed infringement of the rights of others, or to determine the scope and validity of the proprietary rights of others. See "*We are highly dependent on our intellectual property*" in Item 1A "Risk Factors."

Competition

The markets we serve are highly competitive and characterized by rapid technological development and changing customer requirements. No single company dominates any of our markets. Significant competitive factors in our markets include product performance, compatibility with adjacent products, price, quality, reliability, and level of customer service and support.

We have seen an increase in global competition in the markets in which we compete, especially from Asian and European-based component suppliers. We encounter substantial competition from foreign and domestic companies for each of our product lines. Some of our competitors have greater financial and other resources than we do. In some cases, competitors are smaller than we are, but are well established in specific product niches. MKS Instruments, Inc., COMET Holding AG., Daihen Corp., TRUMPF Hüttinger GmbH + Co. KG, Comdel, Inc., Kyosan Electric Mfg. Co., Ltd., New Power Plasma Co., Ltd., EN Technologies Inc., Seren IPS, Inc., and Adtec Plasma Tech. Co., Ltd. compete with our power conversion products

for thin film processing. Spellman High Voltage Electronics Corp., Crane Co., and Matsusada Precision, Inc. offer products that compete with our high voltage products. LumaSense Technologies, Inc., CI Systems Ltd., BASF SE., and LayTec AG. offer products that compete with our thermal instrumentation products. Eurotherm, Control Concepts Inc., CD Automation, and Spang Power Electronics offer products that compete with our power control modules. Artesyn Embedded Technologies, Cosel Co., LTD, TKD-Lambda Americas Inc., Mean Well, Vox Power and XP Power compete with our low voltage products.

Additionally, a focus on local content is causing new competitors to emerge around the world, with strong support from local governments, industry leaders, and investors.

Our ability to continue to compete successfully in these markets depends on our ability to make timely introductions of product enhancements and new products, to localize these development and production activities in key world regions, and to produce quality products. We expect our competitors will continue to improve the design and performance of their products, and introduce new products with competitive performance characteristics. We believe that we compete effectively with respect to these factors, although we cannot assure that we will be able to compete effectively in the future.

Research and Development

The market for our precision power conversion, thermal, and high voltage products is characterized by ongoing technological changes. We believe that continued and timely development of new highly differentiated products and enhancements to existing products to support end user and OEM requirements is necessary for us to maintain a competitive position in the markets we serve. Accordingly, we continue to devote a significant portion of our personnel and financial resources to research and development projects and seek to maintain close relationships with our key customers and other industry leaders in order to remain responsive to their product requirements now and in the future.

Research and development expenses were \$58.0 million in 2017, \$44.4 million in 2016, and \$39.6 million in 2015, representing 8.6% of our sales in 2017, 9.2% of our sales in 2016, and 9.5% of our sales in 2015.

Employees

As of December 31, 2017, we had a total of 1,876 employees. Our employees are not represented by unions, except for statutory organization rights applicable to our employees in the PRC and Germany. We believe that our continued success depends, in part, on our ability to attract and retain qualified personnel. We consider our relations with our employees to be good.

Effect of Environmental Laws

We are subject to federal, state, and local environmental laws and regulations, as well as the environmental laws and regulations of the foreign federal and local jurisdictions in which we have manufacturing and service facilities. We believe we are in material compliance with all such laws and regulations.

Compliance with federal, state, and local laws and regulations has not had, and is not expected to have, an adverse effect on our capital expenditures, competitive position, financial condition, or results of operations.

Website Access

Our website address is www.advanced-energy.com. We make available, free of charge on our website, our Annual Report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and all amendments to these reports as soon as reasonably practicable after filing such reports with, or furnishing them to, the Securities and Exchange Commission ("SEC"). Such reports are also available at www.sec.gov. Information contained on our website is not incorporated by reference in, or otherwise part of, this Annual Report on Form 10-K nor any of our other filings with the SEC.

Special Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K includes or incorporates by reference "forward-looking statements" within the meanings of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements contained or incorporated by reference in this Annual Report on Form 10-K, other than statements of historical fact, are "forward-looking statements." For example, statements relating to our beliefs, expectations, plans, projections, forecasts, goals, and estimates are forward-looking statements, as are statements that specified actions, conditions, or circumstances will continue or change. Forward-looking statements involve risks and uncertainties. In some cases, forward-looking statements can be identified by the inclusion of words such as "believe," "expect," "plan," "anticipate," "estimate," "may," "might," "could," "should," "will," "continue," "intend," "goal," and similar words.

Some of the forward-looking statements in this Annual Report on Form 10-K are, or reflect, our expectations or projections relating to:

- our future revenues;
- our future sales, including backlog orders;
- our ability to be successful in the design win process with our OEM customers;
- unanticipated costs in fulfilling our warranty obligations for solar inverters;
- our future gross profit;
- our competition;
- market acceptance of, and demand for, our products;
- the fair value of our assets and financial instruments;
- research and development expenses;
- selling, general, and administrative expenses;
- sufficiency and availability of capital resources;
- capital expenditures;
- our share repurchase program;
- our tax assets and liabilities;
- our other commitments and contingent liabilities;
- adequacy of our reserve for excess and obsolete inventory;
- adequacy of our warranty reserves;
- restructuring activities and expenses;
- the integration of our acquisitions;
- general global political and economic conditions; and
- industry trends.

Our actual results could differ materially from those projected or assumed in our forward-looking statements because forward-looking statements by their nature are subject to risks and uncertainties. Factors that could contribute to these differences or prove our forward-looking statements, by hindsight, to be overly optimistic or unachievable include the factors described in Item 1A “Risk Factors.” Other factors might also contribute to the differences between our forward-looking statements and our actual results. We assume no obligation to update any forward-looking statement or the reasons why our actual results might differ.

Executive Officers of the Registrant

Our executive officers, their positions and their ages as of December 31, 2017 were as follows:

Yuval Wasserman, 63, has served as President & Chief Executive Officer, and as a director since October 2014. Mr. Wasserman joined us in August 2007 as Senior Vice President, Sales, Marketing and Service. In October 2007, Mr. Wasserman was promoted to Executive Vice President, Sales, Marketing and Service. In April 2009, he was promoted to Executive Vice President and Chief Operating Officer of the Company, and then in August 2011, he was promoted to President of the Thin Films Business Unit. Prior to joining the Company, Mr. Wasserman served as the President, and later as Chief Executive Officer, of Tevet Process Control Technologies, Inc., a semiconductor metrology company, until July 2007. Prior to that, he held senior executive and general management positions at Boxer Cross (a metrology company acquired by Applied Materials, Inc.), Fusion Systems (a plasma strip company that is a division of Axcelis Technologies, Inc.), and AG Associates (a semiconductor capital equipment company focused on rapid thermal processing). Mr. Wasserman started his career at National Semiconductor, Inc., where he held various process engineering and management positions. Mr. Wasserman was on

the Board of Directors of Synconess, Inc., an outsourced engineering and product development company, from 2010 to 2017 when it was sold, and joined the Board of Directors of FARO Technologies, Inc., a publicly traded, manufacturer of three-dimensional (3D) measurement, imaging and realization systems, in December 2017. Mr. Wasserman is a National Association of Corporate Directors (NACD) Governance Fellow. Mr. Wasserman has a BSc degree in chemical engineering from Ben-Gurion University in Israel.

Thomas Liguori, 59, was our Executive Vice President and Chief Financial Officer from May 2015 until his resignation on January 26, 2018. Prior to joining Advanced Energy, he served as Executive Vice President and Chief Financial Officer at Multi-Fineline Electronix, Inc. since 2008. Multi-Fineline Electronix, Inc. is one of the world's largest producers of flexible printed circuits and flexible circuit assemblies. Prior to Multi-Fineline Electronix, Inc., Mr. Liguori served as Chief Financial Officer at Hypercom, Inc. from November 2005 to February 2008, where he designed and built the global finance and administration functions. From February 2005 to November 2005, Mr. Liguori served as Vice President, Finance and Chief Financial Officer at Iomega Corporation, a publicly traded provider of storage and network security solutions, and from April 2000 to February 2005, as Chief Financial Officer at Channell Commercial Corporation, a publicly traded designer and manufacturer of telecommunications equipment. Prior to that time, Mr. Liguori served as Chief Financial Officer of Dole Europe for Dole Food Company, serving as the top-ranking financial and IT executive in Dole's operations in Europe, Africa and the Middle East, and as Vice President of Finance at Teledyne Technologies International Corp. Mr. Liguori began his career with Honeywell Ltd. and served as a management consultant with Deloitte & Touche LLP. Mr. Liguori holds a Bachelor's in Business Administration from Boston University and completed a M.B.A. in Finance, from Arizona State University. He is a Certified Management Accountant and a Certified Financial Manager. Mr. Liguori is a National Association of Corporate Directors (NACD) Board Leadership Fellow.

Thomas O. McGimpsey, 56, joined us in April 2009 as Vice President and General Counsel and was promoted to Executive Vice President of Corporate Development (M&A) and General Counsel in August 2011, and held the corporate development executive position until mid-2015. In January 2018, Mr. McGimpsey was appointed as the Interim Chief Financial Officer and now has the combined role of Executive Vice President, Chief Financial Officer & General Counsel. Mr. McGimpsey also managed Advanced Energy's IT Department from 2010 to 2013. Prior to joining the Company, from February 2008 to April 2009, Mr. McGimpsey held the position of Vice President of Operations at First Data Corporation. During 2007, Mr. McGimpsey was a consultant and legal advisor to various companies. From July 2000 to January 2007, Mr. McGimpsey held various positions with McDATA Corporation such as Executive Vice President of Business Development & Chief Legal Officer, Senior Vice President & General Counsel and Vice President of Corporate Development. From February 1998 until its sale in June 2000, Mr. McGimpsey held the position of Director and Senior Corporate Attorney at US WEST, Inc. From 1991 to 1998, Mr. McGimpsey was in private practice at national law firms. From 1984 to 1988, Mr. McGimpsey was a Senior Engineer for Software Technology, Inc. Mr. McGimpsey has been on the Board of Directors of CPP, Inc., an international engineering services company since August 2015 and has been a Commissioner to the Colorado Commission on Higher Education since July 2015. Mr. McGimpsey received his Executive M.B.A. (with honors) from Colorado State University, his Juris Doctor degree from the University of Colorado and his B.S. degree in Computer Science (with a minor in electrical systems) from Embry-Riddle Aeronautical University. Mr. McGimpsey is a National Association of Corporate Directors (NACD) Board Leadership Fellow.

ITEM 1A. RISK FACTORS

Our business, financial condition, operating results and cash flows can be impacted by a number of factors, including, but not limited to, those set forth below, any of which could cause our results to be adversely impacted and could result in a decline in the value or loss of an investment in our common stock. Other factors may also exist that we cannot anticipate or that we currently do not consider to be significant based on information that is currently available. These risks and uncertainties have the potential to materially affect our business, financial condition, results of operations, cash flows and future results. Such risks and uncertainties may also impact the accuracy of forward-looking statements included in this Form 10-K and other reports we file with the Securities and Exchange Commission. Investors should carefully consider information in this Annual Report on Form 10-K in light of the risk factors described below.

We conduct manufacturing at only a few sites and our sites are not generally interchangeable.

Our power products for the semiconductor industry are manufactured in Shenzhen, PRC. Our high voltage products are manufactured in Ronkonkoma, New York, Littlehampton, United Kingdom and Shenzhen, PRC. Our thermal instrumentation products that are used in the semiconductor industry are manufactured in Vancouver, Washington and Littlehampton, United Kingdom. Each facility is under operating lease and interruptions in operations could be caused by early termination of existing leases by landlords or failure by landlords to renew existing leases upon expiration, including

the possibility that suitable operating locations may not be available in proximity to existing facilities which could result in labor or supply chain risks. Each facility manufactures different products, and therefore, is not interchangeable. Natural, uncontrollable occurrences or other operational issues at any of our manufacturing facilities could significantly reduce our productivity at such site and could prevent us from meeting our customers' requirements in a timely manner, or at all. In particular, for certain higher demand products manufactured out of our Littlehampton, United Kingdom site, we are experiencing longer delivery times and delayed shipments to customers which may continue over the short term. Any potential losses from such occurrences could significantly affect our relationship with customers, operations and results of operations for a prolonged period of time.

Our restructuring and other cost reduction efforts in prior years have included transitioning manufacturing operations to our facility in Shenzhen from other manufacturing facilities, such as Fort Collins, Colorado and Littlehampton, United Kingdom, which renders us increasingly reliant upon our Shenzhen facility. We have been notified that we will be required to relocate our Shenzhen, PRC manufacturing facility by July 2020. A disruption in manufacturing at our Shenzhen facility, from whatever cause, could have a significantly adverse effect on our ability to fulfill customer orders, our ability to maintain customer relationships, our costs to manufacture our products and, as a result, our results of operations and financial condition.

Our evolving manufacturing footprint may increase our risk.

The nature of our manufacturing is evolving as we continue to grow by acquisition. Historically, our principal manufacturing location has been in Shenzhen, PRC; however, we have also added specialized manufacturing at our Littlehampton, United Kingdom, and Ronkonkoma, New York facilities. From time to time we may be required to relocate manufacturing or migrate manufacturing of specific products between facilities or to third party manufacturers. We have been notified that we will be required to relocate our Shenzhen, PRC manufacturing facility by July 2020. If we do not successfully coordinate the timely manufacturing and distribution of our products during this time, we may have insufficient supply of products to meet customer demand, we could lose sales, we may experience a build-up in inventory, or we may incur additional costs.

Raw material, part, component, and subassembly shortages, exacerbated by our dependence on sole and limited source suppliers, could affect our ability to manufacture products and systems and could delay our shipments.

Our business depends on our ability to manufacture products that meet the rapidly changing demands of our customers. Our ability to timely manufacture our products depends in part on the timely delivery of raw materials, parts, components, and subassemblies from suppliers. We rely on sole and limited source suppliers for some of our raw materials, parts, components, and subassemblies that are critical to the manufacturing of our products.

This reliance involves several risks, including the following:

- the inability to obtain an adequate supply of required parts, components, or subassemblies;
- supply shortages, if a sole or limited source provider ceases operations;
- the need to fund the operating losses of a sole or limited source provider;
- reduced control over pricing and timing of delivery of raw materials and parts, components, or subassemblies;
- the need to qualify alternative suppliers;
- suppliers that may provide parts, components or subassemblies that are defective, contain counterfeit goods or are otherwise misrepresented to us in terms of form, fit or function; and
- the inability of our suppliers to develop technologically advanced products to support our growth and development of new products.

From time to time, our sole or limited source suppliers have given us notice that they are ending supply of critical parts, components, and subassemblies that are required for us to deliver product. If we cannot qualify alternative suppliers before ending supply of critical parts from the sole or limited source suppliers, we may be required to make a last-time-buy(s) and take possession of material amounts of inventory in advance of customer demand. In some instances, the last-time-buy materials required to be purchased may be for several years which in turn exposes us to additional excess and obsolescence risk. If we cannot qualify alternative suppliers before the last-time-buy materials are utilized in our products or legacy inverter warranty operations, we may be unable to deliver further product or legacy inverter warranty service to our customers.

Qualifying alternative suppliers could be time consuming and lead to delays in, or prevention of delivery of products to our customers, as well as increased costs. If we are unable to qualify additional suppliers and manage relationships with our existing and future suppliers successfully, if our suppliers experience financial difficulties including bankruptcy, or if our suppliers cannot meet our performance or quality specifications or timing requirements, we may experience shortages, delays, or increased costs of raw materials, parts, components, or subassemblies. This in turn could limit or prevent our ability to

manufacture and ship our products, which could materially and adversely affect our relationships with our current and prospective customers and our business, financial condition, and results of operations.

Our orders of raw materials, parts, components, and subassemblies are based on demand forecasts.

We place orders with many of our suppliers based on our customers' quarterly forecasts and our annual forecasts. These forecasts are based on our customers' and our expectations as to demand for our products. As the quarter and the year progress, such demand can change rapidly or we may realize that our customers' expectations were overly optimistic or pessimistic, especially when industry or general economic conditions change. Orders with our suppliers cannot always be amended in response. In addition, in order to assure availability of certain components or to obtain priority pricing, we have entered into contracts with some of our suppliers that require us to purchase a specified amount of components and subassemblies each quarter, even if we are not able to use such components or subassemblies. Moreover, we have obligations to some of our customers to hold a minimum amount of finished goods in inventory, in order to fulfill just in time orders, regardless of whether the customers expect to place such orders. We currently have firm purchase commitments and agreements with various suppliers to ensure the availability of components. If demand for our products does not continue at current levels, we might not be able to use all of the components that we are required to purchase under these commitments and agreements, and our reserves for excess and obsolete inventory may increase, which could have a material adverse effect on our results of operations. If demand for our products exceeds our customers' and our forecasts, we may not be able to timely obtain sufficient raw materials, parts, components, or subassemblies, on favorable terms or at all, to fulfill the excess demand.

Newly enacted U.S. government tax reform could have a negative impact on the results of future operations.

On December 22, 2017, the U.S. Tax Cuts and Jobs Act (the "Tax Act") was enacted which contained substantial changes to the Internal Revenue Code, some of which could have an adverse effect on our business. The Tax Act significantly revises the U.S. corporate income tax by, among other things, lowering corporate income tax rates, implementing the territorial tax system and imposing a transition tax on deemed repatriated earnings of our foreign subsidiaries. With the enactment of the Tax Act, our financial results for 2017 included a mandatory one-time estimated income tax expense of approximately \$72.9 million resulting from the transition tax and the revaluation of our U.S. deferred tax assets and liabilities to reflect the recently enacted 21% federal corporate tax rate effective January 1, 2018. These estimates are based on our initial analysis of the Tax Act. Given the significant complexity of the Tax Act, anticipated guidance from the Internal Revenue Service about implementing the Tax Act, and the potential for additional guidance from the Securities and Exchange Commission or the Financial Accounting Standards Board related to the Tax Act, these estimates may be adjusted in future periods during 2018.

Significant developments stemming from recent U.S. government proposals concerning tariffs and other economic proposals could have a material adverse effect on us.

Recent U.S. government proposals could impose greater restrictions and economic disincentives on international trade, particularly imports.

Proposals to date include possible tariffs on goods imported into the United States, particularly from China, that could increase the cost of imported products. We have our primary manufacturing facility in Shenzhen, PRC and a significant portion of our products are imported into the United States. Any increase in the cost of our goods imported into the United States could adversely impact our competitiveness. Depending on the final regulation, we may elect to move some of our manufacturing operations to the US which could increase our costs as well. While the final changes in regulation are not known at this time, any final regulation that adds a cost to imported product could have a material effect on our costs and net income.

Changes in U.S. social, political, regulatory and economic conditions or in laws and policies governing foreign trade, manufacturing, development and investment in the territories and countries where we currently develop and sell products, and any negative sentiments towards the United States as a result of such changes, could adversely affect our business. In addition, negative sentiments towards the United States among non-U.S. customers and among non-U.S. employees or prospective employees could adversely affect sales or hiring and retention, respectively.

Increased governmental action on income tax regulations could negatively impact our business.

International governments have heightened their review and scrutiny of multinational businesses like ours which could increase our compliance costs and future tax liability to those governments. As governments continue to look for ways to increase their revenue streams they could increase audits of companies to accelerate the recovery of monies perceived as owed to them under current or past regulations. Such an increase in audit activity could have a negative impact on companies which operate internationally, as we do.

Activities necessary to integrate acquisitions may result in costs in excess of current expectations or be less successful than anticipated.

We have completed acquisitions in the past and we may acquire other businesses in the future. The success of such transactions will depend on, among other things, our ability to integrate assets and personnel acquired in these transactions and to apply our internal controls process to these acquired businesses. The integration of acquisitions may require significant attention from our management, and the diversion of management's attention and resources could have a material adverse effect on our ability to manage our business. Furthermore, we may not realize the degree or timing of benefits we anticipated when we first entered into the acquisition transaction. If actual integration costs are higher than amounts originally anticipated, if we are unable to integrate the assets and personnel acquired in an acquisition as anticipated, or if we are unable to fully benefit from anticipated synergies, our business, financial condition, results of operations, and cash flows could be materially adversely affected.

We have historically made acquisitions and divestitures. However, we may not find suitable acquisition candidates in the future and we may not be able to successfully integrate and manage acquired businesses. In either an acquisition or a divestiture, we may be required to make fundamental changes in our ERP, business processes and tools which could disrupt our core business and harm our financial condition.

In the past, we have made strategic acquisitions of other corporations and entities, as well as asset purchases, and we continue to evaluate potential strategic acquisitions of complementary companies, products, and technologies. We have also divested businesses. In the future, we could:

- issue stock that would dilute our current stockholders' percentage ownership;
- pay cash that would decrease our working capital;
- incur debt;
- assume liabilities; or
- incur expenses related to impairment of goodwill and amortization.

Acquisitions and divestitures also involve numerous risks, including:

- problems combining or separating the acquired/divested operations, systems, technologies, or products;
- an inability to realize expected sales forecasts, operating efficiencies or product integration benefits;
- difficulties in coordinating and integrating geographically separated personnel, organizations, systems, and facilities;
- difficulties integrating business cultures;
- unanticipated costs or liabilities;
- diversion of management's attention from our core business;
- adverse effects on existing business relationships with suppliers and customers;
- potential loss of key employees, particularly those of purchased organizations;
- incurring unforeseen obligations or liabilities in connection with either acquisitions or divestitures; and
- the failure to complete acquisitions even after signing definitive agreements which, among other things, would result in the expensing of potentially significant professional fees and other charges in the period in which the acquisition or negotiations are terminated.

We may not be able to successfully identify appropriate acquisition candidates, to integrate any businesses, products, technologies, or personnel that we might acquire in the future or achieve the anticipated benefits of such transactions, which may harm our business.

Our operations in the People's Republic of China are subject to significant political and economic uncertainties over which we have little or no control and we may be unable to alter our business practice in time to avoid reductions in revenues.

A significant portion of our operations outside the United States are located in the PRC, which exposes us to risks, such as exchange controls and currency restrictions, changes in local economic conditions, changes in customs regulations, changes in tax policies, changes in PRC laws and regulations, possible expropriation or other PRC government actions, and unsettled political conditions including potential changes in U.S. policy regarding overseas manufacturing. These factors may have a material adverse effect on our operations, business, results of operations, and financial condition. See "We are exposed to risks associated with worldwide financial markets and the global economy" risk factor below.

The PRC's economy differs from the economies of most developed countries in many respects, including with respect to the amount of government involvement, level of development, rate of growth, control of foreign exchange and allocation of resources. While the economy of the PRC has experienced significant growth in the past 20 years, growth has been uneven across different regions and amongst various economic sectors of the PRC. The PRC government has implemented various measures to encourage economic development and guide the allocation of resources. Strikes by workers and picketing in front of the factory gates of certain companies in Shenzhen have caused unrest among some workers seeking higher wages, which could impact our manufacturing facility in Shenzhen. While some of the government's measures may benefit the overall economy of the PRC, they may have a negative effect on us. For example, our financial condition and results of operations may be materially and adversely affected by government control over capital investments or changes in tax regulations that are applicable to us as well as work stoppages.

Changes in tax laws, tax rates, or mix of earnings in tax jurisdictions in which we do business, could impact our future tax liabilities and related corporate profitability

We are subject to income taxes in the U.S. (federal and state) and numerous foreign jurisdictions. Tax laws, regulations, and administrative practices in various jurisdictions may be subject to significant change due to economic, political, and other conditions, and significant judgment is required in evaluating and estimating our provision and accruals for these taxes. There are many transactions that occur during the ordinary course of business for which the ultimate tax determination is uncertain. Our effective tax rates could be adversely affected by earnings being lower than anticipated in jurisdictions where we have lower statutory rates and earnings higher than anticipated in jurisdictions where we have higher statutory rates, losses incurred in jurisdictions for which we are not able to realize the related tax benefit, changes in foreign currency exchange rates, entry into new businesses and geographies and changes to our existing businesses, acquisitions (including integrations) and investments, changes in our deferred tax assets and liabilities and their valuation, and changes in the relevant tax, accounting, and other laws, regulations, administrative practices, principles, and interpretations, including fundamental changes to the tax laws applicable to corporate multinationals. The U.S., many countries in the European Union, and a number of other countries are actively considering changes in this regard.

For example, on October 5, 2015, the Organisation for Economic Co-operation and Development (OECD) issued the final report on all 15 Base Erosion and Profit Shifting "BEPS" Action Plans. According to the OECD, the current rules have created opportunities for Base Erosion and Profit Shifting and suggest new rules whereby profits are taxed where economic activities take place and value is created. OECD comments include new or reinforced international standards as well as concrete measures to help countries tackle BEPS. Among the highlights of the OECD Final Reports are the new transfer pricing approach and reinforced international standards on tax treaties, the setting of minimum standards on harmful tax practices, treaty abuse, country-by-country reporting and dispute resolution, action items requiring national legislation particularly in hybrid mismatches and interest restriction, and analytical reports with recommendations concerning digital economy and multilateral instruments. If countries in which we operate adopt the OECD recommendations as outlined in the BEPS Action Plans, it is uncertain to what extent the changes could impact the Company.

We are exposed to risks associated with worldwide financial markets and the global economy.

Our business depends on the expansion of manufacturing capacity in our end markets and the installation base for the products we sell. In the past, severe tightening of credit markets, turmoil in the financial markets, and a weakening global economy have contributed to slowdowns in the industries in which we operate. Some of our key markets depend largely on consumer spending. Economic uncertainty, such as that recently experienced in the PRC, exacerbates negative trends in consumer spending and may cause our customers to push out, cancel, or refrain from placing orders.

Difficulties in obtaining capital and uncertain market conditions may also lead to a reduction of our sales and greater instances of nonpayment. These conditions may similarly affect our key suppliers, which could affect their ability to deliver parts and result in delays for our products. Further, these conditions and uncertainty about future economic conditions could make it challenging for us to forecast our operating results and evaluate the risks that may affect our business, financial condition, and results of operations. As discussed in "*Our orders of raw materials, parts, components, and subassemblies are based on demand forecasts,*" a significant percentage of our expenses are relatively fixed and based, in part, on expectations of future net sales. If a sudden decrease in demand for our products from one or more customers were to occur, the inability to adjust spending quickly enough to compensate for any shortfall would magnify the adverse impact of a shortfall in net sales on our results of operations. Conversely, if market conditions were to unexpectedly improve and demand for our products were to increase suddenly, we might not be able to respond quickly enough, which could have a negative impact on our results of operations and customer relations.

Our results of operations could be affected by natural disasters and other events in the locations in which we or our customers or suppliers operate.

We have manufacturing and other operations in locations subject to natural occurrences such as severe weather and geological events including earthquakes or tsunamis that could disrupt operations. In addition, our suppliers and customers also have operations in such locations. A natural disaster, fire, explosion, or other event that results in a prolonged disruption to our operations, or the operations of our customers or suppliers, may materially adversely affect our business, results of operations, or financial condition.

We transitioned a significant amount of our supply base to Asian suppliers.

We transitioned the purchasing of a substantial portion of components for our thin film products to Asian suppliers to lower our materials costs and shipping expenses. These components might require us to incur higher than anticipated testing or repair costs, which would have an adverse effect on our operating results. Customers who have strict and extensive qualification requirements might not accept our products if these lower-cost components do not meet their requirements. A delay or refusal by our customers to accept such products, as well as an inability of our suppliers to meet our purchasing requirements, might require us to purchase higher-priced components from our existing suppliers or might cause us to lose sales to these customers, either of which could lead to decreased revenue and gross margins and have an adverse effect on our results of operations.

The industries in which we compete are subject to volatile and unpredictable cycles.

As a supplier to the global semiconductor, flat panel display, solar, industrial and related industries, we are subject to business cycles, the timing, length, and volatility of which can be difficult to predict. These industries historically have been cyclical due to sudden changes in customers' manufacturing capacity requirements and spending, which depend in part on capacity utilization, demand for customers' products, inventory levels relative to demand, and access to affordable capital. These changes have affected the timing and amounts of customers' purchases and investments in technology, and continue to affect our orders, net sales, operating expenses, and net income. In addition, we may not be able to respond adequately or quickly to the declines in demand by reducing our costs. We may be required to record significant reserves for excess and obsolete inventory as demand for our products changes.

To meet rapidly changing demand in each of the industries we serve, we must effectively manage our resources and production capacity. During periods of decreasing demand for our products, we must be able to appropriately align our cost structure with prevailing market conditions, effectively manage our supply chain, and motivate and retain key employees. During periods of increasing demand, we must have sufficient manufacturing capacity and inventory to fulfill customer orders, effectively manage our supply chain, and attract, retain, and motivate a sufficient number of qualified individuals. If we are not able to timely and appropriately adapt to changes in our business environment or to accurately assess where we are positioned within a business cycle, our business, financial condition, or results of operations may be materially and adversely affected.

We must continually design and introduce new products into the markets we serve to respond to competition and rapid technological changes.

We operate in a highly competitive environment where innovation is critical, our future success depends on many factors, including the effective commercialization and customer acceptance of our products and services. The development, introduction and support of a broadening set of products is critical to our continued success. Our results of operations could be adversely affected if we do not continue to develop new products, improve and develop new applications for existing products, and differentiate our products from those of competitors resulting in their adoption by customers.

We must achieve design wins to retain our existing customers and to obtain new customers, although design wins achieved do not necessarily result in substantial sales.

Driven by continuing technology migration and changing customers demand the markets we serve are constantly changing in terms of advancement in applications, core technology and competitive pressures. New products we design for capital equipment manufacturers typically have a lifespan of five to ten years. Our success and future growth depends on our products being designed into our customers new generations of equipment as they develop new technologies and applications. We must work with these manufacturers early in their design cycles to modify, enhance and upgrade our products or design new products that meet the requirements of their new systems. The design win process is highly competitive and we may win or lose new design wins for our existing customers or new customers next generations of equipment. In case existing or new customers do not choose our products as a result of the development, evaluation and qualification efforts related to the design

win process, our market share will be reduced, the potential revenues related to the lifespan of our customers' products, which can be 5-10 years, will not be realized, and our business, financial condition and results of operations would be materially and adversely impacted.

We generally have no long-term contracts with our customers requiring them to purchase any specified quantities from us.

Our sales are primarily made on a purchase order basis, and we generally have no long-term purchase commitments from our customers, which is typical in the industries we serve. As a result, we are limited in our ability to predict the level of future sales or commitments from our current customers, which may diminish our ability to allocate labor, materials, and equipment in the manufacturing process effectively. In addition, we may purchase inventory in anticipation of sales that do not materialize, resulting in excess and obsolete inventory write-offs.

If we are unable to adjust our business strategy successfully for some of our product lines to reflect the increasing price sensitivity on the part of our customers, our business and financial condition could be harmed.

Our business strategy for many of our product lines has been focused on product performance and technology innovation to provide enhanced efficiencies and productivity. As a result of recent economic conditions and changes in various markets that we serve, our customers have experienced significant cost pressures. We have observed increased price sensitivity on the part of our customers. If competition against any of our product lines should come to focus solely on price rather than on product performance and technology innovation, we will need to adjust our business strategy and product offerings accordingly, and if we are unable to do so, our business, financial condition, and results of operations could be materially and adversely affected.

Our competitive position could be weakened if we are unable to convince end users to specify that our products be used in the equipment sold by our customers.

The end users in our markets may direct equipment manufacturers to use a specified supplier's product in their equipment at a particular facility. This occurs with frequency because our products are critical in manufacturing process control for thin-film applications. Our success, therefore, depends in part on our ability to have end users specify that our products be used at their facilities. In addition, we may encounter difficulties in changing established relationships of competitors that already have a large installed base of products within such facilities.

The markets we operate in are highly competitive.

We face substantial competition, primarily from established companies, some of which have greater financial, marketing, and technical resources than we do. We expect our competitors will continue to develop new products in direct competition with ours, improve the design and performance of their products, and introduce new products with enhanced performance characteristics. In order to remain competitive, we must improve and expand our products and product offerings. In addition, we may need to maintain a high level of investment in research and development and expand our sales and marketing efforts, particularly outside of the United States. We might not be able to make the technological advances and investments necessary to remain competitive. If we were unable to improve and expand our products and product offerings, our business, financial condition, and results of operations could be materially and adversely affected.

A significant portion of our sales and accounts receivable are concentrated among a few customers.

Our ten largest customers accounted for 70.4%, 67.7% and 61.2% of our sales for the years ended December 31, 2017, 2016 and 2015, respectively. During the year ended December 31, 2017, sales to Applied Materials, Inc. and Lam Research were \$224.8 million and \$155.3 million or 33.5% and 23.1%, respectively, and accounts receivable were \$36.8 million and \$5.4 million, respectively. During the year ended December 31, 2016, sales to Applied Materials, Inc., and Lam Research were \$170.2 million and \$100.3 million, or 35.2% and 20.7%, respectively, and accounts receivable were \$31.1 million and \$14.3 million, respectively. During the year ended December 31, 2015, sales to Applied Materials, Inc. and Lam Research were \$123.5 million and \$84.2 million, or 29.8% and 20.3%, respectively, and accounts receivable were \$17.1 million and \$7.3 million, respectively. A significant decline in sales from either or both of these customers, or the Company's inability to collect on these sales, could materially and adversely impact our business, results of operations and financial condition.

We maintain significant amounts of cash in international locations.

Given the global nature of our business, we have both domestic and international concentrations of cash and investments. The value of our cash, cash equivalents, and marketable securities can be negatively affected by liquidity, credit

deterioration, financial results, economic risk, political risk, sovereign risk or other factors. The Company intends to utilize its foreign cash to expand our international operations through internal growth and strategic acquisitions. If our intent changes or if these funds are needed for our U.S. operations, or we are negatively impacted by any of the factors above, our financial condition and results of operations could be materially adversely affected.

We are subject to risks inherent in international operations.

Sales to our customers outside the United States were approximately 32.5% and 32.3% of our total sales for the years ended December 31, 2017 and 2016. The acquisitions of the power controls modules and high and low voltage product lines have increased our presence in international locations. Our success producing goods internationally and competing in international markets is subject to our ability to manage various risks and difficulties, including, but not limited to:

- our ability to effectively manage our employees at remote locations who are operating in different business environments from the United States;
- our ability to develop and maintain relationships with suppliers and other local businesses;
- compliance with product safety requirements and standards that are different from those of the United States;
- variations and changes in laws applicable to our operations in different jurisdictions, including enforceability of intellectual property and contract rights;
- trade restrictions, political instability, disruptions in financial markets, and deterioration of economic conditions;
- customs regulations and the import and export of goods (including customs audits in various countries that occur from time to time);
- the ability to provide sufficient levels of technical support in different locations;
- our ability to obtain business licenses that may be needed in international locations to support expanded operations;
- timely collecting accounts receivable from foreign customers including \$21.4 million in accounts receivable from foreign customers as of December 31, 2017; and
- changes in tariffs, taxes, and foreign currency exchange rates.

Our profitability and ability to implement our business strategies, maintain market share and compete successfully in international markets will be compromised if we are unable to manage these and other international risks successfully.

Globalization of sales increases risk of compliance with policy.

We operate in an increasingly complex sales environment around the world which places greater importance on our global control environment and imposes additional oversight risk. Such increased complexity could adversely affect our operating results by increasing compliance costs in the near-term and by increasing the risk of control failures in the event of non-compliance.

Market pressures and increased low-cost competition may reduce or eliminate our profitability.

Our customers continually exert pressure on us to reduce our prices and extend payment terms. Given the nature of our customer base and the highly competitive markets in which we compete, we may be required to reduce our prices or extend payment terms to remain competitive. We have recently seen pricing pressure from our largest customers due in part to low-cost competition and market consolidation. As a result of the competitive markets we serve, from time to time we may enter into long term pricing agreements with our largest customers that results in reduced product pricing. Such reduced product pricing may result in product margin declines unless we are successful in reducing our product costs ahead of such price reductions. We believe some of our Asian competitors benefit from local governmental funding incentives and purchasing preferences from end-user customers in their respective countries. Moreover, in order to be successful in the current competitive environment, we are required to accelerate our investment in research & development to meet time-to-market, performance and technology adoption cycle needs of our customers simply in order to compete for design wins, and if successful, receive potential purchase orders. Given such up-front investments we have to make and the competitive nature of our markets, we may not be able to reduce our expenses in an amount sufficient to offset potential margin declines or loss of business and may not be able to meet customer product time-line expectations. The potential decrease in cash flow could materially and adversely impact our financial condition.

We are highly dependent on our intellectual property.

Our success depends significantly on our proprietary technology. We attempt to protect our intellectual property rights through patents and non-disclosure agreements; however, we might not be able to protect our technology, and competitors might be able to develop similar technology independently. In addition, the laws of some foreign countries might not afford our intellectual property the same protections as do the laws of the United States. Our intellectual property is not protected

by patents in several countries in which we do business, and we have limited patent protection in other countries, including the PRC. The cost of applying for patents in foreign countries and translating the applications into foreign languages requires us to select carefully the inventions for which we apply for patent protection and the countries in which we seek such protection. Generally, our efforts to obtain international patents have been concentrated in the European Union and certain industrialized countries in Asia, including Korea, Japan, and Taiwan. If we are unable to protect our intellectual property successfully, our business, financial condition, and results of operations could be materially and adversely affected.

The PRC commercial law is relatively undeveloped compared to the commercial law in the United States. Limited protection of intellectual property is available under PRC law. Consequently, manufacturing our products in the PRC may subject us to an increased risk that unauthorized parties may attempt to copy our products or otherwise obtain or use our intellectual property. We may not be able to protect our intellectual property rights effectively. Additionally, we may not have adequate legal recourse in the event that we encounter infringements of our intellectual property in the PRC.

Our legacy inverter products may suffer higher than anticipated litigation, damage or warranty claims.

Our legacy inverter products (of which we discontinued the manufacture, engineering, and sale in December 2015 and which are reflected as Discontinued Operations in this filing) contain components that may contain errors or defects and were sold with original product warranties ranging from one to ten years with an option to purchase additional warranty coverage for up to 20 years. If any of our products are defective or fail because of their design, we might be required to repair, redesign or recall those products or to pay damages (including liquidated damages) or warranty claims, and we could suffer significant harm to our reputation. We are experiencing claims from customers and suppliers and in some cases litigation related to the legacy inverter product line. Prior suppliers of the legacy inverter business have made claims and have pursued lawsuits ranging from allegations of losses associated with raw material inventory and other commercial claims, to an allegation of improper use of proprietary design. We review such claims and vigorously defend against such lawsuits in the ordinary course of our business. We cannot assure you that any such claims or litigation brought against us will not have a material adverse effect on our business or financial statements. Our involvement in such litigation could result in significant expense to us and divert the efforts of our technical and management personnel. We also accrue a warranty reserve for estimated costs to provide warranty services including the cost of technical support, product repairs, and product replacement for units that cannot be repaired. Our estimate of costs to fulfill our warranty obligations is based on historical experience and expectation of future conditions. To the extent we experience increased warranty claim activity or increased costs associated with servicing those claims, our warranty accrual will increase, resulting in additional expenses in the line "Income (loss) from discontinued operations, net of tax" on our Consolidated Statement of Operations in future periods. We plan to continue supporting inverter customers with service maintenance and repair operations. This includes performing service to fulfill obligations under existing service maintenance contracts. There is no certainty that these can be performed profitably and could be adversely affected by higher than anticipated product failure rates, loss of critical service technician skills, an inability to obtain service parts, customer demands and disputes and cost of repair parts, among other factors. See *Note 3. Discontinued Operations* in Item 8 "Financial Statements and Supplementary Data".

Our products may suffer from defects or errors leading to damage or warranty claims.

Our products use complex system designs and components that may contain errors or defects, particularly when we incorporate new technology into our products or release new versions. If any of our products are defective or fail because of their design, we might be required to repair, redesign or recall those products, pay damages (including liquidated damages) or warranty claims, and we could suffer significant harm to our reputation. We accrue a warranty reserve for estimated costs to provide warranty services including the cost of technical support, product repairs, and product replacement for units that cannot be repaired. Our estimate of costs to fulfill our warranty obligations is based on historical experience and expectation of future conditions. To the extent we experience increased warranty claim activity or increased costs associated with servicing those claims, our warranty accrual will increase, resulting in decreased gross profit. In recent years, we have experienced increased warranty costs for our legacy inverter product lines, which is reflected in "Income from discontinued operations, net of income taxes." See *Note 3. Discontinued Operations* in Item 8 "Financial Statements and Supplementary Data".

Unfavorable currency exchange rate fluctuations may lead to lower operating margins, or may cause us to raise prices, which could result in reduced sales.

Currency exchange rate fluctuations could have an adverse effect on our sales and results of operations and we could experience losses with respect to forward exchange contracts into which we may enter. Unfavorable currency fluctuations could require us to increase prices to foreign customers, which could result in lower net sales by us to such customers. Alternatively, if we do not adjust the prices for our products in response to unfavorable currency fluctuations, our results of

operations could be materially and adversely affected. In addition, most sales made by our foreign subsidiaries are denominated in the currency of the country in which these products are sold and the currency in which they receive payment for such sales could be less valuable at the time of receipt as a result of exchange rate fluctuations. Given recent acquisitions in Europe, our exposure to fluctuations in the value of the Euro is becoming more significant. From time to time, we enter into forward exchange contracts and local currency purchased options to reduce currency exposures related to likely or pending transactions including those arising from intercompany sales of inventory. However, we cannot be certain that our efforts will be adequate to protect us against significant currency fluctuations or that such efforts will not expose us to additional exchange rate risks, which could materially and adversely affect our results of operations.

Recent developments relating to the United Kingdom's referendum vote in favor of leaving the European Union and related actions could adversely affect us.

On June 23, 2016, the United Kingdom (UK) held a referendum in which voters approved an exit from the European Union ("EU"). On March 29, 2017, the UK's ambassador to the EU delivered a letter to the president of the European Council that gave formal notice under Article 50 of the Lisbon Treaty of UK's withdrawal from the EU, commonly referred to as "Brexit". As a result, negotiations have commenced to determine the terms of the UK's withdrawal from the EU as well as its relationship with the EU going forward, including the terms of trade between the UK and the EU. Although it is unknown what those terms will be, it is possible that there will be greater restrictions on imports and exports between the UK and EU countries and increased regulatory complexities. These changes may adversely affect our sales, operations and financial results. In particular, our operations in the UK may be adversely affected by extreme fluctuations in the UK exchange rates. Moreover, the imposition of any import restrictions and duties levied on our UK products as imported for EU customers may make our products more expensive for such customers and less competitive from a pricing perspective.

Changes in the value of the Chinese yuan could impact the cost of our operation in Shenzhen, PRC and our sales growth in our PRC markets.

The PRC government is continually pressured by its trading partners to allow its currency to float in a manner similar to other major currencies. In 2016, the PRC's currency devalued by a cumulative 6.5% against the U.S. dollar, making Chinese exports cheaper and imports into the PRC more expensive by that amount. This devaluation negatively impacts U.S. businesses that trade with the PRC because it puts them at a cost disadvantage. Any change in the value of the Chinese yuan may impact our ability to control the cost of our products in the world market. Specifically, the decision by the PRC government to allow the yuan to begin to float against the United States dollar could significantly increase the labor and other costs incurred in the operation of our Shenzhen facility and the cost of raw materials, parts, components, and subassemblies that we source in the PRC, thereby having a material and adverse effect on our financial condition and results of operations.

Difficulties with our enterprise resource planning ("ERP") system and other parts of our global information technology system could harm our business and results of operation.

Like many multinational corporations, we maintain a global information technology system, including software products licensed from third parties. Any system, network or Internet failures, misuse by system users, the hacking into or disruption caused by unauthorized access or loss of license rights could disrupt our ability to timely and accurately manufacture and ship products or to report our financial information in compliance with the timelines mandated by the SEC. Any such failure, misuse, hacking, disruptions or loss would likely cause a diversion of management's attention from the underlying business and could harm our operations. In addition, a significant failure of our global information technology system could adversely affect our ability to complete an evaluation of our internal controls and attestation activities pursuant to Section 404 of the Sarbanes-Oxley Act of 2002.

If our network security measures are breached and unauthorized access is obtained to a customer's data or our data or our information technology systems, we may incur significant legal and financial exposure and liabilities.

As part of our day-to-day business, we store our data and certain data about our customers in our global information technology system. Unauthorized access to our data, including any regarding our customers, could expose us to a risk of loss of this information, loss of business, litigation and possible liability. These security measures may be breached by intentional misconduct by computer hackers, as a result of third-party action, employee error, malfeasance or otherwise. Additionally, third parties may attempt to fraudulently induce employees or customers into disclosing sensitive information such as user names, passwords or other information in order to gain access to our customers' data or our data, including our intellectual property and other confidential business information, or our information technology systems. Because the techniques used to obtain unauthorized access, or to sabotage systems, change frequently and generally are not recognized until launched against a target, we may be unable to anticipate these techniques or to implement adequate preventative measures. Any security

breach could result in a loss of confidence by our customers, damage our reputation, disrupt our business, lead to legal liability and negatively impact our future sales.

The loss of any of our key personnel could significantly harm our results of operations and competitive position.

Our success depends to a significant degree upon the continuing contributions of our key management, technical, marketing, and sales employees. We may not be successful in retaining our key employees or attracting or retaining additional skilled personnel as required. Failure to retain or attract key personnel could significantly harm our results of operations and competitive position. We must develop our personnel to provide succession plans capable of maintaining continuity in the midst of the inevitable unpredictability of personnel retention. While we have plans for key management succession and long-term compensation plans designed to retain our senior employees, if our succession plans do not operate effectively, our business could be adversely affected.

Deterioration of demand for our inverter services could negatively impact our business.

Our business may be adversely affected by changes in national or global demand for our inverter service repair capabilities. Any such changes could adversely affect the carrying amount of our inverter service inventories, thereby negatively affecting our financial results from Continuing Operations.

We have been, and in the future may again be, involved in litigation. Litigation is costly and could result in further restrictions on our ability to conduct business or make use of market relationships we have developed, or an inability to prevent others from using technology.

Litigation may be necessary to enforce our commercial or property rights, to defend ourselves against claimed violations of such rights of others, or to protect our interests in regulatory, tax, customs, commercial, and other disputes or similar matters. Litigation often requires a substantial amount of our management's time and attention, as well as financial and other resources, including:

- substantial costs in the form of legal fees, fines, and royalty payments;
- restrictions on our ability to sell certain products or in certain markets;
- an inability to prevent others from using technology we have developed; and
- a need to redesign products or seek alternative marketing strategies.

Any of these events could have a significant adverse effect on our business, financial condition, and results of operations.

Return on investments or interest rate declines on plan investments could result in additional unfunded pension obligations for the HiTek Power pension plan.

We currently have unfunded obligations in the HiTek Power pension plan. The extent of future contributions to the pension plan depends heavily on market factors such as the discount rate used to calculate our future obligations and the actual return on plan assets which enable future payments. We estimate future contributions to the plan using assumptions with respect to these and other items. Changes to those assumptions could have a significant effect on future contributions. Additionally, a material deterioration in the funded status of the plan could increase pension expenses and reduce our profitability. See *Note 14. Retirement Plans* in Item 8 "Financial Statements and Supplementary Data" contained herein.

Funds associated with our marketable securities that we have traditionally held as short-term investments may not be liquid or readily available.

In the past, certain of our investments have been affected by external market conditions that impacted the liquidity of the investment. We do not currently have investments with reduced liquidity, but external market conditions that we cannot anticipate or mitigate may impact the liquidity of our marketable securities. Any changes in the liquidity associated with these investments may require us to borrow funds at terms that are not favorable or repatriate cash from international locations at a significant cost. We cannot be certain that we will be able to borrow funds or continue to repatriate cash on favorable terms, or at all. If we are unable to do so, our available cash may be reduced until those investments can be liquidated. The lack of available cash may prevent us from taking advantage of business opportunities that arise and may prevent us from executing some of our business plans, either of which could cause our business, financial condition or results of operations to be materially and adversely affected.

Our intangible assets may become impaired.

As of December 31, 2017, we have \$53.8 million of goodwill and \$33.5 million in intangible assets. We periodically review the estimated useful lives of our goodwill and identifiable intangible assets, taking into consideration any events or circumstances that might result in either a diminished fair value, or for intangible assets, a revised useful life. The events and circumstances include significant changes in the business climate, legal factors, operating performance indicators, and competition. Any impairment or revised useful life could have a material and adverse effect on our financial position and results of operations, and could harm the trading price of our common stock.

We are subject to numerous governmental regulations.

We are subject to federal, state, local and foreign regulations, including environmental regulations and regulations relating to the design and operation of our products and control systems and regulations governing the import, export and customs duties related to our products. We might incur significant costs as we seek to ensure that our products meet safety and emissions standards, many of which vary across the states and countries in which our products are used. In the past, we have invested significant resources to redesign our products to comply with these directives. Compliance with future regulations, directives, and standards could require us to modify or redesign some products, make capital expenditures, or incur substantial costs. Also, we may incur significant costs in complying with the myriad of different import, export and customs regulations as we seek to sell our products internationally. If we do not comply with current or future regulations, directives, and standards:

- we could be subject to fines and penalties;
- our production or shipments could be suspended; and
- we could be prohibited from offering particular products in specified markets.

If we were unable to comply with current or future regulations, directives and standards, our business, financial condition and results of operations could be materially and adversely affected.

Financial reform legislation will result in new laws and regulations that may increase our costs of operations.

The Dodd-Frank Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act") requires various federal agencies to adopt a broad range of new implementing rules and regulations, and to prepare numerous studies and reports for Congress. On August 22, 2012, under the Dodd-Frank Act, the SEC adopted new requirements for companies that use certain minerals and metals, known as conflict minerals, in their products, whether or not these products are manufactured by third parties. These requirements require companies to perform due diligence, disclose and report whether or not such minerals originate from the Democratic Republic of Congo and adjoining countries. We have to perform sufficient due diligence to determine whether such minerals are used in the manufacture of our products. However, the implementation of these requirements could adversely affect the sourcing, availability and pricing of such minerals if they are found to be used in the manufacture of our products. In addition, we incur costs to comply with the disclosure requirements, including costs related to determining the source of any of the relevant minerals and metals used in our products. Since our supply chain is complex, we may not be able to sufficiently verify the origins for these minerals and metals used in our products through the due diligence procedures that we implement, which may harm our reputation. In such event, we may also face difficulties in satisfying customers who require that all of the components of our products are certified as conflict mineral free.

The market price of our common stock has fluctuated and may continue to fluctuate for reasons over which we have no control.

The stock market has from time to time experienced, and is likely to continue to experience, extreme price and volume fluctuations. Prices of securities of technology companies have been especially volatile and have often fluctuated for reasons that are unrelated to their operating performance. In the past, companies that have experienced volatility in the market price of their stock have been the subject of securities class action litigation. If we were the subject of securities class action litigation, it could result in substantial costs and a diversion of management's attention and resources.

Our operating results are subject to fluctuations, and if we fail to meet the expectations of securities analysts or investors, our share price may decrease significantly.

Our annual and quarterly results may vary significantly depending on various factors, many of which are beyond our control. Because our operating expenses are based on anticipated revenue levels, our sales cycle for development work is relatively long, and a high percentage of our expenses are fixed for the short term, a small variation in the timing of recognition of revenue can cause significant variations in operating results from period to period. If our earnings do not meet the expectations of securities analysts or investors, the price of our stock could decline.

Deterioration of economic conditions could negatively impact our business.

Our business may be adversely affected by changes in national or global economic conditions, including inflation, interest rates, availability of capital markets, consumer spending rates, energy availability and costs (including fuel surcharges) and the effects of governmental initiatives to manage economic conditions. Any such changes could adversely affect the demand for our products both in domestic and export markets, or the cost and availability of our needed raw materials and packaging materials, thereby negatively affecting our financial results.

A disruption in credit and other financial markets and deterioration of national and global economic conditions, could, among other things:

- negatively impact global demand for our products, which could result in a reduction of sales, operating income and cash flows;
- make it more difficult or costly for us to obtain financing for our operations or investments or to refinance our debt in the future;
- cause our lenders to depart from prior credit industry practice and make more difficult or expensive the granting of any technical or other waivers under our debt agreements to the extent we may seek them in the future;
- decrease the value of our investments; and
- impair the financial viability of our insurers.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Information concerning our principal properties at December 31, 2017 is set forth below:

| Location | Principal Activity | Ownership |
|---------------------------------|--|------------------|
| Fort Collins, CO | Corporate headquarters, research and development, distribution, sales, and service | Leased |
| San Jose, CA | Distribution, sales, and service, research and development | Leased |
| Georgetown, MA | Service | Leased |
| Ronkonkoma, New York | Manufacturing, distribution, service, and research and development | Leased |
| Vancouver, WA | Research and development, manufacturing, distribution, sales, and service | Leased |
| Beijing, China | Sales | Leased |
| Shanghai, China | Distribution and sales | Leased |
| Shenzhen, China | Manufacturing, distribution, service, and research and development | Leased |
| Xian, China | Service | Leased |
| Metzingen, Germany | Distribution, sales, and service | Leased |
| Warstein-Belecke, Germany | Research, distribution, sales, and service | Leased |
| Pune, India | Distribution and sales | Leased |
| Cork, Ireland | Sales, service, and research and development | Leased |
| Tokyo, Japan | Sales | Leased |
| Singapore | Sales and service | Leased |
| Hwasung Kyunggi-do, South Korea | Distribution, sales, and service | Leased |
| Sungnam City, South Korea | Distribution, sales, service and research and development | Owned |
| Villaz-St-Pierre, Switzerland | Research and development | Leased |
| Taipei, Taiwan | Distribution, sales, and service | Leased |
| Littlehampton, United Kingdom | Manufacturing, distribution, service, and research and development | Leased |

We consider the properties that we own or lease as adequate to meet our current and future requirements. We regularly assess the size, capability, and location of our global infrastructure and periodically make adjustments based on these assessments.

ITEM 3. LEGAL PROCEEDINGS

We are presently involved in disputes and legal actions arising in the normal course of our business. While we currently believe that the amount of any ultimate loss would not be material to our financial position, the outcome of these actions is inherently difficult to predict. In the event of an adverse outcome, the ultimate loss could have a material adverse effect on our financial position or reported results of operations. An unfavorable decision in patent litigation could require material changes in production processes and products or result in our inability to ship products or components found to have violated third-party patent rights. An unfavorable decision in a collection action against a customer we sold products to, or a claim or counterclaim from a customer related to alleged product failures, could also have a material adverse effect on our financial position or reported results of operations. We are engaged presently in such disputes and legal actions with customers for the inverter product line. We accrue loss contingencies in connection with our commitments and contingencies, including litigation, when it is probable that a loss has occurred and the amount of the loss can be reasonably estimated.

ITEM 4. MINE SAFETY DISCLOSURES

None.

PART II**ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES****Principal Market and Price Range of Common Stock**

Our common stock is listed on the NASDAQ Global Select Market under the symbol "AEIS." At February 13, 2018, the number of common stockholders of record was 324, and the closing sale price of our common stock on the NASDAQ Global Select Market on that day was \$64.36 per share.

The table below shows the range of high and low closing sale prices for our common stock as quoted (without retail markup or markdown and without commissions) on the NASDAQ Global Select Market:

| | 2017 | | 2016 | |
|----------------|----------|----------|----------|----------|
| | High | Low | High | Low |
| First Quarter | \$ 70.64 | \$ 53.79 | \$ 34.99 | \$ 25.45 |
| Second Quarter | 86.25 | 63.81 | 38.85 | 32.35 |
| Third Quarter | 80.85 | 63.66 | 47.32 | 37.24 |
| Fourth Quarter | 95.00 | 67.39 | 56.91 | 45.73 |

Dividend Policy

We have not declared or paid any cash dividends on our capital stock in our history as a public company. We currently intend to retain all future earnings to finance our business or make stock repurchases and do not anticipate paying cash or other dividends on our common stock in the foreseeable future.

Share Repurchases

In September 2015, our Board of Directors authorized a program to repurchase up to \$150.0 million of our stock. In November 2017, our Board of Directors approved an extension to the share repurchase program to December 2019 from its original maturity of March 2018. As of December 31, 2017, we had \$70.0 million remaining for the authorized repurchase of shares.

In November 2015 we entered into a Fixed Dollar Accelerated Share Repurchase Transaction to purchase \$50.0 million of shares of our common stock in the open market. A total of 1.7 million shares of our common stock was repurchased under the Fixed Dollar Accelerated Share Repurchase Agreement at an average price of \$28.99 per share.

In August and December 2017, we entered into Fixed Dollar Share Repurchase Agreements to repurchase \$25.0 million and \$5.0 million, respectively, of shares of our common stock in the open market. Total shares repurchased under the Fixed Dollar Share Repurchase Agreements in August and December 2017 were 351,292 and 70,700, respectively, at an average price of \$71.16 and \$70.65, respectively, per share.

All shares repurchased were executed in the open market, and no shares were repurchased from related parties. Repurchased shares were retired and assumed the status of authorized and unissued shares. Accordingly, the associated cost of the repurchased shares were recognized as a reduction to Additional paid-in capital.

The following table summarizes information with respect to the company's purchase of its common stock during the quarter ended December 31, 2017:

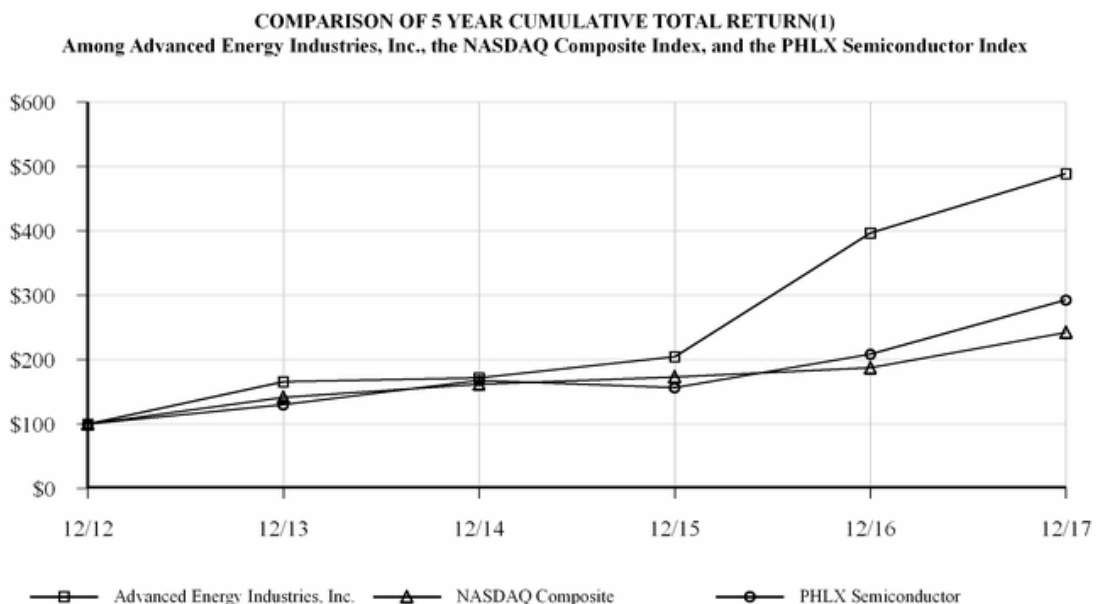
| Period | Total Number of Shares Purchased | Average Price Paid per Share | Total Number of Shares Purchased as Part of Publicly Announced Program (1) | Approximate Value of Shares that May Yet Be Purchased Under the Program (2) |
|--------------------------------|----------------------------------|------------------------------|--|---|
| December 1 - December 31, 2017 | 70,700 | \$ 70.65 | 70,700 | \$ 70,008,000 |
| Total | 70,700 | \$ 70.65 | 70,700 | \$ 70,008,000 |

(1) In September 2015, our Board of Directors authorized a program to repurchase up to \$150.0 million of our stock over a thirty-month period. Under this program, in August and December 2017, we entered into two Fixed Dollar Share Repurchase Agreements to repurchase \$25.0 million and \$5.0 million, respectively, of shares of our common stock in the open market.

(2) While the Company has remaining authority to repurchase up to \$70.0 million of our common stock, the Company has no current commitments or obligations to repurchase any shares of our common stock.

Performance Graph

The performance graph below shows the five-year cumulative total stockholder return on our common stock during the period from December 31, 2012 through December 31, 2017. This is compared with the cumulative total return of the NASDAQ Composite Index and the Philadelphia Semiconductor Index (PHLX) over the same period. The comparison assumes \$100 was invested on December 31, 2012 in Advanced Energy common stock and in each of the foregoing indices and assumes reinvestment of dividends, if any. Dollar amounts in the graph are rounded to the nearest whole dollar. The performance shown in the graph represents past performance and should not be considered an indication of future performance.



(1) \$100 invested on 12/31/2012 in our stock or index, including reinvestment of dividends. Indices and our stock performance calculated on a calendar year-end basis.

| | 12/12 | 12/13 | 12/14 | 12/15 | 12/16 | 12/17 |
|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Advanced Energy Industries, Inc. | \$ 100.00 | \$ 165.55 | \$ 171.63 | \$ 204.43 | \$ 396.48 | \$ 488.67 |
| NASDAQ Composite | 100.00 | 141.63 | 162.09 | 173.33 | 187.19 | 242.29 |
| PHLX Semiconductor | 100.00 | 130.15 | 167.68 | 156.67 | 208.23 | 292.66 |

Information relating to compensation plans under which our equity securities are authorized for issuance is set forth in Part III, Item 12 of this Annual Report on Form 10-K.

ITEM 6. SELECTED FINANCIAL DATA

The selected Consolidated Statements of Operations and related Consolidated Balance Sheets data were derived from our audited Consolidated Financial Statements. The information below is not necessarily indicative of results of future operations and should be read in conjunction with Item 7 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” of this Form 10-K in order to understand more fully the factors that may affect the comparability of the information presented below:

| | Years Ended December 31, | | | | |
|---|--------------------------|------------|------------|------------|------------|
| | 2017 | 2016 | 2015 | 2014 | 2013 |
| Consolidated Statements of Operations Data: | | | | | |
| Sales | \$ 671,012 | \$ 483,704 | \$ 414,811 | \$ 367,333 | \$ 299,381 |
| Operating income | 200,770 | 126,857 | 106,656 | 86,091 | 47,847 |
| Income from continuing operations before income taxes | 198,191 | 128,076 | 105,442 | 86,005 | 48,322 |
| Income from continuing operations, net of income taxes | 136,101 | 116,948 | 83,482 | 69,495 | 59,710 |
| Income (loss) from discontinued operations, net of income taxes | 1,760 | 10,506 | (241,968) | (22,513) | (27,624) |
| Net income (loss) | 137,861 | 127,454 | (158,486) | 46,982 | 32,086 |
| Earnings per Share: | | | | | |
| Continuing Operations: | | | | | |
| Basic earnings per share | \$ 3.42 | \$ 2.94 | \$ 2.05 | \$ 1.72 | \$ 1.51 |
| Diluted earnings per share | \$ 3.39 | \$ 2.92 | \$ 2.03 | \$ 1.69 | \$ 1.47 |
| Discontinued Operations: | | | | | |
| Basic earnings (loss) per share | \$ 0.04 | \$ 0.26 | \$ (5.94) | \$ (0.56) | \$ (0.70) |
| Diluted earnings (loss) per share | \$ 0.04 | \$ 0.26 | \$ (5.94) | \$ (0.56) | \$ (0.70) |
| Net Income (Loss): | | | | | |
| Basic earnings (loss) per share | \$ 3.47 | \$ 3.21 | \$ (3.89) | \$ 1.16 | \$ 0.81 |
| Diluted earnings (loss) per share | \$ 3.43 | \$ 3.18 | \$ (3.89) | \$ 1.14 | \$ 0.79 |
| Basic weighted-average common shares outstanding | 39,754 | 39,720 | 40,746 | 40,420 | 39,597 |
| Diluted weighted-average common shares outstanding | 40,176 | 40,031 | 41,077 | 41,034 | 40,667 |
| Consolidated Balance Sheets Data: | | | | | |
| Total assets | \$ 733,308 | \$ 571,529 | \$ 462,503 | \$ 684,409 | \$ 648,992 |

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

Certain statements set forth below under this caption constitute forward-looking statements. See “*Special Note Regarding Forward-Looking Statements*” in Item 1 “Business” of this Annual Report on Form 10-K for additional factors relating to such statements, and see “*Risk Factors*” in Item 1A for a discussion of certain risks applicable to our business, financial condition and results of operations.

Overview

We design, manufacture, sell, and support power conversion products that transform power into various usable forms. Our products enable manufacturing processes that use thin film technology for various products, such as semiconductor devices, flat panel displays, thin film renewables, architectural glass, optical coating and consumer products decorative and functional coating. We also supply thermal instrumentation products for advanced temperature measurement and control in the thin film process for these same markets. Our power control modules provide power control solutions for industrial applications where heat treatment and processing are used such as glass manufacturing, metal fabrication and treatment, material and chemical processing. Our high voltage power supplies and modules are used in applications such as semiconductor ion implantation, scanning electron microscopy, chemical analysis such as mass spectrometry and various applications using X-ray technology and electron guns for both analytical and processing applications. Our network of global service support centers provides a recurring revenue opportunity as we offer repair services, conversions, upgrades, and refurbishments and used equipment to companies using our products.

Driven by continuing technology migration and changing customers demand the markets we serve are constantly changing in terms of advancement in applications, core technology and competitive pressures. New products we design for capital equipment manufacturers typically have a lifespan of five to ten years. Our success and future growth depends on our products being designed into our customers new generations of equipment as they develop new technologies and applications. We must work with these

manufacturers early in their design cycles to modify, enhance and upgrade our products or design new products that meet the requirements of their new systems. The design win process is highly competitive and we may win or lose new design wins for our existing customers or new customers next generations of equipment. In case existing or new customers do not choose our products as a result of the development, evaluation and qualification efforts related to the design win process, our market share will be reduced, the potential revenues related to the lifespan of our customers' products, which can be 5-10 years, will not be realized, and our business, financial condition and results of operations would be materially and adversely impacted.

We enter 2018 looking to strengthen our position and grow revenue through new products, design wins, new applications and geographical growth, continuously emphasizing margin expansion, cash generation and cost improvement.

CRITICAL ACCOUNTING ESTIMATES

The preparation of Consolidated Financial Statements and related disclosures in conformity with accounting principles generally accepted in the United States of America ("U.S. GAAP") requires management to make judgments, assumptions, and estimates that affect the amounts reported. *Note 1. Operations and Summary of Significant Accounting Policies and Estimates* in Item 8 "Financial Statements and Supplementary Data" describes the significant accounting policies used in the preparation of our Consolidated Financial Statements. The accounting positions described below are significantly affected by critical accounting estimates. Such accounting positions require significant judgments, assumptions, and estimates to be used in the preparation of the Consolidated Financial Statements, actual results could differ materially from the amounts reported based on variability in factors affecting these statements.

Revenue Recognition

We recognize revenue from product sales upon transfer of title and risk of loss to our customers provided that there is evidence of an arrangement, the sales price is fixed or determinable, and the collection of the related receivable is reasonably assured. In most transactions, we have no obligations to our customers after the date products are shipped, other than pursuant to warranty obligations. Shipping and handling fees billed to customers, if any, are recognized as revenue. The related shipping and handling costs are recognized in cost of sales.

We maintain a credit approval process and we make significant judgments in connection with assessing our customers' ability to pay at the time of shipment. Despite this assessment, from time to time, our customers are unable to meet their payment obligations. We continuously monitor our customers' credit worthiness and use our judgment in establishing a provision for estimated credit losses based upon our historical experience and any specific customer collection issues that we have identified. While such credit losses have historically been within our expectations and the provisions established, a significant change in the liquidity or financial position of our customers could have a material adverse impact on the collectability of accounts receivable and our future operating results. Additionally, if our credit loss rates prove to be greater than we currently estimate, we record additional reserves for doubtful accounts.

Inventory

We value our inventory at the lower of cost (first-in, first-out method) or market. We regularly review inventory quantities on hand and record a provision to write-down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on our estimated forecast of product demand. Demand for our products can fluctuate significantly. Our industry is subject to technological change, new product development, and product technological obsolescence that could result in an increase in the amount of obsolete inventory quantities on hand. Therefore, any significant unanticipated changes in demand or technological developments in excess of our current estimates could have a significant impact on the value of our inventory and our reported operating results.

Warranty Costs

We provide for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. We offer warranty coverage for a majority of our Precision Power products for periods typically ranging from 12 to 24 months after shipment. We warranted our inverter products for five to ten years and provided the option to purchase additional warranty coverage up to 20 years. The product warranty expense accrued related to our standard inverter product warranties is now considered part of our discontinued operations and is recorded as such on our Consolidated Balance Sheets. See *Note 3. Discontinued Operations* in Item 8 "Financial Statements and Supplementary Data" for more information on our discontinued operations and *Note 12. Warranties* in Item 8 "Financial Statements and Supplementary Data" for more information on our warranties from continuing operations. We estimate the anticipated costs of repairing our products under such warranties based on the historical costs of the repairs. The assumptions we use to estimate warranty accruals are reevaluated periodically, in light of actual experience, and when appropriate, the accruals are adjusted. Should product failure rates differ from our estimates, actual costs could vary significantly from our expectations.

Goodwill, Intangible and Other Long-Lived Assets

As a result of our acquisitions, we recorded goodwill and intangible assets. Goodwill and indefinite-lived intangible assets are subject to annual impairment testing, as well as testing upon the occurrence of any event that indicates a potential impairment. The annual impairment test can be performed using an assessment of qualitative factors in determining if it is more likely than not that goodwill is impaired. If this assessment indicates that it is more likely than not that goodwill is impaired, then the next step of impairment testing compares the fair value of a reporting unit to its carrying value. Goodwill would be impaired if the resulting implied fair value of goodwill was less than the recorded carrying value of the goodwill.

Finite-lived intangible assets and other long-lived assets are subject to an impairment test if there is an indicator of impairment. When we determine that the carrying value of intangibles or other long-lived assets may not be recoverable based upon the existence of one or more indicators of impairment, we use the projected undiscounted cash flow method to determine whether an impairment exists, and then measure the impairment using discounted cash flows and other fair value measurements. The carrying value and ultimate realization of these assets is dependent upon our estimates of future earnings and benefits that we expect to generate from their use. If our expectations of future results and cash flows are significantly diminished, intangible assets, long-lived assets, and goodwill may be impaired and the resulting charge to operations may be material. Additionally, the estimation of useful lives and expected cash flows require us to make significant judgments regarding future periods that are subject to some factors outside of our control. Changes in these estimates could result in significant revisions to our carrying value of these assets and may result in material charges to our results of operations.

In 2017, we performed an assessment of qualitative factors for our annual impairment test of the goodwill. The factors reviewed included macroeconomic conditions, industry and market conditions, cost factors, and overall financial performance. This assessment resulted in the conclusion that there was no impairment of goodwill in 2017.

Income Taxes

We are subject to income taxes in the United States and numerous foreign jurisdictions. Significant judgment is required in determining our provision for income taxes and income tax assets and liabilities, including evaluating uncertainties in the application of accounting principles and complex tax laws. We record a provision for income taxes for the anticipated tax consequences of the reported results of operations using the asset and liability method. Under this method, we recognize deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the financial reporting and tax bases of assets and liabilities, as well as for operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using the tax rates that are expected to apply to taxable income for the years in which those tax assets and liabilities are expected to be realized or settled. We calculate tax expense consistent with intraperiod tax allocation methodology resulting in an allocation of current year tax expense/benefit between continuing operations and discontinued operations. We record a valuation allowance to reduce our deferred tax assets to the net amount that we believe is more likely than not to be realized. We recognize tax benefits from uncertain tax positions only if we believe that it is more likely than not that the tax position will be sustained on examination by the taxing authorities based on the technical merits of the position. Although we believe that we have adequately reserved for our uncertain tax positions, we can provide no assurance that the final tax outcome of these matters will not be materially different. We make adjustments to these reserves when facts and circumstances change, such as the closing of a tax audit or the refinement of an estimate. To the extent that the final tax outcome of these matters is different than the amounts recorded, such differences will affect the provision for income taxes in the period in which such determination is made and could have a material impact on our financial condition and operating results. The provision for income taxes includes the effects of any reserves that we believe are appropriate, as well as the related net interest and penalties. For more details see *Note 4 Income Taxes* in Item 8 "Financial Statements and Supplementary Data."

On December 22, 2017, the U.S. enacted the 2017 Tax Cuts and Jobs Act (the Tax Act) into law and the new legislation contains several key tax provisions that affected us, including a one-time mandatory transition tax on our accumulated foreign earnings and a reduction of the corporate income tax rate to 21%, effective January 1, 2018, among others. We are required to recognize the effect of the tax law changes in the period of enactment, such as determining the transition tax, re-measuring our U.S. deferred tax assets and liabilities as well as reassessing the net realizability of our deferred tax assets and liabilities. In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118, *Income Tax Accounting Implications of the Tax Cuts and Jobs Act* (SAB 118), which allows us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. Since the Tax Act was passed late in the fourth quarter of 2017, and ongoing guidance and accounting interpretation is expected over the next 12 months, we consider the accounting for the transition tax, deferred tax re-measurements, and other items to be incomplete due to the forthcoming guidance and our ongoing analysis of final year-end data and tax positions. We expect to complete our analysis within the measurement period in accordance with SAB 118.

Business Environment and Trends*SEMICONDUCTORS*

Investment in semiconductor capital equipment increased approximately 31% year over year in 2017. Sales to our semiconductor OEM customers continued to increase quarter over quarter throughout the year. Sales in the fourth quarter of 2017 represented a record for our semiconductor business. The semiconductor market is being driven by the rapid adoption of solid-state drives (SSD) deploying the latest 3D-NAND memory devices and a ramp of advanced Logic devices at the 10nm technology node.

The industry's transition to 3D memory devices and advanced Logic is generating increasing demand for RF power supplies, matches and accessories. The growing number of steps associated with the deposition and etch processes is driving an increase in the number of process chambers per fab and higher content of more advanced power solutions per chamber. As etching processes become more challenging due to increasing aspect ratios in advanced 3D devices, more advanced RF technology that includes pulsing and increased control and instrumentation is needed. We are capitalizing on these trends and providing a broader range of more complex combinations of RF power and frequencies and launching more capable matching networks to manage and control the delivered power.

INDUSTRIAL POWER

Customers in the industrial capital equipment market incorporate our industrial process power and specialty power products into a wide variety of equipment used in applications such as thin films, advanced material fabrication, and analytical instrumentation.

In industrial applications, we remain focused on taking our products into new applications and world regions, increasing our penetration into Asia, Europe and North America. In 2017, we made gains across an array of industries. The flat panel display market showed continued strength with the ongoing ramp of OLED mobile screen capacity. Demand for our products used in many industrial thin film coating and specialty power markets increased, particularly in manufacturing areas for products such as solar panels, consumer device coatings, flat panel displays and analytical instrumentation. Our thermal process control and measurement instruments are also making gains in North America, where we have focused for regional expansion.

Results of Continuing Operations

Our analysis presented below is organized to provide the information we believe will facilitate an understanding of our historical performance and relevant trends going forward, and should be read in conjunction with our Consolidated Financial Statements, including the notes thereto, in Item 8 "Financial Statements and Supplementary Data" of this Annual Report on Form 10-K.

Advanced Energy is organized as a single business unit, which principally serves OEM and end customers in the semiconductor, flat panel display, high and low voltage, solar panel, and other capital equipment markets. As of December 31, 2015 we discontinued our inverter products manufacturing and sales. All prior periods disclosed have been recast to reflect continuing operations. Results of discontinued operations are reflected as "Income (loss) from discontinued operations, net of income taxes" in our Consolidated Statements of Operations. See *Note 3. Discontinued Operations* in Item 8 "Financial Statements and Supplementary Data."

The following table sets forth, for the periods indicated, certain data derived from our Consolidated Statements of Operations (in thousands):

| | Years Ended December 31, | | |
|--|---------------------------------|-------------|-------------|
| | 2017 | 2016 | 2015 |
| Sales | \$ 671,012 | \$ 483,704 | \$ 414,811 |
| Gross profit | 356,381 | 253,147 | 216,870 |
| Operating expenses | 155,611 | 126,290 | 110,214 |
| Operating income | 200,770 | 126,857 | 106,656 |
| Other income (expense) | (2,579) | 1,219 | (1,214) |
| Income from continuing operations before income taxes | 198,191 | 128,076 | 105,442 |
| Provision for income taxes | 62,090 | 11,128 | 21,960 |
| Income from continuing operations, net of income taxes | \$ 136,101 | \$ 116,948 | \$ 83,482 |

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The following table sets forth, for the periods indicated, the percentage of sales represented by certain items reflected in our Consolidated Statements of Operations (in thousands):

| | Years Ended December 31, | | |
|--|--------------------------|--------|---------|
| | 2017 | 2016 | 2015 |
| Sales | 100.0 % | 100.0% | 100.0 % |
| Gross profit | 53.1 % | 52.3% | 52.3 % |
| Operating expenses | 23.1 % | 26.2% | 26.5 % |
| Operating income | 30.0 % | 26.1% | 25.8 % |
| Other income (expense) | (0.4)% | 0.3% | (0.3)% |
| Income from continuing operations before income taxes | 29.6 % | 26.4% | 25.5 % |
| Provision for income taxes | 9.3 % | 2.3% | 5.3 % |
| Income from continuing operations, net of income taxes | 20.3 % | 24.1% | 20.2 % |

SALES

The following tables summarize annual net sales and percentages of net sales, by product line, for each of the years ended 2017, 2016 and 2015 (in thousands):

| | Years Ended December 31, | | | Change | | | |
|---------------------------------|--------------------------|------------|------------|--------------|-------|--------------|-------|
| | 2017 | 2016 | 2015 | 2017 v. 2016 | | 2016 v. 2015 | |
| Semiconductor capital equipment | \$ 461,701 | \$ 326,316 | \$ 266,465 | \$ 135,385 | 41.5% | \$ 59,851 | 22.5% |
| Industrial capital equipment | 116,949 | 84,263 | 84,217 | 32,686 | 38.8% | 46 | 0.1% |
| Global Support | 92,362 | 73,125 | 64,129 | 19,237 | 26.3% | 8,996 | 14.0% |
| Total | \$ 671,012 | \$ 483,704 | \$ 414,811 | \$ 187,308 | 38.7% | \$ 68,893 | 16.6% |

| | Years Ended December 31, | | |
|------------------------------------|--------------------------|--------|--------|
| | 2017 | 2016 | 2015 |
| Semiconductor capital equipment | 68.8% | 67.5% | 64.2% |
| Industrial power capital equipment | 17.4% | 17.4% | 20.3% |
| Global Support | 13.8% | 15.1% | 15.5% |
| Total | 100.0% | 100.0% | 100.0% |

OPERATING EXPENSE

The following table summarizes our operating expense as a percentage of sales for the years ended December 31, 2017, 2016 and 2015 (in thousands):

| | Years Ended December 31, | | | | | |
|--------------------------------------|--------------------------|-------|------------|-------|------------|-------|
| | 2017 | | 2016 | | 2015 | |
| Research and development | \$ 57,999 | 8.6% | \$ 44,445 | 9.2% | \$ 39,551 | 9.5% |
| Selling, general, and administrative | 93,262 | 13.9% | 77,678 | 16.1% | 66,097 | 15.9% |
| Amortization of intangible assets | 4,350 | 0.6% | 4,167 | 0.9% | 4,368 | 1.1% |
| Restructuring charges | — | —% | — | —% | 198 | —% |
| Total operating expenses | \$ 155,611 | 23.1% | \$ 126,290 | 26.2% | \$ 110,214 | 26.5% |

2017 Results Compared To 2016

SALES

Total sales for the year ended December 31, 2017 increased 38.7% to \$671.0 million from \$483.7 million for the year ended December 31, 2016. The increase in sales was primarily due to demand in the semiconductor market driven by accelerated demand and strength in etch and CVD applications. We also experienced continued growth within our industrial products and

global services. Total sales from Excelsys, which was acquired July 3, 2017, was \$7.6 million for the year ended December 31, 2017.

In 2017, sales in our semiconductor market increased 41.5% to \$461.7 million, and 68.8% of sales, from \$326.3 million, and 67.5% of sales in 2016. Our growth in the semiconductor market has been fueled by our leadership in etch applications, specifically related to advanced memory and transition to 3DNAND, along with advances in logic technology. Sales growth was driven primarily by recent program wins which have moved into production and delivery.

Sales to the industrial capital equipment markets increased 38.8% to \$116.9 million in 2017 from \$84.3 million in 2016. The industrial markets we serve include solar panel, flat panel display, power control modules, data storage, architectural glass, high voltage and other industrial manufacturing markets. Our customers in these markets are primarily global and regional original equipment manufacturers. The increase in sales was primarily due to the expansion in advanced coating applications. Sales to the industrial capital equipment markets as a percentage of total sales remained flat at 17.4% in 2017 and 2016, due primarily to the strong growth in sales in our semiconductor market. Sales from the acquisition of Excelsys for the year ended December 31, 2017 was \$7.6 million.

Global service sales increased 26.3% to \$92.4 million from \$73.1 million in 2016. Increased global service sales was due to share gains as well as growth in our installed product base. Despite this growth, global support revenue as a percentage of total sales decreased to 13.8% in 2017 from 15.1% in 2016, due to the strong growth in sales in our semiconductor market.

Sales to Applied Materials Inc. and Lam Research, our two largest customers, increased \$109.6 million to \$380.1 million, and 56.6% of sales, in 2017 from \$270.5 million, and 55.9% of sales in 2016. Our sales to Applied Materials Inc. and Lam Research included sales for the semiconductor capital equipment market, as well as industrial capital equipment used in the solar and flat panel display markets.

Backlog

Our backlog was \$131.3 million at December 31, 2017 as compared to \$69.2 million at December 31, 2016. Backlog remains strong primarily due to demand within the semiconductor market.

GROSS PROFIT

Gross profit increased \$103.2 million to \$356.4 million in 2017 from \$253.1 million in 2016 and is primarily attributed to increased sales volume. Gross profit as a percentage of sales in 2017 increased to 53.1% from 52.3% in 2016, due to increased volume as the semiconductor capital equipment market remains strong and favorable product mix. Gross profit from our 2017 acquisition of Excelsys was \$3.1 million, which included \$0.1 million associated with a step up in book basis for purchased inventory.

OPERATING EXPENSE

Research and Development

We perform research and development of products for new or emerging applications, technological changes to provide higher performance, lower cost, or other attributes that we may expect to advance our customers' products. We believe that continued development of technological applications, as well as enhancements to existing products to support customer requirements, are critical for us to compete in the markets we serve. Accordingly, we devote significant personnel and financial resources to the development of new products and the enhancement of existing products, and we expect these investments to continue.

Research and development expenses in 2017 increased \$13.6 million to \$58.0 million, from \$44.4 million in 2016 primarily due to our investment in new programs to maintain and increase our technological leadership and provide solutions to our customers' evolving needs. Research and development expense from our 2017 acquisition of Excelsys was \$1.1 million.

Research and development expenses as a percentage of total revenue decreased to 8.6% in 2017 from 9.2% in 2016 as successful adoption of our products has driven increased sales.

Selling, General and Administrative

Our selling expenses support domestic and international sales and marketing activities that include personnel, trade shows, advertising, third-party sales representative commissions, and other selling and marketing activities. Our general and administrative expenses support our worldwide corporate, legal, tax, financial, governance, administrative, information systems, and human resource functions in addition to our general management, including acquisition-related activities.

Selling general and administrative ("SG&A") expenses increased \$15.6 million to \$93.3 million in 2017 as compared to \$77.7 million in 2016. The increase in SG&A expense is primarily driven by higher stock-based compensation and performance

bonus, investment in organizational structure to support business volumes and future growth, and costs associated with business development. SG&A expense from our 2017 acquisition of Excelsys was \$1.8 million.

Amortization Expense

Amortization expense increased \$0.2 million to \$4.4 million in 2017 from \$4.2 million in 2016. The increase of \$0.2 million in 2017 is primarily due to the amortization of intangibles recognized upon the acquisition of Excelsys, which was completed July 3, 2017, partially offset by the affect of foreign exchange rates.

OTHER INCOME (EXPENSE)

Other income (expense), net consists primarily of interest income and expense, foreign exchange gains and losses, gains and losses on sales of fixed assets, and other miscellaneous items. Other income (expense) was a loss of \$2.6 million in 2017, as compared to a gain of \$1.2 million in 2016. The loss in 2017 was primarily the cost of a foreign currency exchange rate forward contract that we entered into for a potential offshore acquisition that we decided not to consummate. See *Note 7. Derivative Financial Instruments* in Item 8 "Financial Statements and Supplementary Data.". The gain in 2016 is principally related to gains recognized due to fluctuation in foreign exchange rates and our assets in different countries. Other income (expense), net includes interest expense, net of \$0.1 million and \$(0.1) million in 2017 and 2016, respectively.

PROVISION FOR INCOME TAXES FROM CONTINUING OPERATIONS

In 2017, we recorded income tax expense for our continuing operations of \$62.1 million or an effective tax rate of 31.3%. Included in our 2017 tax expense is the estimated impact of the Tax Act which was passed December 22, 2017. Among other provisions, the Tax Act imposes a mandatory one-time transition tax on the accumulated earnings of our foreign subsidiaries. The Company estimates the 2017 financial statement expense related to the transition tax will approximate \$61.8 million. Additionally, the Tax Act reduced the U.S. corporate income tax rate to 21%, effective January 1, 2018, from the previous 35% rate. The reduction in the U.S. corporate tax rate required the Company to re-value its net U.S. deferred tax assets and liabilities effective December 31, 2017. The Company estimates the 2017 financial statement expense related to the reduction of the U.S. tax rate to be \$11.1 million. Additionally, in 2017, we recorded a tax benefit of \$33.8 million associated with the wind down of our solar inverter business which was discontinued in 2015. After giving consideration to the above items, tax expense for our continuing operations would have been \$23.0 million or an effective tax rate of 11.6%, as compared to tax expense of \$11.1 million, or 8.7%, for 2016. The increase in the 2017 tax rate of 11.6% compared to the 2016 tax rate of 8.7% is primarily due to favorable settlements of tax audits in 2016. The 2017 effective tax rate differs from the federal statutory rate of 35% primarily due to the benefit of earnings in foreign jurisdictions which are subject to lower tax rates, benefits related to stock-based compensation and tax amortization.

2016 Results Compared To 2015

SALES

Total sales for the year ended December 31, 2016 increased 16.6% to \$483.7 million from \$414.8 million for the year ended December 31, 2015. The increase in sales was due to the rebound in the semiconductor market after a pause in the fourth quarter of 2015 as well as continued growth in our global support business.

In 2016, sales in our semiconductor market increased 22.5% to \$326.3 million, and 67.5% of sales, from \$266.5 million, and 64.2% of sales in 2015. These increases were driven by strong market conditions across the semiconductor market driven by our leadership in etch applications, specifically related to advanced memory and transition to 3DNAND, along with advances in logic technology.

Sales to the industrial capital equipment markets increased 0.1% to \$84.3 million in 2016 from \$84.2 million in 2015. The industrial markets we serve include solar panels, flat panel display, architectural glass, analytical instrumentation and other industrial manufacturing markets. Our customers in these markets are primarily global and regional original equipment manufacturers. Sales to the industrial capital equipment markets as a percentage of total sales decreased to 17.4% in 2016 from 20.3% in 2015, due primarily to the strong growth in sales in our semiconductor market.

Global support revenue increased by 14.0% to \$73.1 million, and 15.1% of sales from \$64.1 million, and 15.5% of sales in 2015. Increased global service sales was due to share gains as well as growth in the installed base. Despite this growth, global support revenue as a percentage of total sales decreased due to the strong growth in sales in our semiconductor market.

Sales to Applied Materials Inc. and Lam Research, our two largest customers, increased \$62.8 million to \$270.5 million, and 55.9% of sales, in 2016 from \$207.7 million, and 50.1% of sales in 2015. Our sales to Applied Materials Inc. and Lam Research included sales for the semiconductor capital equipment market, as well as the solar and flat panel display markets.

GROSS PROFIT

Gross profit increased \$36.3 million to \$253.1 million, and 52.3% of revenue in 2016 from \$216.9 million, and 52.3% of revenue in 2015, due to increased sales volume, higher procurement volumes, better absorption of fixed overhead and general weakening of the Chinese yuan against the U.S. dollar. A substantial part of our direct labor and variable overhead costs are denominated in Chinese yuan.

OPERATING EXPENSE

Research and Development

We perform research and development of products for new or emerging applications, technological changes to provide higher performance, lower cost, or other attributes that we expect to advance our customers' products. We believe that continued development of technological applications, as well as enhancements to existing products to support customer requirements, are critical for us to compete in the markets we serve. Accordingly, we devote significant personnel and financial resources to the development of new products and the enhancement of existing products, and we expect these investments to continue.

Research and development expenses in 2016 increased \$4.9 million to \$44.4 million from \$39.6 million in 2015 primarily due to our continued investment in product development to maintain and increase our technological leadership.

Research and development expenses as a percentage of total revenue decreased to 9.2% in 2016 from 9.5% in 2015 as successful adoption of our products has driven increased sales.

Selling, General and Administrative

Our selling expenses support domestic and international sales and marketing activities that include personnel, trade shows, advertising, internal and third-party sales representative commissions, and other selling and marketing activities. Our general and administrative expenses support our worldwide corporate, legal, tax, financial, governance, administrative, information systems, and human resource functions in addition to our general management.

SG&A expenses increased \$11.6 million to \$77.7 million in 2016 as compared to \$66.1 million in 2015. The increases were primarily due to higher sales expense as we expanded our sales management and marketing team to support our growth diversification and geographical expansion plans, as well as, higher stock-based compensation expense, professional fees and costs associated with acquisition opportunities.

Amortization Expense

Amortization expense decreased \$0.2 million to \$4.2 million in 2016 compared to \$4.4 million in 2015. The decrease of \$0.2 million in 2016 is primarily due to the decrease in foreign exchange rates in Europe

Restructuring Charges

In June 2015, we committed to a restructuring plan in relation to the wind down of our Inverter business which concluded December 31, 2015 and accordingly our Inverter business has been reflected as a discontinued operation in our consolidated financial statements as of December 31, 2015. See *Note 3. Discontinued Operations* in Item 8 "Financial Statements and Supplementary Data." As a result of discontinued operations, amounts of general corporate overhead which had previously been reflected in our inverter segment have been included in the total operating expense in the table above in all periods presented.

OTHER INCOME (EXPENSE)

Other income (expense), net consists primarily of interest income and expense, foreign exchange gains and losses, and other miscellaneous items. Other income (expense), net increased \$2.4 million to \$1.2 million in 2016 from \$(1.2) million in 2015. These gains are principally related to gains recognized due to fluctuation in foreign exchange rates and our assets in different countries. Other income (expense), net includes interest expense, net of \$(0.1) million and \$(0.9) million in 2016 and 2015, respectively.

PROVISION FOR INCOME TAXES FROM CONTINUING OPERATIONS

We recorded income tax expense of \$11.1 million, or an effective tax rate of 8.7% in 2016, compared to 2015 income tax expense of \$22.0 million, or an effective tax rate of 20.8%. The decrease in tax rate for 2016 is attributable to a tax benefit related to the early adoption of ASU 2016-09, "Improvements to Employee Share-Based Payment Accounting" and the favorable settlement of tax audits during 2016.

The effective rate differs from the federal statutory rate of 35% primarily due to the benefit of earnings in foreign jurisdictions which are subject to lower tax rates, a benefit related to foreign tax credits, favorable settlements of tax audits, and the early adoption of ASU 2016-09, "Improvements to Employee Share-Based Payment Accounting."

Discontinued Operations

In December 2015, we completed the wind down of engineering, manufacturing and sales of our solar inverter product line (the "inverter business"). Accordingly, the results of our inverter business has been reflected as "Income (loss) from discontinued operations, net of income taxes" on our Condensed Consolidated Statements of Operations for all periods presented herein.

The effect of our sales of extended inverter warranties to our customers continues to be reflected in deferred revenue in our Consolidated Balance Sheets. Deferred revenue for extended inverter warranties and the associated costs of warranty service will be reflected in Sales and Cost of goods sold, respectively, from continuing operations in future periods in our Consolidated Statement of Operations, as the deferred revenue is earned and the associated services are rendered. Extended warranties related to the inverter product line are no longer offered.

The significant items included in Income (loss) from discontinued operations, net of income taxes (in thousands):

| | Year Ended December 31, | | |
|---|--------------------------------|-------------|--------------|
| | 2017 | 2016 | 2015 |
| Sales | \$ — | \$ — | \$ 95,856 |
| Cost of sales | 234 | 154 | 139,045 |
| Total operating (income) expenses (including restructuring) | (1,576) | (3,894) | 232,262 |
| Operating income (loss) from discontinued operations | 1,342 | 3,740 | (275,451) |
| Other income (expense) | 337 | 2,636 | (55) |
| Income (loss) discontinued operations before income taxes | 1,679 | 6,376 | (275,506) |
| Benefit for income taxes | (81) | (4,130) | (33,538) |
| Income (loss) from discontinued operations, net of income taxes | \$ 1,760 | \$ 10,506 | \$ (241,968) |

Operating income from discontinued operations for 2017 and 2016 includes the recovery of accounts receivable previously reserved for as well as the reduced settlements primarily of warranty liabilities recorded in previous years.

Operating loss from discontinued operations from 2015 includes impairment charges of \$198.7 million which consisted of \$153.8 million from goodwill and intangible assets, \$17.7 million of accounts receivable, \$15.0 million in excess and obsolete inventory and \$12.3 million in property, plant and equipment.

Non-GAAP Results

Management uses non-GAAP operating income and non-GAAP EPS to evaluate business performance without the impacts of certain non-cash charges and other charges which are not part of our usual operations. We use these non-GAAP measures to assess performance against business objectives, make business decisions, including developing budgets and forecasting future periods. In addition, management's incentive plans include these non-GAAP measures as criteria for achievements. These non-GAAP measures are not in accordance with U.S. GAAP and may differ from non-GAAP methods of accounting and reporting used by other companies. However, we believe these non-GAAP measures provide additional information that enables readers to evaluate our business from the perspective of management. The presentation of this additional information should not be considered a substitute for results prepared in accordance with U.S. GAAP.

The non-GAAP results presented below exclude the impact of non-cash related charges, such as the amortization of intangible assets, stock-based compensation, and restructuring charges, as well as acquisition-related costs and other nonrecurring costs, as they are not indicative of future performance. The tax effect of our non-GAAP adjustments represents the anticipated annual tax rate applied to each non-GAAP adjustment after consideration of their respective book and tax treatments.

Reconciliation of Non-GAAP measure - operating expenses and operating income, excluding certain items

| | Years Ended December 31, | | |
|--|--------------------------|--------------------------|-------------------------|
| | 2017 | 2016 | 2015 |
| Gross Profit from continuing operations, as reported | \$ 356,381 | \$ 253,147 | \$ 216,870 |
| Operating expenses from continuing operations, as reported | 155,611 | 126,290 | 110,214 |
| Adjustments: | | | |
| Restructuring charges | — | — | (197) |
| Acquisition-related costs | (150) | — | — |
| Stock-based compensation | (12,549) | (6,332) | (2,810) |
| Amortization of intangible assets | (4,350) | (4,167) | (4,368) |
| Non-GAAP operating expenses from continuing operations | 138,562 | 115,791 | 102,839 |
| Non-GAAP operating income from continuing operations | <u>\$ 217,819</u> | <u>\$ 137,356</u> | <u>\$ 114,031</u> |
| Income from continuing operations, net of income taxes, as reported | \$ 136,101 | \$ 116,948 | \$ 83,482 |
| Adjustments: | | | |
| Restructuring charges | — | — | 197 |
| Acquisition-related costs | 150 | — | — |
| Stock-based compensation | 12,549 | 6,332 | 2,810 |
| Amortization of intangible assets | 4,350 | 4,167 | 4,368 |
| Loss on foreign exchange hedge | 3,489 | — | — |
| Incremental expense associated with start-up of the Asia regional headquarters | 1,133 | — | — |
| Nonrecurring tax (benefit) expense associated with inverter business | (33,837) | — | — |
| Tax Cuts and Jobs Act Impact | 72,867 | — | — |
| Tax effect of non-GAAP adjustments | (5,264) | (2,854) | (1,589) |
| Non-GAAP income from continuing operations, net of income taxes | <u>\$ 191,538</u> | <u>\$ 124,593</u> | <u>\$ 89,268</u> |

Impact of Inflation

In recent years, inflation has not had a significant impact on our operations. However, we continuously monitor operating price increases, particularly in connection with the supply of component parts used in our manufacturing process. To the extent permitted by competition, we pass increased costs on to our customers by increasing sales prices over time. Sales price increases, however, were not significant in any of the years presented herein.

Liquidity and Capital Resources
LIQUIDITY

We believe that adequate liquidity and cash generation is important to the execution of our strategic initiatives. Our ability to fund our operations, acquisitions, capital expenditures, and product development efforts may depend on our ability to generate cash from operating activities which is subject to future operating performance, as well as general economic, financial, competitive, legislative, regulatory, and other conditions, some of which may be beyond our control. Our primary sources of liquidity are our available cash, investments and, cash generated from current operations.

At December 31, 2017, we had \$410.4 million in cash, cash equivalents, and marketable securities. We believe that adequate liquidity and cash generation will be important to the execution of our strategic initiatives. We believe that our current cash levels and our cash flows from future operations will be adequate to meet anticipated working capital needs, anticipated levels of capital expenditures, and contractual obligations for the next twelve months.

At December 31, 2017, we had \$288.3 million in cash, cash equivalents, and marketable securities held by foreign subsidiaries. As a result of the recent Tax Act and the implementation of the Transition Tax, we have provided for U.S. tax on all foreign unremitted earnings. Accordingly, cash related to these unremitted earnings could be repatriated to the U.S. with minimal additional taxes. Such additional taxes would include foreign withholding taxes and US state income taxes. At this time, the Company has no plans to repatriate foreign cash and intends to invest such unremitted earnings indefinitely outside of the U.S.

Consistent with the Company's capital deployment initiatives, the Company intends to utilize foreign cash to expand our international operations through internal growth and strategic acquisitions. If our intent changes or if these funds are needed for our U.S. operations, we would be required to accrue any associated taxes on some or all of these undistributed earnings and our effective tax rate would be adversely affected.

On February 1, 2018, we used \$11.8 million of our available cash to acquire 100% of the outstanding stock of Trek Holdings Co., LTD ("Trek"), a privately held company with operations in Tokyo, Japan and Lockport, New York. Trek has a 95% ownership interest in its U.S. subsidiary which is also its primary operation. Trek designs, manufactures and sells high-voltage amplifiers, power supplies and generators, high-performance electrostatic measurement instruments and electrostatic discharge (ESD) sensors and monitors to the global marketplace. Trek's standard and custom-OEM products are used in industry and research in aerospace, automotive, electronics, electrostatics, materials, medical, military, nanotechnology, photovoltaic/solar, physics, plasma, semiconductor and test and measurement applications. For the twelve months ended December 31, 2017, Trek reported unaudited sales totaling approximately \$20 million. Trek's comprehensive portfolio of power supply products strengthen and accelerate Advanced Energy's growth in high voltage applications.

Credit Facility

On July 28, 2017, the Company entered into a Loan Agreement (the "Loan Agreement") with a bank which provides a revolving line of credit of up to \$100.0 million subject to certain funding conditions through July 28, 2022. On December 21, 2017, the Company entered into the First Amendment to the Loan Agreement ("First Amendment") to increase the line of credit to \$150.0 million. The credit facility provides us greater future flexibility for execution of our strategic plans. At December 31, 2017, we had \$150.0 million in available funding under the Loan Agreement. For more information on the Loan Agreement, see "Note 19. Credit Facility" in Item 8 "Financial Statements and Supplementary Data".

We terminated our previous \$100.0 million secured revolving credit facility on September 9, 2016. There were no outstanding balances under this credit facility during 2016.

Share Repurchase Program

In September 2015, our Board of Directors authorized a program to repurchase up to \$150.0 million of our stock over a thirty-month period (expiring in March 2018). In November 2017, our Board of Directors approved an extension to the \$150.0 million share repurchase program until December 2019. At December 31, 2017, there remained \$70.0 million available under the share repurchase program for future share repurchases.

During 2017, we entered into two Fixed Dollar Share Repurchase Agreements to purchase a total of \$30.0 million of shares of our common stock in the open market. Total shares of our common stock repurchased during 2017 were 421,992 at an average price of \$71.07 per share.

During 2015, we entered into a Fixed Dollar Accelerated Share Repurchase Agreement to purchase \$50.0 million of shares of our common stock in the open market. A total of 1.7 million shares of our common stock was repurchased under the Fixed Dollar Accelerated Share Repurchase Agreement at an average price of \$28.99 per share.

Shares of the company's stock that have been repurchased were retired and assumed the status of authorized and unissued shares. The associated cost of shares repurchased has been recognized as a reduction to Additional paid-in capital.

CASH FLOWS

A summary of our cash provided by and used in operating, investing, and financing activities is as follows (in thousands):

| | Years Ended December 31, | | |
|--|---------------------------------|-------------|-------------|
| | 2017 | 2016 | 2015 |
| Net cash provided by operating activities from continuing operations | \$ 189,956 | \$ 127,144 | \$ 124,122 |
| Net cash used in operating activities from discontinued operations | (7,255) | (7,857) | (19,413) |
| Net cash provided by operating activities | 182,701 | 119,287 | 104,709 |
| Net cash (used in) provided by investing activities from continuing operations | (28,082) | 300 | (13,219) |
| Net cash used in investing activities from discontinued operations | — | — | (46) |
| Net cash (used in) provided by investing activities | (28,082) | 300 | (13,265) |
| Net cash (used in) provided by financing activities from continuing operations | (31,307) | 2,171 | (45,528) |
| Net cash used in financing activities from discontinued operations | — | (29) | (14) |
| Net cash (used in) provided by financing activities | (31,307) | 2,142 | (45,542) |
| EFFECT OF CURRENCY TRANSLATION ON CASH | 2,208 | (1,932) | (1,467) |
| INCREASE IN CASH AND CASH EQUIVALENTS | 125,520 | 119,797 | 44,435 |
| CASH AND CASH EQUIVALENTS, beginning of period | 289,517 | 169,720 | 125,285 |
| CASH AND CASH EQUIVALENTS, end of period | 415,037 | 289,517 | 169,720 |
| Less cash and cash equivalents from discontinued operations | 7,754 | 7,564 | 11,277 |
| CASH AND CASH EQUIVALENTS FROM CONTINUING OPERATIONS, end of period | \$ 407,283 | \$ 281,953 | \$ 158,443 |

2017 Compared To 2016*Net cash provided by operating activities*

Net cash provided by operating activities in 2017 was \$182.7 million, an increase of \$63.4 million, or 53.2% compared to \$119.3 million for the same period in 2016. The increase in net cash flows from operating activities was primarily due to improved earnings from continuing operations and timing of taxes, partially offset by increased cash required for accounts receivable and inventory to support current business volume.

Net cash (used in) provided by investing activities

Net cash (used in) provided by investing activities in 2017 was \$(28.1) million, compared to \$0.3 million in 2016. Included in cash used in investing activities for 2017 was \$17.3 million for the acquisition of Excelsys and \$3.5 million for the purchase of a foreign currency exchange hedge for an anticipated transaction which was not completed. Capital expenditures in 2017 increased \$2.2 million from \$6.8 million in 2016 to \$9.0 million in 2017 to support new facilities and manufacturing operations.

Net cash (used in) provided by financing activities

Net cash (used in) provided by financing activities in 2017 was \$(31.3) million, a \$(33.4) million change from \$2.1 million cash provided by financing activities in 2016. The increase in cash used in financing activities is due to the repurchase of \$30.0 million in company stock in 2017.

2016 Compared To 2015*Net cash provided by operating activities*

Net cash provided by operating activities in 2016 was \$119.3 million, compared to \$104.7 million in 2015. The increase of \$14.6 million in net cash flows from operating activities was due to the increase in income from continuing operations, net of income taxes, offset partially by additional investment in working capital from increased sales volume.

Net cash flows provided by (used in) investing activities

Net cash provided by (used in) investing activities in 2016 was \$0.3 million, a \$13.6 million increase from cash used of \$(13.3) million in 2015 primarily due to the net change in marketable securities.

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Capital expenditures increased \$2.8 million to \$6.8 million compared to \$4.0 million in 2015. We expect to fund future capital expenditures with cash generated from operations.

Net cash flows provided by (used in) financing activities

Net cash provided by (used in) financing activities in 2016 was \$2.1 million, a \$47.7 million change from \$(45.5) million cash used in 2015. The increase in cash provided by financing activities is due to the repurchase of \$50.0 million in company stock in 2015.

Effect of currency translation on cash

The effect of foreign currency translations on cash had a \$2.2 million favorable impact for the year ended December 31, 2017 compared to a \$1.9 million unfavorable impact for the year ended December 31, 2016. Our foreign operations primarily sell products and incur expenses in the related local currency. Exchange rate fluctuations could require us to increase prices to foreign customers, which could result in lower net sales by us to such customers. Alternatively, if we do not adjust the prices for our products in response to unfavorable currency fluctuations, our results of operations could be adversely impacted. The functional currencies of our worldwide operations include U.S. dollar ("USD"), Canadian Dollar ("CAD"), Swiss Franc ("CHF"), Chinese Yuan ("CNY"), Euro ("EUR"), Pound Sterling ("GBP"), Indian Rupee ("INR"), Japanese Yen ("JPY"), South Korean Won ("KRW"), Singapore Dollar ("SGD") and New Taiwan Dollar ("TWD"). Our purchasing and sales activities are primarily denominated in USD, CNY, EUR and JPY.

The change in these key currency rates during the year ended December 31, 2017, 2016, and 2015 are as follows:

| From | To | Twelve Months Ended December 31, | | |
|------|-----|----------------------------------|---------|---------|
| | | 2017 | 2016 | 2015 |
| CNY | USD | 6.7% | (6.5)% | (4.4)% |
| EUR | USD | 13.9% | (3.1)% | (10.3)% |
| JPY | USD | 3.9% | 2.8% | (0.4)% |
| KRW | USD | 13.0% | (2.5)% | (6.6)% |
| TWD | USD | 8.8% | 1.8% | (3.8)% |
| GBP | USD | 9.3% | (16.2)% | (5.5)% |
| CAD | USD | 7.1% | 2.9% | (16.1)% |
| CHF | USD | 4.4% | (1.6)% | (0.9)% |
| INR | USD | 6.5% | (2.5)% | (4.6)% |
| SGD | USD | 8.2% | (2.0)% | (6.6)% |

Off Balance Sheet Arrangements

We have no off-balance sheet arrangements or variable interest entities.

Contractual Obligations

The following table sets forth our future payments due under contractual obligations as of December 31, 2017:

| | Total | Less than | | | More than 5 years |
|-----------------------------|------------|------------|------------|-----------|-------------------|
| | | 1 year | 1 -3 years | 4-5 years | |
| Operating lease obligations | \$ 28,355 | \$ 7,109 | \$ 12,183 | \$ 5,477 | \$ 3,586 |
| Purchase obligations | 142,125 | 142,125 | — | — | — |
| Income tax obligations | 14,627 | 1,170 | 2,340 | 2,340 | 8,777 |
| Pension funding commitment | 23,162 | 877 | 1,754 | 1,754 | 18,777 |
| Total | \$ 207,633 | \$ 151,230 | \$ 16,175 | \$ 9,469 | \$ 30,759 |

Purchase obligations include firm commitments and agreements with various suppliers to ensure the availability of components. For more information see *Note 15. Commitments and Contingencies* in Item 8 "Financial Statements and Supplementary Data." Income tax obligations are a result of the 2017 Tax Cuts and Jobs Act and includes a transition tax on unremitted foreign earnings and profits, of which we have elected to pay the estimated amount over an eight-year period. For more information see *Note 4. Income Taxes* in Item 8 "Financial Statements and Supplementary Data."

Recent Accounting Pronouncements

From time to time, the Financial Accounting Standards Board ("FASB") or other standards setting bodies issue new accounting pronouncements. Updates to the FASB Accounting Standards Codification ("ASC") are communicated through issuance of an Accounting Standards Update ("ASU"). Unless otherwise discussed, we believe that the impact of recently issued guidance, whether adopted or to be adopted in the future, is not expected to have a material impact on our Consolidated Financial Statements upon adoption.

To understand the impact of recently issued guidance, whether adopted or to be adopted, please review the information provided in *Note 1. Operations and Summary of Significant Accounting Policies and Estimates* in Item 8 "Financial Statements and Supplementary Data."

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Market Risk and Risk Management

In the normal course of business, we have exposures to interest rate risk from our investments, credit facility, and foreign exchange rate risk related to our foreign operations and foreign currency transactions.

Interest Rate Risk

Our market risk exposure relates to changes in interest rates in our investment portfolio and credit facility. We generally place our investments with high-credit quality issuers and by policy are averse to principal loss and seek to protect and preserve our invested funds by limiting default risk, market risk, and reinvestment risk.

As of December 31, 2017, our investments consisted primarily of certificates of deposit with maturity of less than 1 years. As a measurement of the sensitivity of our portfolio and assuming that our investment portfolio balances remain constant, a hypothetical decrease of 100 basis points (1%) in interest rates would decrease annual pre-tax earnings by a nominal amount.

Foreign Currency Exchange Rate Risk

We are impacted by changes in foreign currency exchange rates through sales and purchasing transactions when we sell products and purchase materials in currencies different from the currency in which product and manufacturing costs were incurred. The functional currencies of our worldwide facilities primarily include the USD, EUR, KRW, TWD, GBP, and CNY. Our purchasing and sales activities are primarily denominated in the USD, JPY, EUR and CNY. We may be impacted by changes in the relative buying power of our customers, which may impact sales volumes either positively or negatively. As these currencies fluctuate against each other, and other currencies, we are exposed to foreign currency exchange rate risk on sales, purchasing transactions and labor.

Acquisitions are a large component of our capital deployment strategy. A significant number of acquisition target opportunities are located outside the U.S. and their value is denominated in foreign currency. Changes in exchange rates therefore may have a material impact on their valuation in USD and therefore may impact our view of their attractiveness.

From time to time, we may enter into foreign currency exchange rate contracts to hedge against changes in foreign currency exchange rates on assets and liabilities expected to be settled at a future date, including foreign currency which may be required for a potential foreign acquisition. Market risk arises from the potential adverse effects on the value of derivative instruments that result from a change in foreign currency exchange rates. We may enter into foreign currency forward contracts to manage the exchange rate risk associated with intercompany debt denominated in nonfunctional currencies. We minimize our market risk applicable to foreign currency exchange rate contracts by establishing and monitoring parameters that limit the types and degree of our derivative contract instruments. We enter into derivative contract instruments for risk management purposes only. We do not enter into or issue derivatives for trading or speculative purposes.

Our reported financial results of operations, including the reported value of our assets and liabilities, are also impacted by changes in foreign currency exchange rates. Assets and liabilities of substantially all of our subsidiaries outside the U.S. are translated at period end rates of exchange for each reporting period. Operating results and cash flow statements are translated at weighted-average rates of exchange during each reporting period. Although these translation changes have no immediate cash impact, the translation changes may impact future borrowing capacity, and overall value of our net assets.

Currency exchange rates vary daily and often one currency strengthens against the USD while another currency weakens. Because of the complex interrelationship of the worldwide supply chains and distribution channels, it is difficult to quantify the impact of a change in one or more particular exchange rates.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Shareholders
Advanced Energy Industries, Inc.

Opinion on the financial statements

We have audited the accompanying consolidated balance sheets of Advanced Energy Industries, Inc. (a Delaware corporation) and subsidiaries (the “Company”) as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive income (loss), stockholders’ equity, and cash flows for each of the three years in the period ended December 31, 2017, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the Company’s internal control over financial reporting as of December 31, 2017, based on criteria established in the 2013 *Internal Control-Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”), and our report dated February 15, 2018 expressed an unqualified opinion.

Basis for opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ GRANT THORNTON LLP

We have served as the Company’s auditor since 2004.

Denver, CO

February 15, 2018

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM (DRAFT)

Board of Directors and Shareholders
Advanced Energy Industries, Inc.

Opinion on internal control over financial reporting

We have audited the internal control over financial reporting of Advanced Energy Industries, Inc. (a Delaware corporation) and subsidiaries (the “Company”) as of December 31, 2017, based on criteria established in the 2013 *Internal Control-Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in the 2013 *Internal Control-Integrated Framework* issued by COSO.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the consolidated financial statements of the Company as of and for the year ended December 31, 2017, and our report dated February 15, 2018 expressed an unqualified opinion on those financial statements.

Basis for opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s Annual Report on Internal Controls over Financial Reporting appearing under Item 9A of the Company’s Annual Report on Form 10-K. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and limitations of internal control over financial reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

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

/s/ GRANT THORNTON LLP

Denver, CO

February 15, 2018

ADVANCED ENERGY INDUSTRIES, INC.
Consolidated Balance Sheets
(In thousands, except per share amounts)

| | December 31, | |
|---|-------------------|-------------------|
| | 2017 | 2016 |
| ASSETS | | |
| Current assets: | | |
| Cash and cash equivalents | \$ 407,283 | \$ 281,953 |
| Marketable securities | 3,104 | 4,737 |
| Accounts receivable, net of allowances of \$1,748 and \$1,943 respectively | 87,429 | 75,667 |
| Inventories | 78,450 | 55,770 |
| Income taxes receivable | 1,295 | 1,482 |
| Other current assets | 8,129 | 9,324 |
| Current assets from discontinued operations | 9,535 | 9,401 |
| Total current assets | 595,225 | 438,334 |
| Property and equipment, net | 17,795 | 13,337 |
| Deposits and other | 3,051 | 1,835 |
| Goodwill | 53,812 | 42,125 |
| Intangible assets, net | 33,499 | 28,071 |
| Deferred income tax assets | 18,841 | 32,197 |
| Non-current assets from discontinued operations | 11,085 | 15,630 |
| TOTAL ASSETS | \$ 733,308 | \$ 571,529 |
| LIABILITIES AND STOCKHOLDERS' EQUITY | | |
| Current liabilities: | | |
| Accounts payable | \$ 48,177 | \$ 46,255 |
| Income taxes payable | 5,365 | 1,778 |
| Accrued payroll and employee benefits | 18,412 | 13,230 |
| Other accrued expenses | 19,913 | 14,590 |
| Customer deposits | 6,402 | 5,774 |
| Current liabilities from discontinued operations | 7,850 | 13,419 |
| Total current liabilities | 106,119 | 95,046 |
| Deferred income tax liabilities | 4,556 | 1,008 |
| Uncertain tax positions | 17,031 | 2,538 |
| Long-term deferred revenue | 33,402 | 39,170 |
| Other long-term liabilities | 36,282 | 20,536 |
| Non-current liabilities from discontinued operations | 15,277 | 21,157 |
| Total liabilities | 212,667 | 179,455 |
| Stockholders' equity: | | |
| Preferred stock, \$0.001 par value, 1,000 shares authorized, none issued and outstanding | — | — |
| Common stock, \$0.001 par value, 70,000 shares authorized; 39,604 and 39,712 issued and outstanding, respectively | 40 | 40 |
| Additional paid-in capital | 184,843 | 203,603 |
| Retained earnings | 333,225 | 195,364 |
| Accumulated other comprehensive income (loss) | 2,533 | (6,933) |
| Total stockholders' equity | 520,641 | 392,074 |
| TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY | \$ 733,308 | \$ 571,529 |

The accompanying notes are an integral part of these Consolidated Financial Statements.

ADVANCED ENERGY INDUSTRIES, INC.
Consolidated Statements of Operations
(In thousands, except per share amounts)

| | Years Ended December 31, | | |
|---|--------------------------|-------------------|---------------------|
| | 2017 | 2016 | 2015 |
| Sales: | | | |
| Product | \$ 578,650 | \$ 410,580 | \$ 350,834 |
| Services | 92,362 | 73,124 | 63,977 |
| Total sales | 671,012 | 483,704 | 414,811 |
| Cost of sales: | | | |
| Product | 267,587 | 192,694 | 164,889 |
| Services | 47,044 | 37,863 | 33,052 |
| Total cost of sales | 314,631 | 230,557 | 197,941 |
| Gross profit | 356,381 | 253,147 | 216,870 |
| Operating expenses: | | | |
| Research and development | 57,999 | 44,445 | 39,551 |
| Selling, general and administrative | 93,262 | 77,678 | 66,097 |
| Amortization of intangible assets | 4,350 | 4,167 | 4,368 |
| Restructuring expense | — | — | 198 |
| Total operating expenses | 155,611 | 126,290 | 110,214 |
| Operating income | 200,770 | 126,857 | 106,656 |
| Other income (expense), net | (2,579) | 1,219 | (1,214) |
| Income from continuing operations before income taxes | 198,191 | 128,076 | 105,442 |
| Provision for income taxes | 62,090 | 11,128 | 21,960 |
| Income from continuing operations | 136,101 | 116,948 | 83,482 |
| Income (loss) from discontinued operations, net of income taxes | 1,760 | 10,506 | (241,968) |
| Net income (loss) | \$ 137,861 | \$ 127,454 | \$ (158,486) |
| Basic weighted-average common shares outstanding | | | |
| | 39,754 | 39,720 | 40,746 |
| Diluted weighted-average common shares outstanding | | | |
| | 40,176 | 40,031 | 41,077 |
| Earnings (loss) per share: | | | |
| Continuing operations: | | | |
| Basic earnings per share | \$ 3.42 | \$ 2.94 | \$ 2.05 |
| Diluted earnings per share | \$ 3.39 | \$ 2.92 | \$ 2.03 |
| Discontinued operations: | | | |
| Basic earnings (loss) per share | \$ 0.04 | \$ 0.26 | \$ (5.94) |
| Diluted earnings (loss) per share | \$ 0.04 | \$ 0.26 | \$ (5.94) |
| Net income: | | | |
| Basic earnings (loss) per share | \$ 3.47 | \$ 3.21 | \$ (3.89) |
| Diluted earnings (loss) per share | \$ 3.43 | \$ 3.18 | \$ (3.89) |

The accompanying notes are an integral part of these Consolidated Financial Statements.

ADVANCED ENERGY INDUSTRIES, INC.
Consolidated Statements of Comprehensive Income (Loss)
(In thousands)

| | Years Ended December 31, | | |
|--|--------------------------|-------------------|---------------------|
| | 2017 | 2016 | 2015 |
| Net income (loss) | \$ 137,861 | \$ 127,454 | \$ (158,486) |
| Other comprehensive income (loss), net of tax: | | | |
| Foreign currency translation adjustment | 8,305 | (3,631) | (10,228) |
| Unrealized (losses) gains on marketable securities | (2) | 5 | (3) |
| Minimum retirement benefit liability adjustment | 1,163 | (3,841) | (11) |
| Comprehensive income (loss) | <u>\$ 147,327</u> | <u>\$ 119,987</u> | <u>\$ (168,728)</u> |

The accompanying notes are an integral part of these Consolidated Financial Statements.

ADVANCED ENERGY INDUSTRIES, INC.
Consolidated Statements of Stockholders' Equity
(In thousands, except share amounts)

| | Common Stock | | Additional Paid-in Capital | Retained Earnings | Accumulated Other Comprehensive Income | | | Total Stockholders' Equity |
|---|---------------------------|--------|----------------------------|-------------------|--|---------------------------|--------------------------------------|----------------------------|
| | Shares | Amount | | | Translation adjustments | Unrealized gains (losses) | Minimum retirement benefit liability | |
| | Balances, January 1, 2015 | 40,613 | \$ 41 | \$ 237,752 | \$ 226,396 | \$ 10,249 | \$ — | \$ 527 |
| Stock issued from equity plans | 525 | — | 4,121 | — | — | — | — | 4,121 |
| Stock-based compensation | — | — | 3,321 | — | — | — | — | 3,321 |
| Excess tax benefit from stock-based compensation | — | — | (99) | — | — | — | — | (99) |
| Stock buyback | (1,382) | (1) | (49,999) | — | — | — | — | (50,000) |
| Comprehensive income: | | | | | | | | |
| Equity adjustment from foreign currency translation | — | — | — | — | (10,228) | — | — | (10,228) |
| Unrealized holding gains | — | — | — | — | — | (3) | — | (3) |
| Minimum retirement benefit liability adjustment | — | — | — | — | — | — | (11) | (11) |
| Net income | — | — | — | (158,486) | — | — | — | (158,486) |
| Total comprehensive income (loss) | — | — | — | (158,486) | (10,228) | (3) | (11) | (168,728) |
| Balances, December 31, 2015 | 39,756 | \$ 40 | \$ 195,096 | \$ 67,910 | \$ 21 | \$ (3) | \$ 516 | \$ 263,580 |
| Stock issued from equity plans | 299 | — | 2,175 | — | — | — | — | 2,175 |
| Stock-based compensation | — | — | 6,332 | — | — | — | — | 6,332 |
| Stock buyback | (343) | — | — | — | — | — | — | — |
| Comprehensive loss: | | | | | | | | |
| Equity adjustment from foreign currency translation | — | — | — | — | (3,631) | — | — | (3,631) |
| Unrealized holding losses | — | — | — | — | — | 5 | — | 5 |
| Minimum retirement benefit liability adjustment | — | — | — | — | — | — | (3,841) | (3,841) |
| Net loss | — | — | — | 127,454 | — | — | — | 127,454 |
| Total comprehensive loss | — | — | — | 127,454 | (3,631) | 5 | (3,841) | 119,987 |
| Balances, December 31, 2016 | 39,712 | \$ 40 | \$ 203,603 | \$ 195,364 | \$ (3,610) | \$ 2 | \$ (3,325) | \$ 392,074 |
| Stock issued from equity plans | 314 | — | (1,316) | — | — | — | — | (1,316) |
| Stock-based compensation | — | — | 12,549 | — | — | — | — | 12,549 |
| Stock buyback | (422) | — | (29,993) | — | — | — | — | (29,993) |
| Comprehensive income (loss): | | | | | | | | |
| Equity adjustment from foreign currency translation | — | — | — | — | 8,305 | — | — | 8,305 |
| Unrealized holding losses | — | — | — | — | — | (2) | — | (2) |
| Minimum retirement benefit liability adjustment | — | — | — | — | — | — | 1,163 | 1,163 |
| Net income | — | — | — | 137,861 | — | — | — | 137,861 |
| Total comprehensive income (loss) | — | — | — | 137,861 | 8,305 | (2) | 1,163 | 147,327 |
| Balances at December 31, 2017 | 39,604 | \$ 40 | \$ 184,843 | \$ 333,225 | \$ 4,695 | \$ — | \$ (2,162) | \$ 520,641 |

The accompanying notes are an integral part of these Consolidated Financial Statements.

ADVANCED ENERGY INDUSTRIES, INC.
Consolidated Statements of Cash Flows
(In thousands)

| | Years Ended December 31, | | |
|---|--------------------------|------------|--------------|
| | 2017 | 2016 | 2015 |
| CASH FLOWS FROM OPERATING ACTIVITIES: | | | |
| Net income (loss) | \$ 137,861 | \$ 127,454 | \$ (158,486) |
| Income (loss) from discontinued operations, net of income taxes | 1,760 | 10,506 | (241,968) |
| Income from continuing operations, net of income taxes | 136,101 | 116,948 | 83,482 |
| Adjustments to reconcile net income to net cash provided by operating activities: | | | |
| Depreciation and amortization | 9,424 | 7,813 | 8,832 |
| Stock-based compensation expense | 12,549 | 6,332 | 2,810 |
| Provision for deferred income taxes | 28,765 | 3,570 | 3,498 |
| Non-cash reserve for potential bad debts | — | — | 5,967 |
| Loss on foreign exchange hedge | 3,489 | — | — |
| Net loss (gain) on disposal of assets | 122 | 319 | (1,019) |
| Changes in operating assets and liabilities, net of assets acquired: | | | |
| Accounts receivable | (7,497) | (21,603) | 17,919 |
| Inventories | (19,261) | (6,359) | (6,715) |
| Other current assets | (1,030) | (1,358) | (2,366) |
| Accounts payable | 1,812 | 18,957 | 3,220 |
| Other liabilities and accrued expenses | 7,159 | 2,169 | (9,500) |
| Income taxes | 18,323 | 356 | 17,994 |
| Net cash provided by operating activities from continuing operations | 189,956 | 127,144 | 124,122 |
| Net cash (used in) operating activities from discontinued operations | (7,255) | (7,857) | (19,413) |
| Net cash provided by operating activities | 182,701 | 119,287 | 104,709 |
| CASH FLOWS FROM INVESTING ACTIVITIES: | | | |
| Purchases of marketable securities | (107) | (763) | (30,172) |
| Proceeds from sale of marketable securities | 1,903 | 7,884 | 21,095 |
| Acquisitions, net of cash acquired | (17,347) | — | (128) |
| Purchase of foreign exchange hedge | (3,489) | — | — |
| Purchases of property and equipment | (9,042) | (6,821) | (4,014) |
| Net cash (used in) provided by investing activities from continuing operations | (28,082) | 300 | (13,219) |
| Net cash used in investing activities from discontinued operations | — | — | (46) |
| Net cash (used in) provided by investing activities | (28,082) | 300 | (13,265) |
| CASH FLOWS FROM FINANCING ACTIVITIES: | | | |
| Purchase and retirement of common stock | (29,993) | — | (50,000) |
| Net (payments) proceeds related to stock-based award activities | (1,315) | 2,175 | 4,476 |
| Other financing activities | 1 | (4) | (4) |
| Net cash (used in) provided by financing activities from continuing operations | (31,307) | 2,171 | (45,528) |
| Net cash (used in) financing activities from discontinued operations | — | (29) | (14) |
| Net cash (used in) provided by financing activities | (31,307) | 2,142 | (45,542) |
| EFFECT OF CURRENCY TRANSLATION ON CASH | 2,208 | (1,932) | (1,467) |
| INCREASE IN CASH AND CASH EQUIVALENTS | 125,520 | 119,797 | 44,435 |
| CASH AND CASH EQUIVALENTS, beginning of period | 289,517 | 169,720 | 125,285 |
| CASH AND CASH EQUIVALENTS, end of period | 415,037 | 289,517 | 169,720 |
| Less cash and cash equivalents from discontinued operations | 7,754 | 7,564 | 11,277 |
| CASH AND CASH EQUIVALENTS FROM CONTINUING OPERATIONS, end of period | \$ 407,283 | \$ 281,953 | \$ 158,443 |
| SUPPLEMENTAL DISCLOSURE OF CASH FLOW INFORMATION: | | | |
| Cash paid for interest | \$ 66 | \$ 173 | \$ 361 |
| Cash paid for income taxes | 5,314 | 5,647 | 7,161 |
| Cash received for refunds of income taxes | 1,448 | 2,232 | 5,377 |
| Cash held in banks outside the United States | 285,686 | 230,168 | 116,259 |

The accompanying notes are an integral part of these Consolidated Financial Statements.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(in thousands, except per share data)

In this Annual Report on Form 10-K, we use the terms “Advanced Energy”, “the Company”, “we”, “us” or “our” to refer to Advanced Energy Industries, Inc. and its subsidiaries.

NOTE 1. OPERATIONS AND SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES AND ESTIMATES

We design, manufacture, sell and support power conversion and control products that transform power into various usable forms. Our products enable manufacturing processes that use thin film and plasma enhanced chemical and physical processing for various products, industrial electro-thermal applications for material and chemical processes, precision power for analytical instrumentation, as well as grid-tied power conversion. We also supply thermal instrumentation products for advanced temperature control in these markets. Our network of global service support centers provides local repair and field service capability in key regions. As of December 31, 2015, we discontinued our Inverter production, engineering, and sales product line. As such, all Inverter revenues, costs, assets and liabilities are reported in Discontinued Operations for all periods presented herein and we currently report as a single unit. See *Note 3. Discontinued Operations* for more information.

Principles of Consolidation — Our Consolidated Financial Statements include our accounts and the accounts of our wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated. Our Consolidated Financial Statements are stated in United States dollars and have been prepared in accordance with accounting principles generally accepted in the United States (“U.S. GAAP”).

Use of Estimates in the Preparation of the Consolidated Financial Statements — The preparation of our Consolidated Financial Statements in conformity with U.S. GAAP requires us to make estimates, assumptions and judgments that affect the reported amounts of assets and liabilities, and disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. We believe that the significant estimates, assumptions, and judgments when accounting for items and matters such as allowances for doubtful accounts, excess and obsolete inventory, warranty reserves, acquisitions, asset valuations, asset life, depreciation, amortization, recoverability of assets, impairments, deferred revenue, stock option and restricted stock grants, taxes, and other provisions are reasonable, based upon information available at the time they are made. Actual results may differ from these estimates, making it possible that a change in these estimates could occur in the near term.

Foreign Currency Translation — The functional currency of our foreign subsidiaries is their local currency, with the exception of our manufacturing facility in Shenzhen, The People's Republic of China (“PRC”) and our regional headquarters in Singapore, where the United States dollar is the functional currency. Assets and liabilities of foreign subsidiaries are translated to United States dollars at period-end exchange rates, and our Consolidated Statements of Operations and Cash Flows are translated at average exchange rates during the period. Resulting translation adjustments are recorded as a component of accumulated other comprehensive income.

Transactions denominated in currencies other than the local currency are recorded based on exchange rates at the time such transactions arise. Subsequent changes in exchange rates result in foreign currency transaction gains and losses which are reflected as unrealized (based on period end translation) or realized (upon settlement of the transactions) in other income, net in our Consolidated Statements of Operations.

Fair Value of Financial Instruments — We value our financial assets and liabilities using fair value measurements. Fair value is based on the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The carrying amount of cash and cash equivalents, marketable securities, accounts receivable, other current assets, accounts payable, accrued liabilities, and other current liabilities in our Consolidated Financial Statements approximates fair value because of the short-term nature of the instruments.

Cash and Cash Equivalents — We consider all amounts on deposit with financial institutions and highly liquid investments with an original maturity of three months or less to be cash equivalents. Cash and cash equivalents are highly liquid investments that consist primarily of short-term money market instruments and demand deposits with insignificant interest rate risk and original maturities of three months or less at the time of purchase.

Sometimes we invest excess cash in money market funds not insured by the Federal Deposit Insurance Corporation. We believe that the investments in money market funds are on deposit with credit-worthy financial institutions and that the funds are highly liquid. The investments in money market funds are reported at fair value, with interest income recorded in earnings and are included in “Cash and cash equivalents.” The fair values of our investments in money market funds are based on the quoted market prices.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

As of December 31, 2017 we have \$1.2 million of cash included in cash and cash equivalents that is restricted from immediate withdrawal. Of this amount, \$0.5 million is a refund from a European tax authority, restricted until the tax authority completes its audit procedures, \$0.2 million is restricted for China and Taiwan Customs Clearance transactions as a guarantee of Customs Duty, adjusted annually based on projected customs clearance transactions, and \$0.5 million is collateral for the U.S. purchasing card program, restricted for the duration of the card program.

Marketable Securities — All of our investments in marketable securities are classified as available-for-sale at the respective balance sheet dates. Marketable securities classified as available-for-sale are recorded at fair value based upon quoted market prices, and any temporary difference between the cost and fair value of the investment is presented as a separate component of accumulated other comprehensive income (loss). We recognize gains and losses on the date our investments mature or are sold and record these gains and losses in other income, net. The specific identification method is used to determine the gains and losses on investments in marketable securities.

Concentrations of Credit Risk — Financial instruments, which potentially subject us to credit risk, include cash and cash equivalents, marketable securities, and trade accounts receivable. To preserve capital and maintain liquidity, we invest with financial institutions we deem to be of high quality and sound financial condition. Our investments are in low-risk instruments and we limit our credit exposure in any one institution or type of investment instrument based upon criteria including creditworthiness.

At December 31, 2017, our accounts receivable from Applied Materials and Lam Research were \$36.8 million, or 42.0% and \$5.4 million, or 6.2% of our total accounts receivable, respectively. At December 31, 2016, our accounts receivable from Applied Materials and Lam Research were \$31.1 million, or 41.1% and \$14.3 million, or 18.9% of our total accounts receivable, respectively. No other customer balance exceeded 10% of our total accounts receivable balance at December 31, 2017 or December 31, 2016. We have established an allowance for doubtful accounts based upon factors surrounding the credit risk of specific customers, historical trends, and other information.

Accounts Receivable and Allowance for Doubtful Accounts — Accounts receivable are recorded at net realizable value. We maintain a credit approval process and we make significant judgments in connection with assessing our customers' ability to pay at the time of shipment. Despite this assessment, from time to time, our customers are unable to meet their payment obligations. We continuously monitor our customers' credit worthiness and use our judgment in establishing a provision for estimated credit losses based upon our historical experience and any specific customer collection issues that we have identified. While such credit losses have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same credit loss rates that we have in the past. A significant change in the liquidity or financial position of our customers could have a material adverse impact on the collectability of accounts receivable and our future operating results.

Changes in allowance for doubtful accounts are summarized as follows:

| | Years Ended December 31, | | |
|--|--------------------------|-----------------|-----------------|
| | 2017 | 2016 | 2015 |
| Balances at beginning of period | \$ 1,943 | \$ 8,739 | \$ 1,052 |
| Additions - charged to expense | — | 1,332 | 7,837 |
| Deductions - write-offs, net of recoveries | (195) | (8,128) | (150) |
| Balances at end of period | <u>\$ 1,748</u> | <u>\$ 1,943</u> | <u>\$ 8,739</u> |

Inventories — Inventories include costs of materials, direct labor, manufacturing overhead, in-bound freight, and duty. Inventories are valued at the lower of cost (first-in, first-out method) or market and are presented net of reserves for excess and obsolete inventory.

We regularly review inventory quantities on hand and record a provision to write-down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on historical usage and our estimated forecast of product demand. Demand for our products can fluctuate significantly. A significant decrease in demand could result in an increase in the charges for excess inventory quantities on hand.

In addition, our industry is subject to technological change, new product development, and product technological obsolescence that could result in an increase in the amount of obsolete inventory quantities on hand. Therefore, any significant unanticipated changes in demand or technological developments could have a significant impact on the value of our inventory and our reported operating results.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

Property and Equipment — Property and equipment is stated at cost or estimated fair value if acquired in a business combination. Depreciation is computed over the estimated useful lives using the straight-line method. Estimated useful lives for financial reporting purposes are as follows: buildings, 20 to 40 years; machinery, equipment, furniture and fixtures and vehicles, three to 10 years; and computer and communication equipment, three years.

Amortization of leasehold improvements and leased equipment is calculated using the straight-line method over the lease term or the estimated useful life of the assets, whichever period is shorter. Leasehold additions and improvements are capitalized, while maintenance and repairs are expensed as incurred.

When depreciable assets are retired, or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts and any related gains or losses are included in other income, net, in our Consolidated Statements of Operations.

Intangible Assets, Goodwill and Other Long-Lived Assets — As a result of our acquisitions, we identified and recorded intangible assets and goodwill. Intangible assets are valued based on estimates of future cash flows and amortized over their estimated useful lives. Goodwill is subject to annual impairment testing, as well as testing upon the occurrence of any event that indicates a potential impairment. Intangible assets and other long-lived assets are subject to an impairment test if there is an indicator of impairment. The carrying value and ultimate realization of these assets is dependent upon our estimates of future earnings and benefits that we expect to generate from their use. If our expectations of future results and cash flows are significantly diminished, intangible assets and goodwill may be impaired and the resulting charge to operations may be material. When we determine that the carrying value of intangibles or other long-lived assets may not be recoverable based upon the existence of one or more indicators of impairment, we use the projected undiscounted cash flow method to determine whether an impairment exists, and then measure the impairment using discounted cash flows.

The estimation of useful lives and expected cash flows requires us to make significant judgments regarding future periods that are subject to some factors outside of our control. Changes in these estimates can result in significant revisions to our carrying value of these assets and may result in material charges to our results of operations.

The annual impairment test for goodwill can be performed using an assessment of qualitative factors in determining if it is more likely than not that goodwill is impaired. If this assessment indicates that it is more likely than not that goodwill is impaired, the next step of impairment testing compares the fair value of a reporting unit to its carrying value. Goodwill would be impaired if the resulting implied fair value of goodwill was less than the recorded carrying value of the goodwill.

Revenue Recognition — We recognize revenue from product sales upon transfer of title and risk of loss to our customers provided that there is evidence of an arrangement, the sales price is fixed or determinable, and the collection of the related receivable is reasonably assured. In most transactions, we have no obligations to our customers after the date products are shipped, other than pursuant to warranty obligations. Shipping and handling fees billed to customers, if any, are recognized as revenue. The related shipping and handling costs are recognized in cost of sales.

We maintain a worldwide support organization in nine countries, including the United States, the PRC, Japan, Korea, Taiwan, Canada, Germany, Ireland and Great Britain. Support services include warranty and non-warranty repair services, upgrades, and refurbishments on the products we sell. Repairs that are covered under our standard warranty do not generate revenue.

As part of our ongoing service business, we satisfy our service obligations under extended warranties and preventive maintenance contracts. Extended warranties had previously been offered on our discontinued inverter products. Any up-front fees received for extended warranties or maintenance plans are deferred and recognized ratably over the service periods, as defined in the agreements. We have deferred revenue related to our extended warranties and service contracts totaling \$37.5 million as of December 31, 2017 and \$40.8 million as of December 31, 2016.

Research and Development Expenses — Costs incurred to advance, test or otherwise modify our proprietary technology or develop new technologies are considered research and development costs and are expensed when incurred. These costs are primarily comprised of costs associated with the operation of our laboratories and research facilities, including internal labor, materials, and overhead.

Warranty Costs — We provide for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. We offer warranty coverage for a majority of our Precision Power products for periods typically ranging from 12 to 24 months after shipment. We warranted our inverter products for five to ten years and provided the option to purchase additional warranty coverage for up to 20 years. The warranty expense accrued related to our standard inverter product warranties is now considered part of our discontinued operations and is recorded as such on our Consolidated Balance Sheets. See *Note 3. Discontinued Operations* for more information. See *Note 12. Warranties* for more information on our warranties from continuing operations. We estimate the anticipated costs of repairing our products under such warranties based on the historical costs of the repairs. The assumptions we use to estimate warranty accruals are reevaluated periodically, in light of actual experience, and when

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

appropriate, the accruals are adjusted. Should product failure rates differ from our estimates, actual costs could vary significantly from our expectations.

Stock-Based Compensation — Accounting for stock-based compensation requires the measurement and recognition of compensation expense for all share-based payment awards made to employees and directors based on estimated fair values. We have estimated the fair value of all stock options and awards on the date of grant using the Black-Scholes-Merton pricing model, which is affected by our stock price, as well as assumptions regarding a number of complex and subjective variables. These variables include our expected stock price volatility over the term of the awards, actual and projected employee option exercise behaviors, risk-free interest rates and expected dividends. We also estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from our estimates. Our expected volatility assumption is based on the historical daily closing price of our stock over a period equivalent to the expected life of the options.

Income Taxes — We follow the liability method of accounting for income taxes under which deferred tax assets and liabilities are recognized for future tax consequences. A deferred tax asset or liability is computed for both the expected future impact of differences between the financial statement and tax basis of assets and liabilities and for the expected future tax benefit to be derived from tax loss and tax credit carry-forwards. Tax rate changes are reflected in the period such changes are enacted.

We assess the recoverability of our net deferred tax assets and the need for a valuation allowance on a quarterly basis. Our assessment includes a number of factors including historical results and taxable income projections for each jurisdiction. The ultimate realization of deferred income tax assets is dependent on the generation of taxable income in appropriate jurisdictions during the periods in which those temporary differences are deductible. We consider the scheduled reversal of deferred income tax liabilities, projected future taxable income, and tax planning strategies in determining the amount of the valuation allowance. Based on the level of historical taxable income and projections for future taxable income over the periods in which the deferred income tax assets are deductible, we determine if we will realize the benefits of these deductible differences.

Accounting for income taxes requires a two-step approach to recognize and measure uncertain tax positions. In general, we are subject to regular examination of our income tax returns by the Internal Revenue Service and other tax authorities. The first step is to evaluate the tax position for recognition by determining, if based on the technical merits, it is more likely than not that the position will be sustained upon audit, including resolutions of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. We regularly assess the likelihood of favorable or unfavorable outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. This evaluation is based on factors including, but not limited to, changes in facts or circumstances, changes in tax law, effectively settled issues under audit, and new audit activity.

On December 22, 2017, the Tax Act was enacted into law and the new legislation contains several key tax provisions that affected us, including a one-time mandatory transition tax on accumulated foreign earnings and a reduction of the corporate income tax rate to 21%, among others. We are required to recognize the effect of the tax law changes in the period of enactment, such as determining the transition tax, re-measuring our U.S. deferred tax assets and liabilities, as well as reassessing the net realizability of our deferred tax assets and liabilities. In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118, *Income Tax Accounting Implications of the Tax Cuts and Jobs Act* (SAB 118), which allows us to record provisional amounts during a measurement period not to extend beyond one year of the enactment date.

Our accounting for the following elements of the Tax Act is incomplete and we were not yet able to make reasonable estimates of the effects, therefore, no provisional adjustments were recorded. Because of the complexity of the new GILTI tax rules, we are continuing to evaluate this provision of the Tax Act and the application of ASC 740 *Income Taxes*. Under U.S. GAAP, we are required to make an accounting policy choice of either (1) treating taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the “period cost method”) or (2) factoring such amounts into a company’s measurement of its deferred taxes (the “deferred method”). Our selection of an accounting policy with respect to the new GILTI tax rules will depend, in part, on analyzing our global income to determine whether we expect to have future U.S. inclusions in taxable income related to GILTI and, if so, what the impact is expected to be. Because whether we expect to have future U.S. inclusions in taxable income related to GILTI depends on not only our current structure and estimated future results of global operations but also our intent and ability to modify our structure and/or our business, we are not yet able to reasonably estimate the effect of this provision of the Tax Act. Therefore, we have not made any adjustments related to potential GILTI tax in our financial statements and have not made a policy decision regarding whether to record deferred taxes on GILTI.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

Since the Tax Act was passed late in the fourth quarter of 2017, and ongoing guidance and accounting interpretation is expected over the next 12 months, we consider the accounting for the transition tax, deferred tax re-measurements, and other items to be incomplete due to forthcoming guidance and our ongoing analysis of final year-end data and tax positions. We expect to complete our analysis within the measurement period in accordance with SAB 118. See *Note 4. Income Taxes* for more information.

Commitments and Contingencies — From time to time we are involved in disputes and legal actions arising in the normal course of our business. While we currently believe that the amount of any ultimate loss would not be material to our financial position, the outcome of these actions is inherently difficult to predict. In the event of an adverse outcome, the ultimate loss could have a material adverse effect on our financial position or reported results of operations in a particular period. An unfavorable decision, particularly in patent litigation, could require material changes in production processes and products or result in our inability to ship products or components found to have violated third-party patent rights. We accrue loss contingencies when it is probable that a loss has occurred or will occur and the amount of the loss can be reasonably estimated. Our estimates of probability of losses are subjective, involve significant judgment and uncertainties, and are based on the best information we have at any given point in time. Resolution of these uncertainties in a manner inconsistent with our expectations could have a significant impact on our results of operations and financial condition

NEW ACCOUNTING STANDARDS

From time to time, the Financial Accounting Standards Board ("FASB") or other standards setting bodies issue new accounting pronouncements. Updates to the FASB Accounting Standards Codification ("ASC") are communicated through issuance of an Accounting Standards Update ("ASU"). Unless otherwise discussed, we believe that the impact of recently issued guidance, whether adopted or to be adopted in the future, is not expected to have a material impact on the Consolidated Financial Statements upon adoption.

In May 2014, the FASB issued [ASU 2014-09, "Revenue from Contracts with Customers"](#) and has subsequently issued several supplemental and/or clarifying ASUs (collectively known as "ASC 606"). ASC 606 implements a five-step model for how an entity should recognize revenue in order to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. This guidance will be effective for fiscal periods beginning after December 15, 2017 and for the interim periods within that year. Advanced Energy has established a cross-functional implementation team to analyze its current portfolio of customer contracts. We have completed the disaggregation of the related sales order data and are finalizing detailed testing of contract elements. The implementation team is close to completion on identifying and implementing changes to existing business processes, controls, and systems in order to support revenue recognition and disclosure under the new standard.

Based on our completed reviews of our customer contracts and attribute testing, we expect that revenue with the majority of our customers will continue to be recognized at a point in time, generally upon shipment of products, consistent with our current revenue recognition model. The most significant update identified in connection with the implementation of ASC 606 is related to the recognition of revenue from sales of inventory to customers under vendor managed inventory or just-in-time inventory arrangements. Prior to implementation of ASU 606, revenue was recognized upon transfer of title, which is triggered by the customer's usage of inventory. Under ASC 606, revenue will be recognized upon delivery of inventory to customer site warehouses to align with transfer of control of the inventory. Analysis of variable consideration within customers contracts has been performed and no material updates for ASC 606 adoption were identified.

The standard permits the use of either the retrospective or cumulative effect transition method. We will adopt the new revenue guidance effective January 1, 2018 with a cumulative adjustment to the opening balance of Retained earnings as opposed to retrospectively adjusting our prior periods. This adjustment is anticipated to increase our Retained earnings by less than \$10 million. Additionally, ongoing impacts of ASC 606 adoption to net income are currently anticipated to be immaterial. Adoption of ASC 606 will also result in future adjustments to the balances of Revenues, Costs of sales, Accounts receivable, and Inventory. We will continue to assess the impact of ASC 606 as adoption is fully completed in 2018, and there remain areas to be fully concluded upon. Additionally, reviews are still underway which may alter current conclusions and the financial impact of ASC 606.

In February 2016, the FASB issued [ASU 2016-02, "Leases \(Topic 842\)"](#), to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and disclosing key information about leasing arrangements. ASU 2016-02 is effective for fiscal years beginning after December 15, 2018, including interim periods within the year of adoption. Early adoption is permitted. Advanced Energy is currently assessing and has not yet determined the impact ASU 2016-02 may have on its Consolidated Financial Statements.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

October 2016, the FASB issued ASU 2016-16, “Accounting for Income Taxes: Intra-Entity Asset Transfers of Assets Other than Inventory.” ASU 2016-16 changes the timing of income tax recognition for an intercompany sale of assets. ASU 2016-16 requires the seller’s tax effects and the buyer’s deferred taxes to be recognized immediately upon the sale instead of deferring accounting for the income tax implications until the assets are sold to a third party or recovered through use. ASU 2016-16 is effective for fiscal years beginning after December 15, 2017 including interim periods within the year of adoption. Modified retrospective adoption is required with any cumulative-effect adjustment recorded to retained earnings as of the beginning of the period of adoption. Early adoption is allowed but only if adopted in the first quarter of fiscal year 2017. Advanced Energy is currently assessing the impact of ASU 2016-16 adoption and while it has not completed the assessment, it has determined the impact of ASU 2016-16 adoption will require the recognition of deferred tax assets totaling approximately \$15 million with a corresponding increase to Retained Earnings in its Consolidated Financial Statements upon adoption.

In March 2017, the FASB issued ASU 2017-07, “Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost”, an update to ASC Topic 715 – Compensation – Retirement Benefits. The amendments in ASU 2017-07 require that the service cost component of the net periodic benefit cost be presented in the same income statement line item as other employee compensation costs arising from services rendered during the period. Other components of the net periodic benefit cost should be reported separately from the line item that includes the service cost and outside of any subtotal of operating income. ASU 2017-07 is effective for annual reporting periods beginning after December 15, 2017, and for the interim periods within those annual reporting periods. Early adoption is permitted. The Company does not expect this standard will have a material impact on our Consolidated Financial Statements.

NOTE 2. BUSINESS ACQUISITIONS

On July 3, 2017, Advanced Energy acquired all of the issued and outstanding shares of capital stock of Excelsys Holdings Limited (“Excelsys”), an electronics manufacturer in Cork, Ireland. This acquisition is part of Advanced Energy’s strategy to continue to grow and diversify its revenue through organic and inorganic opportunities. The high-efficiency, configurable power supplies that Excelsys manufactures for medical and industrial applications will further enhance Advanced Energy’s product portfolio.

The components of the fair value of the total consideration transferred for the Excelsys acquisition are as follows:

| | | |
|---|----|---------------|
| Cash paid to owners | \$ | 18,512 |
| Cash acquired | | (1,165) |
| Total fair value of consideration transferred | \$ | <u>17,347</u> |

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

The following table summarizes estimated fair values of the assets acquired and liabilities assumed as of July 3, 2017:

| | | |
|---|----|---------|
| Accounts receivable | \$ | 1,930 |
| Inventories | | 1,048 |
| Income taxes receivable | | 558 |
| Other current assets | | 47 |
| Property and equipment | | 256 |
| Deferred income tax asset | | 35 |
| Accounts payable | | (1,342) |
| Income taxes payable | | (34) |
| Other accrued expenses | | (719) |
| Deferred income tax liabilities | | (946) |
| | | 833 |
| Amortizable intangible assets: | | |
| Tradename | | 182 |
| Customer relationships | | 1,595 |
| Technology | | 5,808 |
| Total amortizable intangible assets | | 7,585 |
| Total identifiable net assets | | 8,418 |
| Goodwill | | 8,929 |
| Total fair value of consideration transferred | \$ | 17,347 |

A summary of the intangible assets acquired, amortization method and estimated useful lives as of July 3, 2017 follows:

| | Amount | Amortization Method | Useful Life |
|------------------------|----------|---------------------|-------------|
| Tradename | \$ 182 | Straight-line | 5 |
| Customer relationships | 1,595 | Straight-line | 10 |
| Technology | 5,808 | Straight-line | 10 |
| | \$ 7,585 | | |

Goodwill and intangible assets are recorded in the functional currency of the entity and are subject to changes due to translation at each balance sheet date. The goodwill associated with the acquisition is the result of expected synergies and expansion of the technology into adjacent markets we already serve. Advanced Energy is in the process of finalizing the assessment of fair value for the assets acquired and liabilities assumed.

NOTE 3. DISCONTINUED OPERATIONS

In December 2015, we completed the wind down of engineering, manufacturing and sales of our solar inverter product line (the "inverter business"). Accordingly, the results of our inverter business have been reflected as "Income (loss) from discontinued operations, net of income taxes" on our Consolidated Statements of Operations for all periods presented herein.

The effect of our sales of extended inverter warranties to our customers continues to be reflected in deferred revenue in our Consolidated Balance Sheets. Deferred revenue for extended inverter warranties and the associated costs of warranty service will be reflected in Sales and Cost of goods sold, respectively, from continuing operations in future periods in our Consolidated Statement of Operations, as the deferred revenue, is earned and the associated services are rendered. Extended warranties related to the inverter product line are no longer offered.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

The significant items included in "Income (loss) from discontinued operations, net of income taxes" are as follows:

| | Year Ended December 31, | | |
|---|--------------------------------|------------------|---------------------|
| | 2017 | 2016 | 2015 |
| Sales | \$ — | \$ — | \$ 95,856 |
| Cost of sales | 234 | 154 | 139,045 |
| Total operating (income) expenses (including restructuring) | (1,576) | (3,894) | 232,262 |
| Operating income (loss) from discontinued operations | 1,342 | 3,740 | (275,451) |
| Other income (expense) | 337 | 2,636 | (55) |
| Income (loss) from discontinued operations before income taxes | 1,679 | 6,376 | (275,506) |
| Benefit for income taxes | (81) | (4,130) | (33,538) |
| Income (loss) from discontinued operations, net of income taxes | <u>\$ 1,760</u> | <u>\$ 10,506</u> | <u>\$ (241,968)</u> |

Assets and Liabilities of discontinued operations within the Consolidated Balance Sheets are comprised of the following:

| | December 31, | |
|--|---------------------|------------------|
| | 2017 | 2016 |
| Cash and cash equivalents | \$ 7,754 | \$ 7,564 |
| Accounts and other receivables, net | 1,363 | 1,670 |
| Inventories | 418 | 167 |
| Current assets of discontinued operations | <u>\$ 9,535</u> | <u>\$ 9,401</u> |
| Other assets | 72 | 70 |
| Deferred income tax assets | 11,013 | 15,560 |
| Non-current assets of discontinued operations | <u>\$ 11,085</u> | <u>\$ 15,630</u> |
| Accounts payable and other accrued expenses | 541 | 3,684 |
| Accrued warranty | 7,305 | 9,254 |
| Accrued restructuring | 4 | 481 |
| Current liabilities of discontinued operations | <u>\$ 7,850</u> | <u>\$ 13,419</u> |
| Accrued warranty | 15,112 | 20,976 |
| Other liabilities | 165 | 181 |
| Non-current liabilities of discontinued operations | <u>\$ 15,277</u> | <u>\$ 21,157</u> |

NOTE 4. INCOME TAXES

The geographic distribution of pretax income from continuing operations is as follows:

| | Years Ended December 31, | | |
|----------|---------------------------------|-------------------|-------------------|
| | 2017 | 2016 | 2015 |
| Domestic | \$ 29,088 | \$ 13,776 | \$ 13,237 |
| Foreign | 169,103 | 114,300 | 92,205 |
| | <u>\$ 198,191</u> | <u>\$ 128,076</u> | <u>\$ 105,442</u> |

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The provision for income taxes from continuing operations is summarized as follows:

| | Years Ended December 31, | | |
|---|--------------------------|-------------------------|-------------------------|
| | 2017 | 2016 | 2015 |
| Current: | | | |
| Federal | \$ 26,550 | \$ 3,187 | \$ 5,823 |
| State | 601 | 351 | 335 |
| Foreign | 9,621 | 3,081 | 5,950 |
| Total current provision | <u>\$ 36,772</u> | <u>\$ 6,619</u> | <u>\$ 12,108</u> |
| Deferred: | | | |
| Federal | \$ 28,297 | \$ 3,110 | \$ 569 |
| State | (1,000) | 1,564 | 870 |
| Foreign | (1,979) | (165) | 8,413 |
| Total deferred provision | <u>25,318</u> | <u>4,509</u> | <u>9,852</u> |
| Total provision for income taxes | <u><u>\$ 62,090</u></u> | <u><u>\$ 11,128</u></u> | <u><u>\$ 21,960</u></u> |

The Company's effective income tax rate is lower than the 35% U.S. statutory tax rate primarily because of benefits from lower-taxed global operations. In 2017, our effective tax rate was also impacted by the effect of the recently enacted U.S. Tax Act, offset partially by a benefit related to the continued wind down of our solar inverter business. The following reconciles our effective tax rate on income from continuing operations to the federal statutory rate of 35%:

| | Years Ended December 31, | | |
|---|--------------------------|-------------------------|-------------------------|
| | 2017 | 2016 | 2015 |
| Income taxes per federal statutory rate | \$ 69,348 | \$ 44,826 | \$ 37,498 |
| State income taxes, net of federal deduction | 1,794 | 963 | 1,204 |
| Change in valuation allowance | 841 | (85) | 6,503 |
| Transition tax - U.S. Tax Reform | 61,690 | — | — |
| Corporate tax rate change - U.S. Tax Reform | 11,177 | — | — |
| Tax benefit associated with inverter business wind down | (33,837) | — | — |
| Stock based compensation | (5,263) | 1,117 | (166) |
| Tax Amortization | (2,558) | — | — |
| Tax effect of foreign operations | (47,482) | (31,651) | (22,495) |
| Uncertain tax positions | 4,948 | 1,636 | 2,122 |
| Tax credits | (658) | (4,495) | (969) |
| Other permanent items, net | 2,090 | (1,183) | (1,737) |
| | <u><u>\$ 62,090</u></u> | <u><u>\$ 11,128</u></u> | <u><u>\$ 21,960</u></u> |

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Deferred tax assets and liabilities are recognized for the future tax consequences of differences between the carrying amounts of assets and liabilities and their respective tax bases using enacted tax rates in effect for the year in which the differences are expected to be reversed. Significant deferred tax assets and liabilities consist of the following:

| | Years Ended December 31, | |
|---|--------------------------|------------------|
| | 2017 | 2016 |
| Deferred tax assets | | |
| Stock based compensation | \$ 1,295 | \$ 2,281 |
| Net operating loss and tax credit carryforwards | 40,572 | 36,145 |
| Pension obligation | 3,363 | 2,338 |
| Excess and obsolete inventory | 841 | 3,031 |
| Deferred revenue | 4,519 | 11,998 |
| Employee bonuses and commissions | 1,112 | 1,908 |
| Other | 2,118 | 3,624 |
| Deferred tax assets | <u>53,820</u> | <u>61,325</u> |
| Less: Valuation allowance | (32,267) | (26,120) |
| Net deferred tax assets | <u>21,553</u> | <u>35,205</u> |
| Deferred tax liabilities | | |
| Depreciation and amortization | 2,605 | 2,266 |
| Foreign other | 3,448 | 1,538 |
| Other | 62 | 212 |
| Deferred tax liabilities | <u>6,115</u> | <u>4,016</u> |
| Net deferred tax assets | <u>\$ 15,438</u> | <u>\$ 31,189</u> |

As of December 31, 2017, the Company has recorded a valuation allowance on a portion of its U.S. domestic deferred tax assets of approximately \$2.8 million related to state net operating losses. The remaining valuation allowance on deferred tax assets approximates \$29.5 million and is associated primarily with operations in Germany, the UK, and India including losses that are both operating and capital in nature. As of December 31, 2017, there is not sufficient positive evidence to conclude that such deferred tax assets will be recognized. The December 31, 2017 valuation allowance balance reflects an increase of \$6.1 million during the year. The current rate reconciliation includes \$0.8 million of such increase and is primarily attributable to an increase in the state valuation allowance for revisions to estimates of 2017 state income, and forecasted state income, offset by a reduction in the state effective tax rate on deferred tax balances. The balance of the current year valuation allowance increase is associated with foreign activity. Several of our foreign entities have full valuation allowances against their deferred tax balances. Movement during 2017 in these deferred tax balances attributable to rate changes, prior year taxable income adjustments, and movement attributable to annual operating activities requires a corresponding adjustment to the related valuation allowance balances. The changes in valuation allowance associated with these foreign items are included in the rate reconciliation as a component of the tax effects of foreign operations.

As of December 31, 2017, the Company had foreign and state tax loss carryforwards of approximately \$174.0 million, and \$116.6 million, respectively. The Company plans to utilize its U.S. federal net operating loss carryforwards against the recently enacted transition tax. The U.S. state tax loss carryforwards are subject to various limitations under Section 382 of the Internal Revenue Code and applicable state laws. The U.S. state losses will expire from 2019 to 2037 and the majority of the foreign operating losses have no expiration date. Additionally, the majority of the foreign losses are subject to full valuation allowance. The majority of the foreign operating losses have no expiration date.

In 2017, we began operating under a tax holiday in one of our foreign jurisdictions. This tax holiday is in effect through June 30, 2027, and may be extended if certain additional requirements are met. The tax holiday is conditional upon our meeting certain employment and investment thresholds. The impact of the tax holiday in 2017 decreased the tax benefit recognized on the current start up tax loss in that jurisdiction by approximately \$6.0 million and decreased our income from continuing operations by \$0.15 per diluted share.

Our accounting for the following elements of the Tax Act is based upon our current understanding of the Tax Act and its estimated impact. However, we were able to make reasonable estimates of certain effects and, therefore, recorded provisional

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adjustments as follows:

The Tax Act reduces the corporate tax rate to 21%, effective January 1, 2018. For certain of our deferred tax assets and deferred tax liabilities, we have recorded a provisional net decrease of \$11.1 million with a corresponding adjustment to deferred income tax expense for the year ended December 31, 2017. While we are able to make a reasonable estimate of the impact of the reduction in corporate rate, it may be affected by other analysis related to the Tax Act, including, but not limited to our calculation of deemed repatriation of deferred foreign income and the state tax effect of adjustments made to federal temporary differences.

The Transition Tax is a one-time tax on previously untaxed accumulated earnings and profits (E&P) of our foreign subsidiaries. We are able to make a reasonable estimate of the Transition Tax and recorded a provisional Transition Tax obligation of \$61.8 million. However, we are continuing to gather additional information to more precisely compute the amount of the Transition Tax. The Transition Tax may be paid over a period of 8 years; 8% per year for years 1 - 5, 15% for year 6, 20% for year 7 and 25% for year 8. We intend to utilize our U.S. net operating loss carryforward to reduce the ultimate cash tax obligation and have currently reflected a total tax payable of \$16 million with \$1 million classified as a current liability and \$15 million classified as Other long term liabilities in the Balance Sheet at December 31, 2017.

We previously considered the earnings in our foreign subsidiaries to be indefinitely reinvested and, accordingly, recorded no deferred income taxes. Total estimated foreign earnings totaled \$524.9 million at December 31, 2017. The Company continues to assert that such foreign earnings are indefinitely invested in operations outside the U.S. While the Transition Tax results in a reduction to undistributed foreign earnings to tax in the future, an actual repatriation from our foreign subsidiaries could still be subject to additional foreign withholding taxes and U.S. state taxes. We will record the tax effects of any change in our prior assertion with respect to these investments, and disclose any unrecognized deferred tax liability for temporary differences related to our foreign investments, if practicable, in the period that we are first able to make a reasonable estimate.

We account for uncertain tax positions by applying a minimum recognition threshold to tax positions before recognizing these positions in the financial statements. The reconciliation of our total gross unrecognized tax benefits is as follows:

| | Years Ended December 31, | | |
|--|---------------------------------|------------------|------------------|
| | 2017 | 2016 | 2015 |
| Balance at beginning of period | \$ 11,401 | \$ 10,049 | \$ 8,001 |
| Additions based on tax positions taken during a prior period | 1,258 | 104 | 433 |
| Additions based on tax positions taken during the current period | 4,433 | 2,318 | 3,413 |
| Reductions related to a lapse of applicable statute of limitations | (1,102) | (1,070) | (1,798) |
| Balance at end of period | <u>\$ 15,990</u> | <u>\$ 11,401</u> | <u>\$ 10,049</u> |

The full \$16.0 million of unrecognized tax benefits, if recognized, will impact the Company's effective tax rate. In accordance with our accounting policy, we recognize accrued interest and penalties related to unrecognized tax benefits as a component of tax expense. We had \$1.0 million and \$0.8 million of accrued interest and penalties at December 31, 2017 and 2016, respectively. We do not anticipate a material change to the amount of unrecognized tax positions within the next 12 months.

With few exceptions, the Company is no longer subject to federal state or foreign income tax examinations by tax authorities for years before 2014.

NOTE 5. EARNINGS PER SHARE

Basic earnings per share ("EPS") is computed by dividing income available to common stockholders by the weighted-average number of common shares outstanding during the period. The computation of diluted EPS is similar to the computation of basic EPS except that the denominator is increased to include the number of additional common shares that would have been outstanding (using the if-converted and treasury stock methods), if our outstanding stock options and restricted stock units had been converted to common shares, and if such assumed conversion is dilutive.

The following is a reconciliation of the weighted-average shares outstanding used in the calculation of basic and diluted earnings per share for the years ended December 31, 2017, 2016, and 2015:

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| | Years Ended December 31, | | |
|---|--------------------------|------------|-----------|
| | 2017 | 2016 | 2015 |
| Income from continuing operations, net of income taxes | \$ 136,101 | \$ 116,948 | \$ 83,482 |
| Basic weighted-average common shares outstanding | 39,754 | 39,720 | 40,746 |
| Assumed exercise of dilutive stock options and restricted stock units | 422 | 311 | 331 |
| Diluted weighted-average common shares outstanding | 40,176 | 40,031 | 41,077 |
| Continuing operations: | | | |
| Basic earnings per share | \$ 3.42 | \$ 2.94 | \$ 2.05 |
| Diluted earnings per share | \$ 3.39 | \$ 2.92 | \$ 2.03 |

The following stock options and restricted units were excluded in the computation of diluted earnings per share because they were anti-dilutive:

| | Years Ended December 31, | | |
|------------------------|--------------------------|------|------|
| | 2017 | 2016 | 2015 |
| Stock options | — | — | 155 |
| Restricted stock units | — | 1 | 1 |

Stock Buyback

In September 2015, our Board of Directors authorized a program to repurchase up to \$150.0 million of our stock. In November 2017, our Board of Directors approved an extension to the share repurchase program to December 2019 from its original maturity of March 2018. As of December 31, 2017, we had \$70.0 million remaining for the authorized repurchase of shares.

In November 2015 we entered into a Fixed Dollar Accelerated Share Repurchase Transaction to purchase \$50.0 million of shares of our common stock in the open market. A total of 1.7 million shares of our common stock was repurchased under the Fixed Dollar Accelerated Share Repurchase Agreement at an average price of \$28.99 per share.

In August and December 2017, we entered into Fixed Dollar Share Repurchase Agreements to repurchase \$25.0 million and \$5.0 million, respectively, of shares of our common stock in the open market. Total shares repurchased under the Fixed Dollar Share Repurchase Agreements in August and December 2017 were 351,292 and 70,700, respectively, at an average price of \$71.16 and \$70.65, respectively, per share.

All shares repurchased were executed in the open market, and no shares were repurchased from related parties. Repurchased shares were retired and assumed the status of authorized and unissued shares. Accordingly, the associated cost of the repurchased shares were recognized as a reduction to Additional paid-in capital.

NOTE 6. MARKETABLE SECURITIES AND ASSETS MEASURED AT FAIR VALUE

Our investments with original maturities of more than three months at time of purchase and that are intended to be held for no more than 12 months, are considered marketable securities available for sale.

Our marketable securities consist of certificates of deposit as follows:

| | December 31, 2017 | | December 31, 2016 | |
|-------------------------|----------------------|------------|----------------------|------------|
| | Cost | Fair Value | Cost | Fair Value |
| Certificates of deposit | 3,103 | 3,104 | 4,735 | 4,737 |

The maturities of our marketable securities available for sale as of December 31, 2017 are as follows:

| | Earliest | | Latest |
|-------------------------|-----------|----|------------|
| Certificates of deposit | 4/10/2018 | to | 10/17/2018 |

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The value and liquidity of the marketable securities we hold are affected by market conditions, as well as the ability of the issuers of such securities to make principal and interest payments when due, and the functioning of the markets in which these securities are traded. As of December 31, 2017, we do not believe any of the underlying issuers of our marketable securities are at risk of default.

The following tables present information about our marketable securities measured at fair value, on a recurring basis, as of December 31, 2017 and December 31, 2016. The tables indicate the fair value hierarchy of the valuation techniques utilized to determine fair value. We did not have any financial liabilities measured at fair value, on a recurring basis, as of December 31, 2017 or December 31, 2016.

| December 31, 2017 | Level 1 | Level 2 | Level 3 | Total |
|-------------------------|---------|----------|---------|----------|
| Certificates of deposit | \$ — | \$ 3,104 | \$ — | \$ 3,104 |

| December 31, 2016 | Level 1 | Level 2 | Level 3 | Total |
|-------------------------|---------|---------|---------|-------|
| Certificates of deposit | — | 4,737 | — | 4,737 |

There were no transfers in or out of Level 1, 2, or 3 fair value measurements during the year ended December 31, 2017.

NOTE 7. DERIVATIVE FINANCIAL INSTRUMENTS

We are impacted by changes in foreign currency exchange rates. We manage these risks through the use of derivative financial instruments, primarily forward contracts with banks. During the years ended December 31, 2017, 2016 and 2015, we entered into foreign currency exchange forward contracts to manage the exchange rate risk associated with intercompany debt denominated in nonfunctional currencies. These derivative instruments are not designated as hedges; however, they do offset the fluctuations of our intercompany debt due to foreign exchange rate changes. These forward contracts are typically for one-month periods. At December 31, 2017 we had outstanding Euro and Pound Sterling forward contracts. We did not have any currency exchange rate contracts as of December 31, 2016. At December 31, 2015 we had one outstanding Euro forward contract.

The notional amount of foreign currency exchange contracts outstanding at December 31, 2017 and 2015 was \$16.3 million and \$37.2 million, respectively, and the fair value of these contracts was not significant at December 31, 2017 and 2015.

During the years ended December 31, 2017, 2016, and 2015, the gains and losses recorded related to the foreign currency exchange contracts are as follows:

| | Years Ended December 31, | | |
|---|--------------------------|----------|----------|
| | 2017 | 2016 | 2015 |
| Foreign currency gain (loss) from foreign currency exchange contracts | \$ (1,438) | \$ (569) | \$ 1,857 |

These gains and losses were offset by corresponding gains and losses on the related intercompany debt and both are included as a component of other income, net, in our Consolidated Statements of Operations.

NOTE 8. INVENTORIES

Our inventories are valued at the lower of cost or market and computed on a first-in, first-out (FIFO) basis. Components of inventories, net of reserves, are as follows:

| | December 31, | |
|-------------------------|------------------|------------------|
| | 2017 | 2016 |
| Parts and raw materials | \$ 58,567 | \$ 43,278 |
| Work in process | 7,986 | 5,292 |
| Finished goods | 11,897 | 7,200 |
| | <u>\$ 78,450</u> | <u>\$ 55,770</u> |

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NOTE 9. PROPERTY AND EQUIPMENT, NET

Property and equipment, net is comprised of the following:

| | December 31, | |
|--------------------------------------|--------------|-----------|
| | 2017 | 2016 |
| Buildings and land | \$ 1,788 | \$ 1,581 |
| Machinery and equipment | 36,579 | 32,743 |
| Computer and communication equipment | 26,819 | 24,637 |
| Furniture and fixtures | 1,568 | 1,267 |
| Vehicles | 341 | 357 |
| Leasehold improvements | 17,286 | 15,546 |
| Construction in process | 802 | 644 |
| | 85,183 | 76,775 |
| Less: Accumulated depreciation | (67,388) | (63,438) |
| Total property and equipment, net | \$ 17,795 | \$ 13,337 |

Depreciation expense recorded in continuing operations and included in selling, general and administrative expense is as follows:

| | Years Ended December 31, | | |
|----------------------|--------------------------|----------|----------|
| | 2017 | 2016 | 2015 |
| Depreciation expense | \$ 5,074 | \$ 3,646 | \$ 4,464 |

NOTE 10. GOODWILL

The following summarizes the changes in goodwill during the years ended December 31, 2017 and 2016:

| Goodwill | Beginning Balance | Additions | Effect of Changes in Exchange Rates | Ending Balance |
|-------------------|-------------------|-----------|-------------------------------------|----------------|
| December 31, 2017 | \$ 42,125 | \$ 8,929 | \$ 2,758 | \$ 53,812 |
| December 31, 2016 | \$ 42,729 | \$ — | \$ (604) | \$ 42,125 |

Additions during 2017 are the result of our July 3, 2017 acquisition of Excelsys as described in *Note 2. Business Acquisition*.

NOTE 11. INTANGIBLE ASSETS

Intangible assets consisted of the following as of December 31, 2017 and 2016:

| | December 31, 2017 | | |
|-------------------------|-----------------------|--------------------------|---------------------|
| | Gross Carrying Amount | Accumulated Amortization | Net Carrying Amount |
| Technology-based | \$ 18,702 | \$ (5,559) | \$ 13,143 |
| Customer relationships | 30,034 | (10,787) | 19,247 |
| Trademarks and other | 2,623 | (1,514) | 1,109 |
| Total intangible assets | \$ 51,359 | \$ (17,860) | \$ 33,499 |

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| | December 31, 2016 | | |
|--------------------------------|-----------------------|--------------------------|---------------------|
| | Gross Carrying Amount | Accumulated Amortization | Net Carrying Amount |
| Technology-based | \$ 11,643 | \$ (3,673) | \$ 7,970 |
| Customer relationships | 26,608 | (7,451) | 19,157 |
| Trademarks and other | 2,223 | (1,279) | 944 |
| Total intangible assets | \$ 40,474 | \$ (12,403) | \$ 28,071 |

Amortization expense related to intangible assets is as follows:

| | Years Ended December 31, | | |
|----------------------|--------------------------|----------|----------|
| | 2017 | 2016 | 2015 |
| Amortization expense | \$ 4,350 | \$ 4,167 | \$ 4,368 |

Estimated amortization expense related to intangibles is as follows:

| Year Ending December 31, | |
|--------------------------|------------------|
| 2018 | \$ 4,879 |
| 2019 | 4,862 |
| 2020 | 4,175 |
| 2021 | 4,071 |
| 2022 | 3,809 |
| Thereafter | 11,703 |
| | \$ 33,499 |

NOTE 12. WARRANTIES

Provisions of our sales agreements include customary product warranties, ranging from 12 months to 24 months following installation. The estimated cost of our warranty obligation is recorded when revenue is recognized and is based upon our historical experience by product, configuration and geographic region.

Our estimated warranty obligation is included in Other accrued expenses in our Consolidated Balance Sheets. Changes in our product warranty obligation are as follows:

| | Years Ended December 31, | | |
|-------------------------------------|--------------------------|-----------------|-----------------|
| | 2017 | 2016 | 2015 |
| Balances at beginning of period | \$ 2,329 | \$ 1,633 | \$ 1,612 |
| Warranty liabilities acquired | 118 | — | — |
| Increases to accruals | 2,029 | 1,802 | 1,071 |
| Warranty expenditures | (2,184) | (1,058) | (1,040) |
| Effect of changes in exchange rates | 20 | (48) | (10) |
| Balances at end of period | \$ 2,312 | \$ 2,329 | \$ 1,633 |

NOTE 13. STOCK-BASED COMPENSATION

As of December 31, 2017, we had two active stock-based incentive compensation plans; the 2017 Omnibus Incentive Plan and the Employee Stock Purchase Plan (“ESPP”). All new equity compensation grants are issued under these two plans; however, outstanding awards previously issued under inactive plans will continue to vest and remain exercisable in accordance with the terms of the respective plans. Our stock plans are administered by the Board of Directors Compensation Committee. At

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December 31, 2017, there were 5.2 million shares reserved and 4.5 million shares available for future grant under our stock-based incentive plans.

On May 4, 2017, the shareholders approved the Company's 2017 Omnibus Incentive Plan ("the 2017 Plan") and reserved 5.2 million shares under the plan. The 2017 Plan replaced the 2008 Omnibus Incentive Plan ("the 2008 Plan"), and all awards previously granted under the 2008 Plan continue to vest and/or are exercisable under the 2017 Plan in accordance with their original terms and conditions. The 2017 Plan and 2008 Plan provide for the grant of stock options, stock appreciation rights, restricted stock, stock units (including deferred stock units), unrestricted stock, and dividend equivalent rights. Additionally, awards issued may be issued as performance based awards to align stock compensation awards to the attainment of annual or long-term performance goals. As of December 31, 2017, there were 4.2 million shares available for grant under the 2017 Plan.

Stock-based Compensation Expense

We recognize stock-based compensation expense based on the fair value of the awards issued and the functional area of the employee receiving the award. Stock-based compensation for the three years ended December 31, is as follows:

| | Years Ended December 31, | | |
|----------------------------------|--------------------------|----------|----------|
| | 2017 | 2016 | 2015 |
| Stock-based compensation expense | \$ 12,549 | \$ 6,332 | \$ 2,810 |

Our stock-based compensation expense is based on the value of the portion of share-based payment awards that are ultimately expected to vest, assuming estimated forfeitures at the time of grant. Estimated forfeiture rates for our stock-based compensation expense applicable to stock options and restricted stock units ("RSUs") was approximately 17% for the year ended December 31, 2017 and 18% for the years ended December 31, 2016 and 2015.

Restricted Stock Units

The fair value of our Restricted Stock Units ("RSUs") is determined based upon the closing fair market value of our common stock on the grant date. Changes in the unvested RSUs during the years ended December 31, 2017, 2016 and 2015 were as follows:

| | 2017 | | 2016 | | 2015 | |
|---|--------|--|--------|--|--------|--|
| | Shares | Weighted-Average Grant Date Fair Value | Shares | Weighted-Average Grant Date Fair Value | Shares | Weighted-Average Grant Date Fair Value |
| RSUs outstanding at beginning of period | 354 | \$ 29.60 | 234 | \$ 26.10 | 357 | \$ 14.29 |
| RSUs granted | 252 | 63.63 | 297 | 30.37 | 221 | 26.67 |
| RSUs vested | (211) | 30.62 | (157) | 25.97 | (161) | 14.48 |
| RSUs forfeited | (9) | 33.91 | (20) | 28.32 | (183) | 14.19 |
| RSUs outstanding at end of period | 386 | 51.06 | 354 | 29.60 | 234 | 26.10 |

The total intrinsic value of RSUs converted to shares for the years ended December 31, 2017, 2016 and 2015 were \$14.8 million, \$5.0 million and \$3.8 million, respectively. As of December 31, 2017, there was \$5.5 million of total unrecognized compensation cost, net of expected forfeitures related to non-vested RSUs granted, which is expected to be recognized through fiscal May 2020, with a weighted-average remaining vesting period of 0.7 years.

Stock Options

Stock option awards are generally granted with an exercise price equal to the market price of our stock at the date of grant and with either a three or four-year vesting schedule or performance based vesting as determined at the time of grant. Stock option awards generally have a term of 10 years.

The fair value of options granted during the year ended December 31, 2015 was estimated on the date of grant using the Black-Scholes-Merton option pricing model using the following assumptions: the risk-free interest rate was 1.1% - 1.4%, the expected term was 4.3 years and expected volatility was 43%. The risk-free interest rate is based on the five-year

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U.S. Treasury Bill at the time of the grant. We utilize our historical experience in determining the expected term of our stock options and volatility of our common stock. We have not historically issued dividends.

Changes in our outstanding stock options during the years ended December 31, 2017, 2016 and 2015 were as follows:

| | 2017 | | 2016 | | 2015 | |
|--|------------|---------------------------------|------------|---------------------------------|------------|---------------------------------|
| | Shares | Weighted-Average Exercise Price | Shares | Weighted-Average Exercise Price | Shares | Weighted-Average Exercise Price |
| Options outstanding at beginning of period | 474 | \$ 17.47 | 642 | \$ 17.11 | 1,022 | \$ 13.32 |
| Options granted | — | — | — | — | 171 | 26.26 |
| Options exercised | (152) | 14.32 | (156) | 15.28 | (366) | 12.97 |
| Options forfeited | (2) | 26.32 | (12) | 26.32 | (38) | 14.55 |
| Options expired | (3) | 11.09 | — | — | (147) | 12.46 |
| Options outstanding at end of period | <u>317</u> | <u>18.97</u> | <u>474</u> | <u>17.47</u> | <u>642</u> | <u>17.11</u> |
| Options vested during the year | 9 | | 11 | | 368 | |

The total intrinsic value of options exercised for the years ended December 31, 2017, 2016 and 2015 were \$9.7 million, \$2.8 million and \$5.2 million, respectively. As of December 31, 2017, there was \$0.1 million of total unrecognized compensation cost related to stock options granted and outstanding, net of expected forfeitures related to non-vested options, which is expected to be recognized through May 2018, with a weighted-average remaining vesting period of 0.1 years. Information about our stock options that are outstanding, options that we expect to vest and options that are exercisable at December 31, 2017 are as follows:

| Options Expected to Vest: | Number | Weighted-Average Exercise Price | Weighted-Average Remaining Contractual Life | Aggregate Intrinsic Value |
|---------------------------|--------|---------------------------------|---|---------------------------|
| Options outstanding | 317 | \$ 18.97 | 5.2 years | \$ 15,375 |
| Options expected to vest | 317 | 18.97 | 5.2 years | 15,375 |
| Options exercisable | 270 | 17.71 | 4.8 years | 13,454 |

The following table summarizes information about the stock options outstanding at December 31, 2017:

| Range of Exercise Prices | Options Outstanding | | | Options Exercisable | |
|--------------------------|---------------------|---|---------------------------------|---------------------|---------------------------------|
| | Number Outstanding | Weighted-Average Remaining Contractual Life | Weighted-Average Exercise Price | Number Exercisable | Weighted-Average Exercise Price |
| 7.69 - 11.02 | 45 | 3.3 years | \$ 9.74 | 45 | \$ 9.74 |
| 11.21 - 13.85 | 41 | 2.5 years | 12.80 | 41 | 12.80 |
| 14.02 - 14.21 | 13 | 2.8 years | 14.17 | 13 | 14.17 |
| 14.50 - 14.50 | 10 | 2.8 years | 14.50 | 10 | 14.50 |
| 14.52 - 14.52 | 8 | 3.1 years | 14.52 | 8 | 14.52 |
| 15.65 - 15.65 | 12 | 2.1 years | 15.65 | 12 | 15.65 |
| 16.25 - 16.25 | 10 | 2.3 years | 16.25 | 10 | 16.25 |
| 18.77 - 18.77 | 57 | 6.8 years | 18.77 | 57 | 18.77 |
| 24.31 - 24.31 | 5 | 7.4 years | 24.31 | 3 | 24.31 |
| 26.32 - 26.32 | 116 | 7.1 years | 26.32 | 71 | 26.32 |
| 7.69 - 26.32 | <u>317</u> | 5.2 years | <u>18.97</u> | <u>270</u> | <u>17.71</u> |

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

Employee Stock Purchase Plan

The ESPP, a stockholder-approved plan, provides for the issuance of rights to purchase up to 1,000,000 shares of common stock. In May 2010, shareholders approved an increase from 500,000 to 1,000,000 shares authorized for sale under our ESPP. Employees below the Vice President level are eligible to participate in the ESPP if employed by us for at least 20 hours per week during at least five months per calendar year. Participating employees may contribute up to the lesser of 15% of their eligible earnings or \$5,000 during each plan period. Currently, the plan period is six months. The purchase price of common stock purchased under the ESPP is currently equal to the lower of: 1) 85% of the fair market value of our common stock on the commencement date of each plan period or 2) 85% of the fair market value of our common shares on each plan period purchase date. At December 31, 2017, 0.3 million shares remained available for future issuance under the ESPP.

Purchase rights granted under the ESPP are valued using the Black-Scholes-Merton model. As of December 31, 2017, there was \$0.2 million of total unrecognized compensation cost related to the ESPP that is expected to be recognized over a remaining period of five months. Total compensation expense was \$0.2 million for the years ended December 31, 2017, 2016, and 2015.

The fair value of each purchase right granted under the ESPP was estimated on the date of grant using the Black-Scholes-Merton option pricing model with the following assumptions:

| | 2017 | 2016 | 2015 |
|-------------------------------|---------------|---------------|---------------|
| Risk-free interest rates | 1.07% - 1.45% | 0.49% - 0.60% | 0.07% - 0.42% |
| Expected dividend yield rates | —% | —% | —% |
| Expected term | 0.5 years | 0.5 years | 0.5 years |
| Expected volatility | 33.3% | 28.2% | 27.8% |

The risk-free interest rate is based on the six month U.S. Treasury Bill at the time of the grant. Historical company information is the primary basis for selection of the expected dividend yield. The expected term is based on historical experience. Expected volatility is based on historical volatility of our common shares using daily stock price observations.

NOTE 14. RETIREMENT PLANS

Defined contribution plans

We have a 401(k) profit sharing and retirement savings plan covering substantially all full-time U.S. employees. Participants may defer up to the maximum amount allowed as determined by law. Participants are immediately vested in their contributions. Profit sharing contributions to the plan, which are discretionary, are approved by the Board of Directors. Vesting in the profit sharing contribution account is based on years of service, with most participants fully vested after four years of credited service. For the years ended December 31, 2017, 2016, and 2015 our contribution for participants in our 401(k) plan was based on matching 50% of contributions made by employees up to 6% of the employee's compensation. During the years ended December 31, 2017, 2016, and 2015 we recognized total defined contribution plan costs of \$1.1 million, \$1.2 million, and \$0.7 million, respectively.

Defined benefit plans

In connection with the acquisition of HiTek Power Group, a privately-held provider of high voltage power solutions, in 2014, we acquired the HiTek Power Limited Pension Scheme ("the HiTek Plan"). The HiTek Plan has been closed to new participants since April 1, 2002 and to additional accruals since April 5, 2005. In order to measure the expense and related benefit obligation, various assumptions are made including discount rates used to value the obligation, expected return on plan assets used to fund these expenses and estimated future inflation rates. These assumptions are based on historical experience as well as facts and circumstances. An actuarial analysis is used to measure the expense and liability associated with pension benefits. The net amount of pension liability recorded as of December 31, 2017 and December 31, 2016 was \$19.8 million and \$18.8 million, respectively, and is included in Other long-term liabilities in our Consolidated Balance Sheets. Anticipated payments to pensioners covered by the HiTek Plan are expected to be between \$0.8 million and \$1.6 million for each of the next ten years. We are committed to make annual fixed payments of \$0.9 million into the Hitek Plan through April 30, 2024, and then \$1.8 million from May 1, 2024 through November 30, 2033.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

The following table sets forth the components of net periodic pension cost for the year ended December 31, 2017:

| | Year Ended December 31, | | |
|--|-------------------------|---------------|---------------|
| | 2017 | 2016 | 2015 |
| Interest cost | \$ 809 | \$ 993 | \$ 1,093 |
| Expected return on plan assets | (597) | (527) | (562) |
| Amortization of actuarial gains and losses | 503 | 264 | 373 |
| Net periodic pension cost | <u>\$ 715</u> | <u>\$ 730</u> | <u>\$ 904</u> |

Assumptions used in the determination of the net periodic pension cost are:

| | Year Ended December 31, | | |
|--|-------------------------|------|------|
| | 2017 | 2016 | 2015 |
| Discount rate | 2.6% | 2.8% | 3.9% |
| Expected long-term return on plan assets | 4.8% | 4.7% | 4.3% |

The status of the HiTek Plan as reflected in "Other long-term liabilities" on our Consolidated Balance Sheets is summarized as follows:

| | Year Ended December 31, | |
|---|-------------------------|--------------------|
| | 2017 | 2016 |
| Projected benefit obligation, beginning of year | \$ 31,110 | \$ 31,466 |
| Interest cost | 809 | 993 |
| Actuarial loss | 35 | 5,377 |
| Benefits paid | (944) | (1,186) |
| Translation adjustment | 2,897 | (5,540) |
| Projected benefit obligation, end of year | <u>\$ 33,907</u> | <u>\$ 31,110</u> |
| Plan assets, beginning of year | \$ 12,274 | \$ 13,677 |
| Actual return on plan assets | 597 | 527 |
| Contributions | 877 | 802 |
| Benefits paid | (944) | (1,186) |
| Actuarial gain | 179 | 620 |
| Translation adjustment | 1,127 | (2,166) |
| Plan assets, end of year | <u>\$ 14,110</u> | <u>\$ 12,274</u> |
| Funded status of plan | <u>\$ (19,797)</u> | <u>\$ (18,836)</u> |

The fair value of the Company's qualified pension plan assets by category for the years ended December 31, are as follows:

| | December 31, 2017 | | | |
|-------------------------|-------------------|------------------|-------------|------------------|
| | Level 1 | Level 2 | Level 3 | Total |
| Multi-Asset Fund | \$ — | \$ 4,784 | \$ — | \$ 4,784 |
| Diversified Growth Fund | — | 5,009 | — | 5,009 |
| Index-Linked Gilts | — | 2,102 | — | 2,102 |
| Corporate Bonds | — | 2,173 | — | 2,173 |
| Cash | 42 | — | — | 42 |
| Total | <u>\$ 42</u> | <u>\$ 14,068</u> | <u>\$ —</u> | <u>\$ 14,110</u> |

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

| | December 31, 2016 | | | |
|-------------------------|-------------------|------------------|-------------|------------------|
| | Level 1 | Level 2 | Level 3 | Total |
| Multi-Asset Fund | \$ — | \$ 3,989 | \$ — | \$ 3,989 |
| Diversified Growth Fund | — | 4,259 | — | 4,259 |
| Index-Linked Gilts | — | 1,915 | — | 1,915 |
| Corporate Bonds | — | 2,013 | — | 2,013 |
| Cash | 98 | — | — | 98 |
| Total | \$ 98 | \$ 12,176 | \$ — | \$ 12,274 |

At December 31, 2017 the HiTek Plan assets of \$14.1 million were invested in four separate funds including a multi-asset fund (33.9%), a diversified growth fund (35.5%), an Investment grade long-term bond fund (15.4%) and an index-linked gilt fund (14.9%). The asset and growth funds aim to generate an 'equity-like' return over an economic cycle with significantly reduced volatility relative to equity markets and have scope to use a diverse range of asset classes, including equities, bonds, cash and alternatives, e.g. property, infrastructure, high yield bonds, floating rate debt, private, equity, hedge funds and currency. The bond fund and gilt fund are invested in index-linked gilts and corporate bonds. These investments are intended to provide a degree of protection against changes in the value of the HiTek Plan's liabilities related to changes in long-term expectations for interest rates and inflation expectations.

NOTE 15. COMMITMENTS AND CONTINGENCIES

Disputes and Legal Actions

We are involved in disputes and legal actions arising in the normal course of our business. While we currently believe that the amount of any ultimate loss would not be material to our financial position, the outcome of these actions is inherently difficult to predict. In the event of an adverse outcome, the ultimate loss could have a material adverse effect on our financial position or reported results of operations. An unfavorable decision in patent litigation also could require material changes in production processes and products or result in our inability to ship products or components found to have violated third-party patent rights. We accrue loss contingencies in connection with our commitments and contingencies, including litigation, when it is probable that a loss has occurred, and the amount of the loss can be reasonably estimated. The Company is currently not a party to any legal action that the Company believes would reasonably have a material adverse impact on its business, financial condition, results of operations or cash flows.

Operating Leases

We have various operating leases for automobiles, equipment, and office and production facilities. Rent expense under operating leases was approximately \$6.5 million in 2017, \$6.4 million in 2016, and \$5.3 million in 2015.

The future minimum rental payments required under non-cancelable operating leases as of December 31, 2017 are as follows:

| | |
|------------|------------------|
| 2018 | \$ 7,109 |
| 2019 | 6,381 |
| 2020 | 5,802 |
| 2021 | 4,204 |
| 2022 | 1,273 |
| Thereafter | 3,586 |
| | \$ 28,355 |

NOTE 16. RESTRUCTURING COSTS

In June 2015, we committed to a restructuring plan in relation to the wind down of our Inverter business. Charges related to this plan that have an effect on continuing operations include strategic headcount reductions, streamlining operational processes and condensing administrative functions to improve efficiencies. This plan was completed in the fourth quarter of 2015. Total cumulative costs through December 31, 2015 were \$0.3 million. We did not incur additional costs related to this plan in 2016 or 2017.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

NOTE 17. RELATED PARTY TRANSACTIONS

Members of our Board of Directors hold various executive positions and serve as directors at other companies, including companies that are our customers. During the years ended December 31, 2017, 2016, and 2015, we engaged in the following transactions with companies related to members of our Board of Directors, as described below:

| | Years Ended December 31, | | |
|-----------------------------------|--------------------------|--------|--------|
| | 2017 | 2016 | 2015 |
| Sales to related parties | \$ 1,425 | \$ 616 | \$ 706 |
| Number of related party customers | 1 | 2 | 3 |
| Purchases from related parties | \$ — | \$ 43 | \$ 40 |
| Number of related party vendors | — | 1 | 2 |

Our accounts receivable balance from related party customers with outstanding balances as of December 31, 2017 and December 31, 2016 is as follows:

| | December 31, | December 31, |
|--|--------------|--------------|
| | 2017 | 2016 |
| Accounts receivable from related parties | \$ 27 | \$ — |
| Number of related party customers | 1 | — |

We did not have any outstanding accounts payable with our related parties as of December 31, 2017 or December 31, 2016.

NOTE 18. GEOGRAPHIC AND SIGNIFICANT CUSTOMER INFORMATION

We have operations in the United States, Europe and Asia. Sales and long-lived assets by geographic area and information relating to major customers are presented below. Sales attributed to individual countries are based on customer location.

| | Years Ended December 31, | | | | | |
|-------------------------------------|--------------------------|--------|------------|--------|------------|--------|
| | 2017 | | 2016 | | 2015 | |
| Sales to external customers: | | | | | | |
| United States | \$ 453,095 | 67.5% | \$ 327,397 | 67.7% | \$ 268,257 | 64.7% |
| Canada | 37 | —% | 161 | —% | 195 | —% |
| North America | 453,132 | 67.5% | 327,558 | 67.7% | 268,452 | 64.7% |
| People's Republic of China | 34,045 | 5.1% | 16,207 | 3.4% | 12,687 | 3.1% |
| Other Asian countries | 104,595 | 15.6% | 77,638 | 16.1% | 61,839 | 15.0% |
| Asia | 138,640 | 20.7% | 93,845 | 19.5% | 74,526 | 18.0% |
| Germany | 57,351 | 8.6% | 48,589 | 10.0% | 46,719 | 11.3% |
| United Kingdom | 14,299 | 2.1% | 13,712 | 2.8% | 25,100 | 6.0% |
| Other European countries | 7,590 | 1.1% | — | —% | 14 | —% |
| Europe | 79,240 | 11.8% | 62,301 | 12.8% | 71,833 | 17.3% |
| Total sales | \$ 671,012 | 100.0% | \$ 483,704 | 100.0% | \$ 414,811 | 100.0% |

Sales to Applied Materials Inc., our largest customer, was \$ 224.8 million or 33.5% of total sales for 2017, \$170.2 million, or 35.2% of total sales for 2016 and \$123.5 million, or 29.8% of total sales for 2015. Sales to Lam Research were \$155.3 million or 23.1% of total sales for 2017, \$100.3 million, or 20.7% of total sales for 2016 and \$84.2 million, or 20.3% of total sales for 2015. Our sales to Applied Materials and Lam Research include precision power products used in semiconductor processing and solar, flat panel display, and architectural glass applications. No other customer accounted for 10% or more of our sales during these periods.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

| | December 31, | |
|---------------------------|-------------------|------------------|
| | 2017 | 2016 |
| Long-lived assets: | | |
| United States | \$ 32,528 | \$ 33,652 |
| Asia | 7,601 | 3,596 |
| Europe | 64,977 | 46,285 |
| | <u>\$ 105,106</u> | <u>\$ 83,533</u> |

Long-lived assets include property and equipment, goodwill and other intangible assets.

NOTE 19. CREDIT FACILITY

On July 28, 2017, the Company entered into a Loan Agreement (the "Loan Agreement") with Bank of America N.A. ("BA") which provides a revolving line of credit of up to \$100.0 million subject to certain funding conditions through July 28, 2022. On December 21, 2017, the Company entered into the First Amendment to the Loan Agreement with BA to increase the line of credit to \$150.0 million. Interest on amounts drawn shall be paid quarterly based upon the LIBOR Daily Floating Rate then in effect, plus between one and one-quarter (1.25%) and one and three-quarters (1.75%) percentage points depending on the Funded Debt to EBITDA ratio. As of December 31, 2017, the interest rate was 2.82%. The Loan Agreement also requires the Company to pay the lender on a quarterly basis an unused commitment fee based on credit availability. The obligations under the Loan Agreement are unsecured until the Funded Debt to EBITDA ratio exceeds 2.0 to 1.0, at which time the Company and certain affiliates' tangible and intangible personal property will be subject to a first priority, perfected lien and security interest in favor of BA pursuant to a Security Agreement. As of December 31, 2017, the Company is in compliance with all covenants required under the Loan Agreement. Our credit availability under the Loan Agreement was \$150.0 million at December 31, 2017.

On September 9, 2016, the Company terminated its Credit Agreement with Wells Fargo Bank, National Association ("Wells Fargo") which provided for a secured revolving credit facility of up to \$50.0 million (the "Credit Facility"), subject to a borrowing base calculation. The Company had no outstanding balances at December 31, 2015 and no borrowing during 2016 until the determination of the Credit Agreement.

Expense relating to interest, unused commitment fees and amortization of debt issuance costs included in our income from continuing operations is as follows:

| | Years Ended December 31, | | |
|-----------------------|--------------------------|------|------|
| | 2017 | 2016 | 2015 |
| Credit facility costs | 66 | 346 | 456 |

NOTE 20. SUPPLEMENTAL QUARTERLY FINANCIAL DATA (UNAUDITED)

The following tables present unaudited quarterly results for each of the eight quarters in the periods ended December 31, 2017 and 2016, in thousands. We believe that all necessary adjustments have been included in the amounts stated below to present fairly such quarterly information. Due to the volatility of the industries in which our customers operate, the operating results for any quarter are not necessarily indicative of results for any subsequent period.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

| | Quarter Ended | | | |
|---|-------------------|--------------------|---------------|----------------|
| | December 31, 2017 | September 30, 2017 | June 30, 2017 | March 31, 2017 |
| Sales | \$ 179,214 | \$ 176,575 | \$ 165,872 | \$ 149,351 |
| Gross Profit | \$ 98,175 | \$ 92,234 | \$ 87,141 | \$ 78,831 |
| Operating income | \$ 58,062 | \$ 51,673 | \$ 47,767 | \$ 43,268 |
| Income (loss) from continuing operations, net of income taxes | \$ (29,007) | \$ 83,794 | \$ 45,873 | \$ 35,441 |
| Income (loss) from discontinued operations, net of income taxes | \$ (583) | \$ 70 | \$ 179 | \$ 2,094 |
| Net income (loss) | \$ (29,590) | \$ 83,864 | \$ 46,052 | \$ 37,535 |
| Earnings (Loss) Per Share: | | | | |
| Continuing Operations: | | | | |
| Basic earnings (loss) per share | \$ (0.73) | \$ 2.11 | \$ 1.15 | \$ 0.89 |
| Diluted earnings (loss) per share | \$ (0.73) | \$ 2.09 | \$ 1.14 | \$ 0.88 |
| Discontinued Operations: | | | | |
| Basic earnings (loss) per share | \$ (0.01) | \$ — | \$ — | \$ 0.05 |
| Diluted earnings (loss) per share | \$ (0.01) | \$ — | \$ — | \$ 0.05 |
| Net Income (Loss): | | | | |
| Basic earnings (loss) per share | \$ (0.75) | \$ 2.11 | \$ 1.16 | \$ 0.94 |
| Diluted earnings (loss) per share | \$ (0.75) | \$ 2.09 | \$ 1.14 | \$ 0.93 |

| | Quarter Ended | | | |
|---|-------------------|--------------------|---------------|----------------|
| | December 31, 2016 | September 30, 2016 | June 30, 2016 | March 31, 2016 |
| Sales | \$ 135,343 | \$ 126,552 | \$ 118,765 | \$ 103,044 |
| Gross Profit | \$ 71,518 | \$ 66,123 | \$ 62,046 | \$ 53,460 |
| Operating income | \$ 38,546 | \$ 34,361 | \$ 30,329 | \$ 23,621 |
| Income from continuing operations, net of income taxes | \$ 40,436 | \$ 29,038 | \$ 27,254 | \$ 20,220 |
| Income (loss) from discontinued operations, net of income taxes | \$ 3,845 | \$ 1,323 | \$ 3,277 | \$ 2,061 |
| Net income (loss) | \$ 44,281 | \$ 30,361 | \$ 30,531 | \$ 22,281 |
| Earnings per Share: | | | | |
| Continuing Operations: | | | | |
| Basic earnings per share | \$ 1.02 | \$ 0.73 | \$ 0.69 | \$ 0.51 |
| Diluted earnings per share | \$ 1.01 | \$ 0.73 | \$ 0.68 | \$ 0.50 |
| Discontinued Operations: | | | | |
| Basic earnings (loss) per share | \$ 0.10 | \$ 0.03 | \$ 0.08 | \$ 0.05 |
| Diluted earnings (loss) per share | \$ 0.10 | \$ 0.03 | \$ 0.08 | \$ 0.05 |
| Net Income (loss): | | | | |
| Basic earnings (loss) per share | \$ 1.12 | \$ 0.77 | \$ 0.77 | \$ 0.56 |
| Diluted earnings (loss) per share | \$ 1.11 | \$ 0.76 | \$ 0.76 | \$ 0.56 |

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except per share data)

NOTE 21. SUBSEQUENT EVENTS

Trek Acquisition

On February 1, 2018, Advanced Energy acquired Trek Holding Co., LTD ("Trek"), a privately held company with operations in Tokyo, Japan and Lockport, New York for a purchase price of \$11.8 million in cash. Trek has a 95% ownership interest in its U.S. subsidiary which is also its primary operation. Trek designs, manufactures and sells high-voltage amplifiers, power supplies and generators, high-performance electrostatic measurement instruments and electrostatic discharge (ESD) sensors and monitors to the global marketplace. Trek's standard and custom-OEM products are used in industry and research in aerospace, automotive, electronics, electrostatics, materials, medical, military, nanotechnology, photovoltaic/solar, physics, plasma, semiconductor and test and measurement applications. For the twelve months ended December 31, 2017, Trek reported unaudited sales of approximately \$20 million. Trek's comprehensive portfolio of power supply products strengthen and accelerate Advanced Energy's growth in high voltage applications.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

We have established disclosure controls and procedures, which are designed to ensure that information required to be disclosed in reports filed or submitted under the Securities Exchange Act of 1934 (the "Act") is recorded, processed, summarized, and reported, within the time periods specified in the Securities and Exchange Commission's rules and forms. These disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed in the reports that we file or submit under the Act is accumulated and communicated to management, including our Principal Executive Officer (Yuval Wasserman, Chief Executive Officer) and Principal Financial Officer (Thomas McGimpsey, Executive Vice President, General Counsel and Chief Financial Officer), as appropriate, to allow timely decisions regarding required disclosures.

As of the end of the period covered by this report, we conducted an evaluation, with the participation of management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of the disclosure controls and procedures pursuant to the Exchange Act Rule 13a-15(b). Based upon this evaluation, the Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of December 31, 2017. The conclusions of the Chief Executive Officer and Chief Financial Officer from this evaluation were communicated to the Audit Committee. We intend to continue to review and document our disclosure controls and procedures, including our internal controls and procedures for financial reporting, and may from time to time make changes aimed at enhancing their effectiveness and to ensure that our systems evolve with our business.

Management's Annual Report on Internal Control over Financial Reporting

It is management's responsibility to establish and maintain effective internal control over our financial reporting, which is a process designed under the supervision of our Chief Executive Officer and Chief Financial Officer and effected by our Board of Directors, management, and other personnel. Our internal control over financial reporting is designed to provide reasonable assurance concerning the reliability of our financial reporting and the preparation of our financial statements for external purposes in accordance with generally accepted accounting principles.

Management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our internal control over financial reporting as of December 31, 2017, using the criteria described in *Internal Control-Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based upon this evaluation, management concluded that our internal control over financial reporting was effective as of December 31, 2017.

Grant Thornton LLP, an independent registered public accounting firm, has audited our Consolidated Financial Statements included in this Form 10-K, and as part of the audit, has issued an attestation report, included herein, on the effectiveness of our internal control over financial reporting as of December 31, 2017.

Attestation Report of Independent Registered Public Accounting Firm

The attestation report required under this Item 9A is contained in Item 8 of Part II of this Annual Report on Form 10-K under the heading "Report of Independent Registered Public Accounting Firm."

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting that occurred during 2017 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Limitations on Controls and Procedures

Management has concluded that our disclosure controls and procedures and internal control over financial reporting provide reasonable assurance that the objectives of our control system are met. We do not expect, however, that our disclosure controls and procedures or internal control over financial reporting will prevent or detect all misstatements, errors, or fraud, if any. All control systems, no matter how well designed and implemented, have inherent limitations, and therefore no evaluation can provide absolute assurance that every misstatement, error, or instance of fraud, if any, or risk thereof, has been or will be prevented or detected. The occurrence of a misstatement, error, or fraud, if any, would not necessarily require a conclusion that our controls and procedures are not effective.

ITEM 9B. OTHER INFORMATION

None.

PART III

In accordance with General Instruction G(3) of Form 10-K, certain information required by this Part III is incorporated by reference to the definitive proxy statement relating to our 2018 Annual Meeting of Stockholders (the "2018 Proxy Statement"), as set forth below. The 2018 Proxy Statement will be filed with the Securities and Exchange Commission within 120 days after the end of our fiscal year.

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information set forth in the 2018 Proxy Statement under the headings "Proposal No. 1/ Election of Directors" and "Section 16(a) Beneficial Ownership Reporting Compliance" is incorporated herein by reference. The information under the heading "Executive Officers of the Registrant" in Part I of this Form 10-K is also incorporated herein by reference.

The Company has adopted a Code of Ethical Conduct that applies to all of the Company's employees, including the Company's Chief Executive Officer and Chief Financial Officer and other persons performing similar functions. The Company has posted a copy of the Code of Ethical Conduct on its website at www.advanced-energy.com, and such Code of Ethical Conduct is available, in print, without charge, to any shareholder who requests it from the Company's Secretary. The Company intends to satisfy the disclosure requirements under Item 5.05 of Form 8-K regarding amendments to, or waivers from, the Code of Ethical Conduct by posting such information on its website at www.advanced-energy.com. The Company is not including the information contained on its website as part of, or incorporating it by reference into, this report.

ITEM 11. EXECUTIVE COMPENSATION

The information set forth in the 2018 Proxy Statement under the headings "Executive Compensation" is incorporated herein by reference.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information set forth in the 2018 Proxy Statement under the headings "Security Ownership of Certain Beneficial Owners and Management" and "Equity Compensation Plan Information" is incorporated herein by reference.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

The information is set forth in *Note 17. Related Party Transactions* in ITEM 8 "Financial Statements and Supplementary Data," and in the 2018 Proxy Statement under the captions "Election of Directors" and "Certain Relationships and Related Transactions" is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information set forth in the 2018 Proxy Statement under the caption "Ratification of the Appointment of Grant Thornton LLP as Advanced Energy's Independent Registered Public Accounting Firm for 2018" is incorporated herein by reference.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(A) Documents filed as part of this Annual Report on Form 10-K are as follows:

1. Financial Statements:

Reports of Grant Thornton LLP

Consolidated Balance Sheets at December 31, 2017 and 2016

Consolidated Statements of Operations for each the years ended December 31, 2017, 2016 and 2015

Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2017, 2016 and 2015

Consolidated Statements of Stockholders' Equity for the years ended December 31, 2017, 2016 and 2015

Consolidated Statements of Cash Flows for the years ended December 31, 2017, 2016 and 2015

Notes to Consolidated Financial Statements

2. Financial Statement Schedules for the years ended December 31, 2017, 2016 and 2015

NOTE: All schedules have been omitted because they are either not applicable or the required information is included in the financial statements and notes thereto.

(B) Exhibits:

[3.1 Restated Certificate of Incorporation. \(2\)](#)

[3.2 Certificate of Amendment of Restated Certificate of Incorporation. \(2\)](#)

[3.3 Certificate of Amendment of Restated Certificate of Incorporation. \(3\)](#)

[3.4 Certificate of Amendment of Restated Certificate of Incorporation. \(3\)](#)

[3.5 Amended and Restated By-laws of Advanced Energy Industries, Inc. \(17\)](#)

[3.6 Fifth Amendment to the By-laws of Advanced Energy Industries, Inc. \(28\)](#)

4.1 Form of Specimen Certificate for Common Stock. (1)

[10.1 Lease Agreement, dated as of December 28, 2011, by and between Sharp Point Properties, LLC and Advanced Energy Industries, Inc., for a building located at 1625 Sharp Point Drive, Fort Collins, Colorado. \(12\)](#)

[10.2 Lease Agreement, dated as of December 28, 2011, by and between Sharp Point Properties, LLC and Advanced Energy Industries, Inc., for a building located at 2424 Midpoint Drive, Fort Collins, Colorado. \(12\)](#)

[10.3 Lease dated January 16, 2003, by and between China Great Wall Computer Shenzhen Co., Ltd., Great Wall Limited and Advanced Energy Industries \(Shenzhen\) Co., Ltd., for a building located in Shenzhen, China. \(4\)](#)

10.4 Form of Indemnification Agreement. (1)

[10.5 Form of Director Indemnification Agreement. \(9\)](#)

[10.6 Form of Notice of Grant for Restricted Stock Unit. \(16\)*](#)

[10.7 Form of Restricted Stock Unit Agreement. \(16\)*](#)

[10.8 Form of Notice of Grant of Stock Option. \(16\)*](#)

[10.9 Form of Incentive Stock Option Agreement. \(16\)*](#)

[10.10 Form of Non-Qualified Stock Option Agreement. \(16\)*](#)

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- [10.11 Form of LTI Notice of Grant. \(16\)*](#)
- [10.12 Form of LTI Performance Stock Option Agreement pursuant to the 2008 Omnibus Incentive Plan. \(16\)*](#)
- [10.13 Form of LTI Performance Stock Unit Agreement pursuant to the 2008 Omnibus Incentive Plan. \(16\)*](#)
- [10.14 Non-employee Director Compensation summary. \(7\)*](#)
- [10.15 Non-Employee Director Compensation Structure. \(8\)*](#)
- [10.16 Non-Employee Director Compensation Structure for 2016.\(24\)*](#)
- [10.17 2017 Long-Term Incentive \(LTI\) Plan. \(25\)*](#)
- [10.18 2017 Short-Term Incentive \(STI\) Plan. \(26\)*](#)
- [10.19 2017 Omnibus Incentive Plan. \(25\)*](#)
- [10.20 2008 Omnibus Incentive Plan, as amended May 4, 2010. \(10\)*](#)
- [10.21 Employee Stock Purchase Plan. \(1\)*](#)
- [10.22 Form of Executive Change in Control Severance Agreement. \(5\)*](#)
- [10.23 Form of Amendment to Executive Change in Control Agreement. \(14\)*](#)
- [10.24 Offer Letter, dated September 28, 2014, by and among Advanced Energy Industries, Inc. and Yuval Wasserman. \(20\)*](#)
- [10.25 Executive Change in Control Agreement, dated September 30, 2014, by and among Advanced Energy Industries, Inc. and Yuval Wasserman. \(20\)*](#)
- [10.26 Executive Change in Control Agreement, dated April 28, 2011, by and among Advanced Energy Industries Inc. and Thomas O. McGimpsey. \(13\)*](#)
- [10.27 Executive Separation Agreement and Release of all Claims, dated May 5, 2014, by and between Advanced Energy Industries, Inc. and Gordon Tredger. \(18\)*](#)
- [10.28 Executive Transition and Separation Agreement, dated May 31, 2014, by and between Advanced Energy Industries, Inc. and Garry Rogerson. \(19\)*](#)
- [10.29 Executive Transition and Separation Agreement, dated November 17, 2014, by and between Advanced Energy Industries, Inc. and Danny C. Herron. \(21\)*](#)
- [10.30 Offer Letter to Thomas Liguori dated April 8, 2015. \(22\)*](#)

- [10.31 Executive Change in Control Agreement, dated May 18, 2015, by and among Advanced Energy Industries, Inc. and Thomas Liguori. \(22\)*](#)
- [10.32 Global Supply Agreement by and between Advanced Energy Industries, Inc. and Applied Materials Inc. dated August 29, 2005. \(6\)+](#)
- [10.33 Shipping Amendment to the Global Supply Agreement by and between Advanced Energy Industries, Inc. and Applied Materials Inc. dated August 29, 2005. \(6\)+](#)
- [10.34 Bridge Amendment to the Global Supply Agreement by and between Advanced Energy Industries, Inc. and Applied Materials Inc. dated January 28, 2011. \(11\)+](#)
- [10.35 Sale and Purchase Agreement by and among Advanced Energy Industries, Inc., Blitz S13-103 GmbH, Jolaos Verwaltungs GmbH and Prettl Beteiligungs Holdings, GmbH, dated as of April 8, 2013. \(15\)](#)
- [10.36 Loan Agreement, dated July 28, 2017, by and between Advanced Energy Industries, Inc. and Bank of America, N.A. \(27\)](#)

- [10.37 First Amendment to Loan Agreement, dated December 21, 2017, by and between Advanced Energy Industries, Inc. and Bank of America, N.A. \(29\)](#)
- [10.38 Continuing and Unconditional Guaranty dated July 28, 2017 among Ultraviolet Group, Inc., AE Solar Energy, Inc., Ultravolt, Inc., AEI US Subsidiary, LLC, AEI Global Holdings, LLC and Sekidenko, Inc. \(27\)](#)
- [10.39 Form of Security and Pledge Agreement among Advanced Energy Industries, Inc., Ultraviolet Group, Inc., AE Solar Energy, Inc., Ultravolt, Inc., AEI US Subsidiary, LLC, AEI Global Holdings, LLC, Sekidenko, Inc. and Bank of America, N.A. \(27\)](#)
- [10.40 Fixed Dollar Accelerated Share Repurchase Transaction, dated November 6, 2015, between Advanced Energy Industries, Inc. and Morgan Stanley & Co. LLC. \(23\)](#)
- [11.1 Computation of per share earnings \(contained in Note 5 of “Notes to Consolidated Financial Statements” of the Company's Annual Report on Form 10-K for the year ended December 31, 2017\).](#)
- [21.1 Subsidiaries of Advanced Energy Industries, Inc.](#)
- [23.1 Consent of Grant Thornton LLP, Independent Registered Public Accounting Firm.](#)
- [31.1 Certification of the Chief Executive Officer Pursuant to Rule 13a-14\(a\) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.](#)
- [31.2 Certification of the Principal Financial Officer Pursuant to Rule 13a-14\(a\) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.](#)
- [32.1 Certification of the Chief Executive Officer Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.](#)
- [32.2 Certification of the Chief Financial Officer Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.](#)
- 101.INS XBRL Instance 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

Attached as Exhibit 101 to this report are the following materials from Advanced Energy, Inc.’s Annual Report on Form 10-K for the year ended December 31, 2017, formatted in XBRL (eXtensible Business Reporting Language): (i) the Consolidated Statements of Operations, (ii) the Consolidated Statements of Comprehensive Income (Loss), (iii) the Consolidated Balance Sheets, (iv) the Consolidated Statements of Cash Flows, (v) the Consolidated Statements of Stockholders’ Equity, and (vi) the Notes to the Consolidated Financial Statements.

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- (1) Incorporated by reference to the Registrant’s Registration Statement on Form S-1 (File No. 33-97188), filed September 21, 1995.
 - (2) Incorporated by reference to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended June 30, 1999 (File No. 000-26966), filed July 28, 1999.
 - (3) Incorporated by reference to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2003 (File No. 000-26966), filed November 4, 2003.
 - (4) Incorporated by reference to the Registrant’s Annual Report on Form 10-K for the year ended December 31, 2003 (File No. 000-26966), filed February 24, 2004.
 - (5) Incorporated by reference to the Registrant’s Annual Report on Form 10-K for the year ended December 31, 2004 (File No. 000-26966), filed March 31, 2005.
 - (6) Incorporated by reference to the Registrant’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2005 (File No. 000-26966), filed November 7, 2005.
 - (7) Incorporated by reference to the Registrant’s Current Report on Form 10-K (File No. 000-26966), filed February 24, 2016.

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- (8) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966), filed July 28, 2006.
- (9) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966), filed December 14, 2009.
- (10) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 (File No. 000-26966), filed March 2, 2011.
- (11) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2011 (File No. 000-26966), filed May 6, 2011.
- (12) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966), filed December 29, 2011.
- (13) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2011 (File No. 000-26966), filed March 2, 2012.
- (14) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2012 (File No. 000-26966), filed March 6, 2013.
- (15) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed April 11, 2013.
- (16) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed May 10, 2013.
- (17) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2013 (File No. 000-26966), filed August 6, 2013.
- (18) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed May 5, 2014.
- (19) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed June 2, 2014.
- (20) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed October 1, 2014.
- (21) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed November 18, 2014.
- (22) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed April 16, 2015.
- (23) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966) filed November 6, 2015.
- (24) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 (File No. 000-26966), filed February 24, 2017.
- (25) Incorporated by reference to Appendix A of the Registrant's Proxy Statement for the Registrant's 2017 Annual Meeting of Shareholders (File No. 000-26966), filed March 14, 2017.
- (26) Incorporated by reference to Appendix B of the Registrant's Proxy Statement for the Registrant's 2017 Annual Meeting of Shareholders (File No. 000-26966), filed March 14, 2017.
- (27) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966), filed July 31, 2017.
- (28) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2017 (File No. 000-26966), filed July 31, 2017.
- (29) Incorporated by reference to the Registrant's Current Report on Form 8-K (File No. 000-26966), filed December 21, 2017.

* Compensation Plan

+ Confidential treatment has been granted for portions of this agreement.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized.

ADVANCED ENERGY INDUSTRIES, INC.

(Registrant)

/s/ Yuval Wasserman

Yuval Wasserman

Chief Executive Officer

Date: February 15, 2018

Pursuant to the requirements of the Securities Exchange Act of 1934, this Annual Report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

| <u>Signatures</u> | <u>Title</u> | <u>Date</u> |
|---|--|-------------------|
| <u>/s/ Yuval Wasserman</u> Yuval Wasserman | Chief Executive Officer and Director | February 15, 2018 |
| <u>/s/ Thomas McGimpsey</u> Thomas McGimpsey | Interim Chief Financial Officer, Executive Vice President, General Counsel & Corporate Secretary | February 15, 2018 |
| <u>/s/ Grant H. Beard</u> Grant H. Beard | Chairman of the Board | February 15, 2018 |
| <u>/s/ Frederick A. Ball</u> Frederick A. Ball | Director | February 15, 2018 |
| <u>/s/ Ronald C. Foster</u> Ronald C. Foster | Director | February 15, 2018 |
| <u>/s/ Edward C. Grady</u> Edward C. Grady | Director | February 15, 2018 |
| <u>/s/ Thomas M. Rohrs</u> Thomas M. Rohrs | Director | February 15, 2018 |
| <u>/s/ John A. Roush</u> John A. Roush | Director | February 15, 2018 |

SUBSIDIARIES OF THE REGISTRANT

| Name | Jurisdiction of Incorporation or Organization |
|---|---|
| Advanced Energy Japan K.K | Japan |
| Advanced Energy Industries U.K. Limited | United Kingdom |
| Advanced Energy Industries GmbH | Germany |
| Advanced Energy Taiwan, Ltd. | Taiwan |
| Advanced Energy Industries, Inc., Shanghai | China |
| Advanced Energy Industries (Shenzhen) Co., Ltd. (manufacturing) | China |
| AEI International Holdings CV | Netherlands |
| AE Korea, Ltd. | South Korea |
| AEI Korea Services, Ltd. | South Korea |
| Tamio Limited | Hong Kong |
| Advanced Energy Industries | China |
| Wankia Limited | Hong Kong |
| Advanced Energy Industries Limited | Hong Kong |
| Fuyogo Limited | Hong Kong |
| AEI Canada, Inc. | Canada |
| Advanced Energy Singapore, Pte. Ltd. | Singapore |
| Advanced Energy Services Pte. Ltd. | Singapore |
| AE Solar Energy, Inc. | Oregon |
| Sekidenko, Inc. | Washington |
| AEI US Subsidiary, Inc. | Delaware |
| AEI Holdings, GmbH | Germany |
| AEI Power GmbH | Germany |
| AEI Power India Pvt. Ltd. | India |
| HV Investments Ltd. U.K. | United Kingdom |
| Ascent Investments Ltd. U.K. | United Kingdom |
| Melbourne Group Ltd. U.K. | United Kingdom |
| HiTek Power Ltd. U.K. | United Kingdom |
| HiTek Power GmbH | Germany |
| UltraVolt Group, Inc. | Delaware |
| UltraVolt, Inc. | New York |
| Solvix GmbH | Switzerland |
| Solvix LLC | Colorado |
| AEI Finance Verwaltungs GmbH | Germany |
| AEI Finance GmbH & Co., KG | Germany |
| AE Precision Power Products Pvt. Ltd. | India |
| AEI Finance Ltd. | Hong Kong |
| Advanced Energy Xi'an Co. Ltd. | China |
| AEI Irish Holdings Ltd. | Ireland |
| Excelsys Holdings Ltd. | Ireland |
| Excelsys Group Ltd. | Ireland |
| Excelsys Technologies Ltd. | Ireland |
| AES Global Holdings PTE Ltd. | Singapore |
| Advanced Energy Industries Israel Ltd. | Israel |
| Illumination Merger Sub. Inc. | Delaware |
| AEI Global Holdings CV | Netherlands |
| AEI Global Holdings LLC | Delaware |
| HiTek DB Pension Scheme Trustees Ltd. | England |

Consent of Independent Registered Public Accounting Firm

We have issued our reports dated February 15, 2018, with respect to the consolidated financial statements, and internal control over financial reporting included in the Annual Report of Advanced Energy Industries, Inc. on Form 10-K for the year ended December 31, 2017. We consent to the incorporation by reference of said reports in the Registration Statements of Advanced Energy Industries, Inc. on Forms S-8 (File Nos. 333-01616, 333-04073, 333-46705, 333-57233, 333-65413, 333-79425, 333-79429, 333-62760, 333-69148, 333-69150, 333-87718, 333-105367, 333-105366, 333-105365, 333-129859, 333-129858, 333-147289, 333-152865, 333-167741, 333-168519, and 333-221376) and Forms S-3 (File Nos. 333-167027, 333-167027, 333-110534, 333-87720, 333-72748, 333-72748, 333-72748, 333-72748, 333-72748, 333-72748, 333-72748, 333-72748, 333-72748, 333-72748, 333-47114, 333-37378, 333-87455, 333-87459, 333-87459, 333-87455, 333-34039, 333-34039, and 333-34039).

/s/ GRANT THORNTON LLP

Denver, Colorado
February 15, 2018

I, Yuval Wasserman, certify that:

1. I have reviewed this annual report on Form 10-K for the period ended December 31, 2017 of Advanced Energy Industries, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 15, 2018

/s/ Yuval Wasserman

Yuval Wasserman

Chief Executive Officer

I, Thomas McGimpsey, certify that:

1. I have reviewed this annual report on Form 10-K for the period ended December 31, 2017 of Advanced Energy Industries, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 15, 2018

/s/ Thomas McGimpsey

Thomas McGimpsey
Interim Chief Financial Officer, Executive Vice President, General Counsel &
Corporate Secretary

Certification of the Chief Executive Officer
Pursuant to 18 U.S.C. Section 1350,
as Adopted Pursuant to Section 906
of the Sarbanes-Oxley Act of 2002

In connection with the accompanying annual report on Form 10-K of Advanced Energy Industries, Inc. (the "Company") for the year ended December 31, 2017 (the "Report"), I, Yuval Wasserman, Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 15, 2018

/s/ Yuval Wasserman

Yuval Wasserman

Chief Executive Officer

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request

Certification of the Chief Financial Officer
Pursuant to 18 U.S.C. Section 1350,
as Adopted Pursuant to Section 906
of the Sarbanes-Oxley Act of 2002

In connection with the accompanying annual report on Form 10-K of Advanced Energy Industries, Inc. (the "Company") for the year ended December 31, 2017 (the "Report"), I, Thomas McGimpsey, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 15, 2018

/s/ Thomas McGimpsey
Thomas McGimpsey
Interim Chief Financial Officer, Executive Vice President, General Counsel
& Corporate Secretary

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

