

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, 2022

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)

1595 Wynkoop Street, Suite 800, Denver, Colorado
(Address of principal executive offices)

84-0846841
(I.R.S. Employer Identification No.)

80202
(Zip Code)

Registrant's telephone number, including area code: (970) 407-6626

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

Title of each class
Common Stock, \$0.001 par value

Trading Symbol(s)
AEIS

Name of each exchange on which registered
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 every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

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

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

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to section 240.10D-1(b).

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 \$2,706,820,026 as of June 30, 2022, based upon the price at which such common stock was last sold on such date.

As of February 10, 2023, there were 37,468,514 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 2023 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, 2022).

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Special Note Regarding Forward-Looking Statements

This annual report on Form 10-K contains, in addition to historical information, forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Statements in this report that are not historical information are forward-looking statements. For example, statements relating to our beliefs, expectations and plans are forward-looking statements, as are statements that certain actions, conditions, or circumstances will continue. The inclusion of words such as “anticipate,” “expect,” “estimate,” “can,” “may,” “might,” “continue,” “enable,” “plan,” “intend,” “should,” “could,” “would,” “likely,” “potential,” or “believe,” as well as statements that events or circumstances “will” occur or continue, indicate forward-looking statements. Forward-looking statements involve risks and uncertainties, which are difficult to predict and many of which are beyond our control.

Risks and uncertainties to which our forward-looking statements are subject include:

- macroeconomic risks, including supply chain cost increases and other inflationary pressures, recession, changes in financial markets, economic volatility and cyclicalities, higher interest rates, labor shortages, foreign currency fluctuations, and pricing controls;
- political and geographical risks, including trade and export controls, war, terrorism, international disputes and geopolitical tensions, natural disasters, public health issues, and industrial accidents;
- sufficiency and availability of components and materials;
- our level of and ability to manage backlog orders;
- our ability to develop new products expeditiously and be successful in the design win process with our customers;
- the ability to stay on the leading edge of innovation, and obtain and defend necessary intellectual property protections;
- the ability to protect our trade secrets and confidential information from misappropriation or infringement;
- our future sales;
- our future profitability;
- 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;
- ability to obtain equity or debt financing on favorable terms;

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- capital expenditures;
- our production and operations strategy;
- 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;
- adequacy of reserves for bad debt, sales returns, and other reserves or impairments;
- our estimates of the fair value of assets acquired;
- restructuring activities and expenses;
- unanticipated costs in fulfilling our warranty obligations for solar inverters;
- the integration of our acquisitions;
- industry and market trends;
- our acquisition, divestiture, and joint venture activities; and
- cost fluctuations and pressures, including prices of components, commodities and raw materials, and costs of labor, transportation, energy, pension, and healthcare.

Actual results could differ materially and adversely from those expressed in any forward-looking statements. Neither we nor any other person assumes responsibility for the accuracy and completeness of such forward-looking statements and readers are cautioned not to place undue reliance on forward-looking statements. 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 Part I, 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 provide the reasons why our actual results might differ.

Market and Industry Data

The market and industry data used in this annual report on Form 10-K are based on independent industry publications, customers, trade or business organizations, reports by market research firms and other published statistical information from third parties, as well as information based on management’s good faith estimates, which we derive from our review of internal information and independent sources. Although we believe these sources to be reliable, we have not independently verified the accuracy or completeness of the information.

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, refine, and modify the raw electrical power coming from either the utility or the building facility and convert it into various types of highly controllable, usable power that is predictable, repeatable, and customizable to meet the necessary requirements for powering a wide range of complex equipment. Many of our products enable customers to reduce or optimize their energy consumption through increased power conversion efficiency, power density, power coupling, and process control across a wide range of applications.

Our plasma power solutions enable innovation in complex semiconductor and thin film plasma processes such as dry etch and deposition. Our broad portfolio of high and low voltage power products are used in a wide range of applications, such as semiconductor equipment, industrial production, medical and life science equipment, data centers computing, networking, and telecommunications. We also supply related sensing, controls, and instrumentation products primarily for advanced measurement and calibration of power and temperature for multiple industrial markets. Our network of global service support centers provides repair services, calibration, conversions, upgrades, refurbishments, and used equipment to companies using our products.

Advanced Energy is organized on a global, functional basis and operates in the single segment for power electronics conversion products. Within this segment, our products are sold into the Semiconductor Equipment, Industrial and Medical, Data Center Computing, and Telecom and Networking markets.

We incorporated in Colorado in 1981 and reincorporated in Delaware in 1995. Our executive offices are located at 1595 Wynkoop Street, Suite 800, Denver, Colorado 80202, and our telephone number is 970-407-6555.

Recent Acquisitions

On April 25, 2022, we acquired 100% of the issued and outstanding shares of capital stock of SL Power Electronics Corporation (“SL Power”), which is based in Calabasas, California. This acquisition added complementary products to Advanced Energy’s medical power offerings and extends our presence in several advanced industrial markets.

On June 1, 2021, we acquired 100% of the issued and outstanding shares of capital stock of TEGAM, Inc. (“TEGAM”), which is based in Geneva, Ohio. This acquisition added metrology and calibration instrumentation to Advanced Energy’s radio frequency (“RF”) process power solutions in our Semiconductor Equipment and Industrial and Medical markets.

For additional information, see *Note 2. Acquisitions* in Part II, Item 8 “Financial Statements and Supplementary Data.”

Products and Services

PRODUCTS

Advanced Energy’s precision power products and solutions are designed to enable new process technologies, improve productivity, lower the cost of ownership, and provide critical power capabilities for our customers. These products are designed to meet our customers’ demanding requirements in efficiency, flexibility, performance, and reliability. We also provide repair and maintenance services for our products.

We principally serve global original equipment manufacturers (“OEM”) and end customers in a wide range of semiconductor and industrial technology applications with a broad range of advanced and embedded power products.

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Our plasma power solutions include RF power supplies, RF matching networks, RF instrumentation, direct current (“DC”) power systems, pulsed DC power systems, low frequency alternating current (“AC”) power systems, and remote plasma sources for reactive gas applications. These solutions are used in a wide range of thin film processes across multiple semiconductor applications, including plasma-based dry etch, dry strip, atomic layer etch, atomic layer deposition, chemical vapor deposition, physical vapor deposition, electro-chemical deposition, and ion implantation. In addition, these solutions are used in the processing of advanced materials in adjacent industries such as flat panel display, solar cell manufacturing, architectural glass coating, thin film coating, optical coating, and hard coatings.

Our power control modules and thermal instrumentation products are used in semiconductor and industrial markets, in which time-temperature cycles affect material properties, productivity, and yield. These products are used in processes such as etch, deposition, thermal processing, epitaxy and crystal growing. They are also used in many industrial production applications for chemical processing, the manufacturing of metal, carbon fiber, and glass, as well as numerous other industrial power applications.

Our RF, micro-ohm, and temperature metrology instruments and calibration systems are used to make critical measurements and calibrate customer hardware with speed and high accuracy in a wide range of applications, such as semiconductor manufacturing, medical, aerospace, and food processing industries.

Our embedded power products are designed to maximize energy conversion efficiency, minimize physical sizes, and to meet a variety of standards, such as International Electrotechnical Commission (“IEC”) 60601-1 for medical equipment or IEC 60950-1 for information technology equipment. Our lower power RF power supplies are designed into surgical equipment for a range of therapeutic applications. Our low-voltage AC-DC and DC-DC power supply products maximize performance, lower energy costs, and minimize the form factor. These products target mission critical applications across a variety of industrial technology applications such as medical equipment, data center servers and storage systems.

Our high and lower voltage DC-DC products are designed to meet the demanding requirements of OEMs worldwide. Our DC-DC solutions and custom-built power conversion products offer high and low voltage topology, ranging from benchtop and rackmount systems to micro-size printed circuit board mount modules. The high voltage power systems target applications including semiconductor equipment, electrostatic clamping of substrates, scientific instrumentation, mass spectrometry, and x-ray systems for industrial and analytical applications. The low voltage board mounted power solutions are designed for a wide range of industrial applications. Our programmable DC power supplies provide accurate power delivery and measurement for use in a wide range of test, measurement, and scientific research applications.

PowerInsight, our big data analytics solution, transforms the data acquired from our power delivery systems into useable insights, through a combination of enhanced data sets and advanced analytics. These capabilities allow our customers to maximize performance, reduce costs and improve yield in their manufacturing processes.

GLOBAL SUPPORT

Our services group offers warranty and after-market 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 costs of system downtime. We meet these requirements by offering comprehensive local repair service and customer support through our worldwide support organization in the United States (“U.S.”), China, Japan, Korea, Taiwan, Germany, Ireland, Singapore, Israel, and United Kingdom. Support services include warranty and non-warranty repair services, calibration, upgrades, and refurbishments on the products we sell.

Markets

Our products compete in markets for high tech applications using capital equipment. The majority of our markets are not generally subject to significant seasonality; however, these markets are cyclical due to changes in customers’ manufacturing capacity requirements and spending, which depend in part on capacity utilization, demand for

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customers' products, inventory levels relative to demand, and access to affordable capital. 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. For more information related to the markets in which we compete and the current environment in those markets, see *Business Environment and Trends* in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations."

SEMICONDUCTOR EQUIPMENT MARKET

The Semiconductor Equipment market is driven by the long-term growing need for more semiconductor production capacity and new process technologies. While the semiconductor and semiconductor equipment industries are inherently cyclical, over the long-term, integrated circuits content is growing across many industries driven by increased demand for processing, storing, and transmitting the growing amount of data. To meet the growing demand, the chip industry continues to invest in production capacity for both leading-edge and trailing-edge nodes logic devices, the latest memory devices, back-end test, and advanced wafer-level packaging. The industry's transition to advanced technology nodes and to increased layers in memory devices require an increased number of plasma-based etch and deposition process tools and higher content of our advanced power solutions per tool. As etching and deposition processes become more challenging due to shrinking device geometry and increasing aspect ratios in advanced 3D devices, more advanced RF and DC plasma generation technologies are needed. We strive to provide a broad range of best-in-class, industry-leading RF and DC power solutions. Beyond etch and deposition processes, growing complexity at advanced nodes also drives a higher number of other process steps across the wafer fab, including inspection, metrology, thermal, ion implantation, and semiconductor test and assembly, where Advanced Energy is actively participating as a critical technology provider. In addition, our global support services group offers comprehensive local repair service, upgrade, and retrofit offerings to extend the useable life of our customers' capital equipment for additional technology generations. Our strategy in the Semiconductor Equipment market is to defend our proprietary positions in our core applications by capturing new design and product generations, growing our market position in applications where we have lower market share, such as remote plasma source and dielectric etch, and leveraging our product portfolio in areas including embedded power, high voltage power systems, and critical sensing and controls to grow our market share and content at our original OEM customers.

INDUSTRIAL AND MEDICAL MARKET

Advanced Energy serves the Industrial and Medical market with mission-critical power components that deliver high reliability, precise, low noise or differentiated power to the equipment they serve. Growth in the Industrial and Medical market is driven by investment in complex manufacturing processes or automation, increased adoption of smart power, sensing, and control solutions across many industrial applications, new investments in clean and sustainable technologies, and growing investment in medical devices and life science equipment. Our customers in the Industrial and Medical market are primarily global and regional original equipment manufacturers, incorporating our advanced power, embedded power, and measurement products into a wide variety of equipment used in applications, such as advanced material fabrication, medical devices, analytical instrumentation, test and measurement equipment, robotics, industrial production, and large-scale connected light-emitting diode applications. Examples of products sold into the Industrial and Medical market include high voltage and low voltage power supplies used in applications such as medical devices, scientific instrumentation and industrial equipment, power control modules and thermal instrumentation products for material fabrication, production process control and many precision industrial sensing applications. Our strategy in the Industrial and Medical market is to expand our product offerings and channel reach, leveraging common platforms, derivatives, and customizations to further penetrate a broader set of applications.

DATA CENTER COMPUTING MARKET

Advanced Energy serves the Data Center Computing market with industry leading power conversion products and technologies, which we sell to OEMs and original design manufacturers ("ODMs") of data center server and storage systems, as well as cloud service providers and their partners. Driven by the growing adoption of cloud computing, market demand for server and storage equipment has shifted from traditional enterprise on-premises computing to the data center, driving investments in data center infrastructure. Beyond the cloud, demand for edge computing is also growing, driven by the need for faster processing, lower latency, and higher data security at edge applications. In

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addition, the data center industry has begun transitioning from 12 Volt to 48 Volt infrastructure in data center server racks to improve overall power efficiency. Advanced Energy benefits from these trends by being an industry leader in providing high-efficiency 48 Volt server power solutions to the data center industry. Further, the rapid growth and adoption of artificial intelligence and machine learning are driving accelerated demand for server and storage racks with increased power density and higher efficiency, which complements Advanced Energy's strengths. With a growing presence at both cloud service providers and industry-leading data center server and storage vendors, our strategy in the Data Center and Computing market is to penetrate selected customers and applications based on our differentiated capability and competitive strengths in power density, efficiency, and controls.

TELECOM AND NETWORKING MARKET

Our customers in the Telecom and Networking market include many leading vendors of wireless infrastructure equipment, telecommunication equipment and computer networking. The wireless telecom market continues to evolve with more advanced mobile standards. 5G wireless technology promises to drive substantial growth opportunities for the telecom industry as it enables new advanced applications such as autonomous vehicles and virtual/augmented reality. Telecom service providers are investing in 5G infrastructure, and this trend is expected to drive demand for our products into the Telecom and Networking market. In datacom, demand is driven by networking investments by telecom service providers and enterprises upgrading their networks, as well as cloud service providers and data centers investing in their networks for increased bandwidth. Our strategy in the Telecom and Networking market is to optimize our portfolio of products to more differentiated applications, and to focus on 5G infrastructure applications.

Customers

Our products are sold worldwide to OEMs, integrators, distributors and directly to end users. During the years ended December 31, 2022 and 2021, our ten largest customers, in the aggregate, accounted for over half of our total revenue.

During the year ended December 31, 2022, Applied Materials, Inc. and Lam Research Corporation accounted for 20% and 14%, respectively, of our total revenue compared to 20% and 10%, respectively, of our total revenue during the prior year.

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. The loss of a large customer could have a material adverse effect on our results of operations.

For more information related to our expectations for the markets we serve, see Business Environment and Trends in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations." For a discussion of our backlog, see Results of Continuing Operations in Part II, Item 7 "Management's Discussion and Analysis of Financial Condition and Results of Operations."

Marketing, Sales, and Distribution

We sell our products through direct and indirect sales channels. Our sales operations are primarily located in the U.S., China, the United Kingdom, Germany, Israel, Japan, South Korea, India, Singapore, Philippines, Hong Kong, Ireland, and Taiwan. In addition to a direct sales force, we have independent sales representatives, channel partners 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.

In October 2022, additional restrictions were announced by the U.S. Commerce Department related to the export of semiconductor equipment for advanced computing chips that have had a negative impact on our semiconductor distribution channels.

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Refer to *Note 3. Revenue* in Part II, Item 8 “Financial Statements and Supplementary Data” for information regarding our revenue by geographic area and Part I, Item 1A “Risk Factors” for a discussion of certain risks related to our foreign operations.

Manufacturing

The manufacturing of our products is primarily performed at our sites in the Philippines, Malaysia, and China. In addition, we perform limited specialty manufacturing for some of our products in the U.S., Mexico, United Kingdom, and Europe. See Part I, Item 1A, “Risk Factors” for a discussion of certain risks related to our manufacturing operations.

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. Global supply chain constraints have impacted the availability of materials, parts, and subcomponents needed for production. In some cases, we paid premiums or expedite fees to obtain critical parts to meet urgent customer needs. In some of those instances, we passed the additional costs along to our customers. We expect the related supply chain challenges will continue into 2023. However, we seek to reduce costs, lower the risks of production and service interruptions, and mitigate key parts shortages by:

- selecting and qualifying alternate suppliers where practical 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 products used in our customers’ and their customers’ processes. The qualification process for our process power products, particularly as it pertains to semiconductor customers, follows semiconductor industry standard practices, such as “copy exact;”
- monitoring the financial condition and overall performance of key suppliers from stable geographies;
- procuring alternate parts from commercial, widely available nodes and processes;
- 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 where possible and in geographies that reduce costs without degradation in quality; and
- locating certain manufacturing operations in areas that are closer to suppliers and customers.

Intellectual Property

We seek patent protection for inventions governing new products or technologies as part of our ongoing research and development. We currently hold 350 U.S. issued patents and 416 foreign issued patents, and we have 568 patent applications pending in the U.S., Europe, and Asia. A substantial majority of our patents are related to our process power products and solutions 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. In addition to patents, we possess other intellectual property, including trademarks, know-how, trade secrets, and copyrights. We leverage our proprietary technology and trade secrets to deliver on our strategy of selling differentiated products for our most important customer solutions. During 2022 we strengthened our trade secret and confidential information protection measures including by disabling USB drives on company-issued laptops, increasing the frequency of internal data loss protection searches, and we brought lawsuits against two former employees who misappropriated confidential data.

Competition

The markets we serve are highly competitive and characterized by rapid technological development and changing customer requirements. We face a wide variety of competitors, and 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 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. Competitors in each of our market verticals include, but are not limited to, the following:

<u>Semiconductor Equipment</u>	<u>Industrial and Medical</u>	<u>Data Center Computing</u>	<u>Telecom and Networking</u>
COMET Holding AG.	Cosel Co., Ltd.	Acbel Polytech Inc.	ABB Ltd.
Daihen Corp.	Delta Electronics, Inc.	Delta Electronics, Inc.	Delta Electronics, Inc.
MKS Instruments, Inc.	MEAN WELL Enterprises	Flex Ltd.	Lite-On Technology Corp.
TRUMPF Hüttinger GmbH + Co. KG	TDK-Lambda Americas Inc. TRUMPF Hüttinger GmbH + Co. KG XP Power Ltd.	Lite-On Technology Corp.	

Research and Development

We perform research and development (“R&D”) on products to develop new or emerging applications, technological advances 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 and related software 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.

The following table summarizes research and development expenses and the percentage of these expenses as compared to total sales (in thousands):

	<u>Years Ended December 31,</u>		
	<u>2022</u>	<u>2021</u>	<u>2020</u>
Research and Development Expenses	\$ 191,020	\$ 161,831	\$ 143,961
% of Sales	10.4%	11.1%	10.2%

Human Capital

Our people are our strength and AE is committed to a core set of values: innovation, integrity, empowerment, partnership, accountability, and execution. These core values are the foundation of how we operate.

We have a globally diverse workforce with approximately 12,000 employees as of December 31, 2022. Our employees are located worldwide in more than 20 countries and are comprised of approximately 55% male and 45% female employees. Our employees are not represented by unions, except for statutory organization rights applicable to our employees in China, Germany, and Mexico.

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Diversity, Equity, and Inclusion

We are committed to creating an inclusive work environment where all our team members feel respected, valued, and empowered. We are also committed to expanding gender diversity. In 2022, our Board of Directors had three female members, and we added two females to our executive leadership team. In addition, through a combination of internal promotion and external hiring, we doubled the number of females represented at the vice president and above level, as compared with 2021.

We have an active Corporate Diversity, Equity, and Inclusion (DE&I) Steering Committee to further increase our commitment to diversity and equity. We offer an annual Advanced Energy STEM (science, technology, engineering, and mathematics) Diversity Scholarship to support and develop emerging talent and promote greater ethnic, racial and gender diversity in STEM.

Health and Safety

We are committed to providing a safe work environment for our employees and have a global team responsible for health and safety related to on-site operations, including hazard and risk identification. We are also committed to the standards of the Responsible Business Alliance Code of Conduct, which promotes labor, health and safety, environmental and ethics best practices.

Employee Engagement

We believe that our continued success depends, in part, on our ability to attract and retain qualified personnel. In 2022, we conducted our biennial confidential employee survey on topics relating to confidence in company leadership, ethical conduct, career growth opportunities, and suggestions on how we can make our company a great place to work. Over 85% of employees participated in the 2022 survey, and we achieved higher scores across most dimensions compared to the 2020 survey with high employee engagement reported by over 85% of our employees. Results of the survey were shared with our employees, our executive team, and our Board of Directors, to help us make further improvements in 2023.

Total Rewards

We offer competitive compensation and benefits to our employees to attract and retain a talented, highly engaged workforce. Our compensation programs are focused on equitable, fair pay practices including market-based base pay, an annual pay-for-performance incentive that over 40% of our non-manufacturing employees participate in, and a discounted employee stock purchase plan.

Learning and Development

We seek to create growth and development opportunities to support our employees in reaching their full potential and offer internal and external learning and development opportunities. In 2022, Advanced Energy launched a 10-week leadership essential training program for our people leaders across all corporate levels, providing the opportunity for employees to develop and enhance the essential competencies needed to empower, engage, and inspire high-performing teams. We also have an internship program designed to help develop our talent pipeline and perform internal talent reviews and succession planning to ensure we have a strong workforce for the future.

Community Involvement

We have an active Community Investment Steering Committee and offer each employee eight hours of paid time off to volunteer with a non-profit organization of their choice. Our Educational Scholarship Program, available to children of Advanced Energy employees, celebrates education accomplishments and supports them in pursuing their career and learning goals.

Environmental Matters

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.

Available Information

Our website address is www.advancedenergy.com. We make available, free of charge on our website, our annual reports 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.

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 material 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.

Macroeconomic and Industry Risks

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

As a supplier to the global semiconductor equipment, telecom, networking, data center computing, industrial, and medical industries, we are subject to business fluctuations, the timing, length, and volatility of which can be difficult to predict. We are also impacted by sudden changes in customers’ manufacturing capacity requirements and spending, which depend in part on technology transitions, capacity utilization, demand for customers’ products, inventory levels relative to demand, and access to affordable capital. These changes have affected the timing and amount of customers’ purchases and investments in technology, and continue to affect our orders, net sales, operating expenses, and net income. We may not be able to respond adequately or quickly to the decline in demand by reducing our costs.

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 enough manufacturing capacity and inventory to fulfill customer orders, effectively manage our supply chain, and attract, retain, and motivate enough 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 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 customer demand, the markets we serve are constantly changing in terms of advancement in applications, core technology and competitive pressures. New products designed for capital equipment manufacturers typically have a lifespan of many years. Increasingly, we are required to accelerate our investment in research and development to meet the time-to-market, performance and technology adoption cycle needs of our customers simply to compete for design wins. Given such up-front investments we make to

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develop, evaluate, and qualify products in the design win process, our success and future growth depend 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, the design windows may be narrow, and there is no assurance we will succeed with new design wins for our existing customers or new customers' next generations of equipment. If existing or new customers do not choose our designs or we agree to suboptimal commercial terms with these customers, our market share may be reduced, the potential revenues related to the lifespan of our customers' products may not be realized, and our business, financial condition and results of operations could be materially and adversely impacted.

Supply chain disruptions, manufacturing interruptions or delays, or the failure to accurately forecast customer demand, could affect our ability to meet customer demand, lead to higher costs, or result in excess or obsolete inventory.

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.

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. 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. Orders with our suppliers cannot always be amended in response. In addition, 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 number 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, 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 exceeds our customers' and our forecasts, we may not be able to timely obtain enough raw materials, parts, components, or subassemblies, on favorable terms or at all, to fulfill the excess demand. This may lead to customers cancelling orders prior to shipment causing a decrease in sales, which may have a material adverse effect on our business and results of operations.

Beginning in 2021 and continuing into 2023, there has been a shortage of critical components caused by a variety of factors, including increased demand for electronic components used in a wide variety of industries, the pandemic-driven rise in consumer demand for technology goods, logistics-related disruptions in shipping, capacity limitations at some suppliers, labor shortages, and other factors. These supply constraints led to longer lead times in procuring materials and subcomponents and, in some cases, meaningfully higher costs for the subcomponents. It is not clear how long global supply constraint conditions will continue, how quickly the supply chain will recover, the extent to which our mitigating actions will be successful, or to what extent we can recover our higher costs. As such, our forward-looking projections of revenues, earnings, and cash flow may be adversely impacted if any of these situations continue for longer than we expect or further deteriorate.

COVID-19 could continue to affect our business, workforce, supply chain, results of operations, financial condition and/or cash flows.

The COVID-19 pandemic has adversely impacted our ability (a) to manufacture, test, service and ship our products, (b) to get required materials and sub-assemblies to build and service our products and (c) to staff labor and management for manufacturing, research and development, supply chain, service, and administrative operations.

COVID-19 continues to impact the global supply chain causing disruptions such as higher input costs through material premiums, expedite fees, price increases, and higher logistic costs. The pandemic has also resulted in economic volatility in many countries, which could adversely impact future customer purchases of our products. The COVID-19 situation continues to evolve and to the extent that it adversely affects our business, financial condition, operating results, and cash flows, it may also have the effect of heightening many of the other risks described in this “Risk Factors” section. Other impacts may arise that we are not aware of currently.

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

We have manufacturing and other operations in locations subject to natural disasters such as severe weather and geological events including earthquakes or tsunamis that could disrupt operations. In addition, our suppliers and customers are also subject to natural and other disaster risk exposure. 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.

If our information security measures are breached or fail and a customer’s or our data is improperly obtained or unauthorized access to our information technology systems occurs, 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. We and our third-party providers have experienced, and expect to continue to experience, cybersecurity or confidential information theft incidents, some of which may be successful. We continue to devote significant resources to network security, data encryption, network redundancy, and other measures to protect our systems and data from unauthorized external access or internal misuse, and we may be required to expend greater resources in the future, especially in the face of continuously evolving and increasingly sophisticated cybersecurity threats and privacy and data protection laws. Unauthorized access to our data or inability to access our data (e.g. through ransomware or denial of service), including any regarding our technology or 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, employee error, employee malfeasance, or otherwise. Additionally, third parties may attempt to fraudulently induce employees or customers into disclosing sensitive information such as usernames, passwords, or other information 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 or theft of any kind of confidential information including trade secrets could result in a loss of confidence by our customers, damage our reputation, disrupt our business, lead to legal liability, and adversely impact our future sales.

Business Risks

We continue to evolve our manufacturing footprint and where our product lines are manufactured.

Our manufacturing facilities are located globally, and the majority of our products are manufactured in a select few key facilities. Most facilities are under operating leases 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. Natural disasters, uncontrollable occurrences, or other operational issues at any of our manufacturing facilities could significantly reduce or disrupt our productivity at such site and could prevent us from meeting our customers' requirements in a timely manner, or at all. Additionally, we continue to evaluate our manufacturing facilities and may decide to conduct optimization and consolidation initiatives, which may or may not be successful.

If we are unable to adjust our business strategy successfully for some of our product lines to reflect our customers' price sensitivity, 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. Our customers continually exert pressure on us to reduce our prices and extend payment terms and we may be required to enter into long term reduced pricing agreements, extended payment terms, exclusivity arrangements, or other unfavorable contract terms with our largest customers to remain competitive. In addition, we compete in markets in which customers may dual or multi-source their power. We believe some of our Asia-based competitors benefit from local governmental funding incentives and purchasing preferences from end-user customers in their respective countries. If competition against any of our product lines should come to focus solely on price rather than on product performance and technology innovation, we would need to adjust our business strategy, product offerings and product costs accordingly, and if we are unable to do so, our business, financial condition, and results of operations could be materially and adversely affected. Further, in 2022, we increased prices and implemented surcharges across many of our products to reflect our higher supply chain costs. Although these price changes have generally been accepted by our customers, the higher prices could make our products less competitive in the market over time and could have an adverse effect on our results of operations.

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

Consistent with prior years, in 2022, two customers each represented over 10% of our total revenue, and our ten largest customers, in the aggregate, accounted for over half of our total revenue. At December 31 2022, one customer accounted for over 10% of our total accounts receivable.

A significant decline in sales from these or our other large customers, or our inability to collect on these sales, could materially and adversely impact our business, results of operations and financial condition.

The loss of and inability to attract and retain 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 management, technical, marketing, and sales employees. We may not be successful in retaining our employees or attracting and retaining additional skilled personnel as required. If we are unable to attract, retain and motivate qualified employees and leaders, we may be unable to fully capitalize on current and new market opportunities, which could adversely impact our business and results of operations. Our success in hiring and retaining employees depends on a variety of factors, including the attractiveness of our compensation and benefit programs, global economic or political and industry conditions, our organizational structure, our reputation, culture and working environment, competition for talent and the availability of qualified employees, the readiness for and availability of career development opportunities, and our ability to offer a challenging and rewarding work environment. We have experienced, and may continue to experience, increasing costs to attract and retain needed talent, driven by macro-economic conditions and a highly competitive labor market. We must develop succession plans capable of maintaining continuity during the inevitable unpredictability of

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employee retention. If our succession plans do not operate effectively, our business could be adversely affected. In addition, the loss or retirement of key employees presents particular challenges to the extent it involves the departure of employees with particularly valuable knowledge or experiences. This requires us to identify and train existing or new employees to perform necessary functions, which we may be unable to do, or could result in unexpected costs, reduced productivity, or difficulties with respect to internal processes and controls.

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 are 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.

We may not pay dividends on our common stock.

Holders of our common stock are only entitled to receive dividends when and if they are declared by our Board of Directors. Our credit facility restricts our ability to pay dividends on our capital stock under certain circumstances. Although we have declared cash dividends on our common stock since 2021, we are not required to do so, and we may reduce or eliminate our cash dividend in the future. This could adversely affect the market price of our common stock. For information on our Credit Facility, see *Note 21. Credit Facility and Note 8. Derivative Financial Instruments* in Part II, Item 8 "Financial Statements and Supplementary Data."

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.

Our long-term success and results of operations depend on our ability to successfully close, integrate, and realize the anticipated benefits from our acquisitions and strategic investments.

As part of our business strategy, we have and will likely continue to acquire companies or businesses and make investments to further our business. Risks associated with these transactions are many, including the following which could adversely affect our financial results:

- the inability to complete proposed transactions timely or at all due to the failure to obtain regulatory or other approvals, litigation or other disputes, and any ensuing obligation to pay a termination fee;
- the failure to realize expected revenues, gross and operating margins, net income, and other returns from acquired businesses;
- the inability to successfully integrate product and/or service offerings to realize all anticipated benefits from business combinations;
- a failure to perform adequate due diligence with respect to business combination and investment transactions and our ability to evaluate the results, is dependent upon the completeness and accuracy of statements and disclosures made or actions taken by third parties and their representatives;
- we have incurred and will incur additional depreciation and amortization expense over the useful lives of certain assets acquired in connection with business combination and investment transactions and, to the extent that the value of goodwill or intangible assets acquired in connection with a business combination

and investment transaction becomes impaired, we may be required to incur additional material charges related to impairment of those assets;

- deterioration in our effective tax rate;
- a failure to retain and motivate key employees of acquired businesses;
- an inability to integrate with our existing enterprise resource planning (“ERP”) and other global information technology systems to realize productivity improvement and cost efficiencies;
- our ability to diligence and maintain appropriate business processes, procedures, and internal controls at the acquired business;
- the risk of litigation or claims associated with a proposed or completed transaction; and
- unknown, underestimated, undisclosed or undetected commitments or liabilities or non-compliance with laws, regulations, or policies.

During the year ended December 31, 2022, we acquired SL Power, and we are continuing to integrate SL Power with our business. Integrating SL Power’s operations with ours requires significant management attention, effort, and expenditures, and we may not be able to achieve the longer-term integration or other business goals in an effective, complete, timely or cost-efficient manner.

Commercial and Financial Related Risks

We are subject to risks inherent in international operations.

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 adversely affected by liquidity, credit deterioration, inflation, foreign currency exchange rate fluctuations, financial results, economic risk, political risk, sovereign risk, or other factors.

Sales to customers outside the United States represented 61% of our total revenue during the year ended December 31, 2022. Refer to *Note 3. Revenue* in Part II, Item 8 “Financial Statements and Supplementary Data” for additional information regarding our revenue by geographic area

We are a global organization with an expanding 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;
- interruptions to our and/or our suppliers’ supply chain;
- 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 contract rights;
- ineffective or inadequate legal protection of intellectual property rights in certain countries;
- global trade issues and changes in and uncertainties with respect to trade and export regulations, trade policies and sanctions, tariffs, and international trade disputes, including new and changing export regulations for certain exports to China and any retaliatory measures;
- delays or restrictions on personnel travel and in shipping materials or finished products between and within countries;

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- political instability, natural disasters, health epidemics, disruptions in financial markets, and deterioration of economic conditions;
- our ability to maintain appropriate business processes, procedures, and internal controls, and comply with environmental, health and safety, anti-corruption, and other regulatory requirements;
- customs regulations including customs audits in various countries that occur from time to time;
- the ability to provide enough 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 significant balances in accounts receivable from foreign customers; and
- changes in tariffs, income tax, value added tax, and foreign currency exchange rates.

Our debt obligations and the restrictive covenants in the agreements governing our debt could limit our ability to operate our business or pursue our business strategies, could adversely affect our business, financial condition, results of operations, and cash flows, and could significantly reduce stockholder benefits from a change of control event.

Our debt obligations could make us more vulnerable to general adverse economic and industry conditions and could limit our flexibility in planning for, or reacting to, changes in our business and the industries in which we operate, thereby placing us at a disadvantage to our competitors that have less debt. We may enter into additional debt obligations at any time.

Our debt obligations impose financial covenants on us and our subsidiaries that require us to maintain a certain leverage ratio. The financial covenants place certain restrictions on our business that may affect our ability to execute our business strategy successfully or take other actions that we believe would be in the best interests of our Company. These include limitations or restrictions, among other things, on our ability and the ability of our subsidiaries to:

- incur additional indebtedness;
- pay dividends or make distributions on our capital stock or certain other restricted payments or investments;
- conduct stock buybacks;
- make domestic and foreign investments and extend credit;
- engage in transactions with affiliates;
- transfer and sell assets;
- effect a consolidation or merger or sell, transfer, lease, or otherwise dispose of all or substantially all our assets; and
- create liens on our assets to secure debt.

Any breach of the covenants or other event of default could cause a default on our debt obligations, which could result in our credit facility being immediately due and payable, and such default may also constitute a default of our other obligations. Our assets and cash flow may not be sufficient to fully repay borrowings under our outstanding debt instruments if accelerated upon an event of default. If we are unable to repay, refinance, or restructure our indebtedness as required, or amend the covenants contained in these agreements, the lenders can exercise all rights and remedies available under our debt obligations or applicable laws or equity. There can be no assurance that we will have sufficient financial resources or be able to arrange financing to repay any borrowings at such time.

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

Uncertain or adverse economic and business conditions, including uncertainties and volatility in the financial markets, rising inflation and interest rates, economic recession, national debt, or fiscal or monetary concerns, could materially adversely impact our operating results. Tightening of credit markets, turmoil in the financial markets, and a weakening global economy have in the past and could again contribute to slowdowns in the industries in which we operate and adversely impact the global demand for our products. Some of our key markets depend largely on consumer spending. Economic uncertainty exacerbates negative trends in consumer and business spending and may cause our customers to push out, cancel, or refrain from placing orders.

Difficulties or increased costs in obtaining capital and uncertain market conditions may also lead to a reduction of 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 including inflation, interest rates, the transition away from the London Interbank Offered Rate and transition to the Secured Overnight Financing Rate, availability of capital markets, consumer spending rates, energy availability and costs and the effects of government initiatives to manage 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.

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 are involved in litigation related to the legacy inverter product line. We review such claims and vigorously defend against such lawsuits in the ordinary course of our business. We cannot assure that any such claims or litigation 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 income taxes” 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 they 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 the cost of repair parts, among other factors.

Our products may suffer from defects or errors leading to increased costs, damages, 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. Further, the manufacture of these products often involves a highly complex and precise process and the utilization of specially qualified components that conform to stringent specifications. Many of our products also require highly skilled labor. As a result of the technical complexity of these products, design defects, skilled labor turnover, changes in our or our suppliers’ manufacturing processes or the inadvertent use of defective or nonconforming materials by us or our suppliers could adversely affect our manufacturing yields and product reliability. If any of our products are defective or fail, 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. Furthermore, some of our products are used in medical device applications where malfunction of the device could result in serious injury. We accrue a warranty reserve for estimated costs to provide warranty services,

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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.

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, we have large, long-term liabilities, such as local lease and pension liabilities in Asia and Europe creating more significant exposure to fluctuations in the value of the Philippine Peso, Chinese Yuan, British Pound, Euro, Hong Kong Dollar, and New Taiwan Dollar. We do not attempt to hedge these exposures given the long-term nature of the underlying liabilities and the non-cash nature of the foreign exchange gain or loss.

The Chinese government is continually pressured by its trading partners to allow its currency to float in a manner like other major currencies. Any change in the value of the Chinese Yuan could significantly increase the labor and other costs incurred in the operation of our China facilities and the cost of raw materials, parts, components, and subassemblies that we source there, which could materially and adversely affect our results of operations.

Our operations in the Asia Pacific region, including 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 and supply chain outside the United States are located in the Asia Pacific region, including China, which exposes us to risks, such as exchange controls and currency restrictions, changes in local economic conditions, changes in customs regulations and tariffs, changes in tax policies, changes in laws and regulations, possible retaliatory government actions, potential inability to enforce intellectual property protection or contracts terms, and recent changes in U.S. policy regarding overseas manufacturing and export controls. The U.S. and China regularly have significant disagreements over geopolitical, trade and economic issues. Any escalating political controversies between the U.S. and China, whether or not directly related to our business, could have a material adverse effect on our operations, business, results of operations, and financial condition. We continuously evaluate the risk of operations in China, including manufacturing and supply chain, and the potential financial impact to our operations

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

We currently have unfunded obligations to our pension plans. 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 17. Employee Retirement Plans and Postretirement Benefits* in Part II, Item 8 “Financial Statements and Supplementary Data” contained herein.

Our intangible assets may become impaired.

We periodically review the carrying value of our goodwill and the estimated useful lives of our 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.

Regulatory, Legal, Tax, and Compliance Related Risks

Significant developments stemming from recent U.S. government actions with respect to trade policies and export regulations, including export license requirements, tariffs, and trade sanctions have adversely impacted and could further adversely impact our business.

U.S. government actions are imposing greater restrictions and economic disincentives on international trade. Recently, the government has amended and expanded export regulations regarding sales to companies on the U.S. Entity List preventing sales of U.S. foreign direct product, and in October 2022, placed unilateral export controls on the export, reexport, and transfer of technology sold in China for certain advanced computing and semiconductor manufacturing equipment and related parts and services. The implementation and interpretation of these rules is ongoing and evolving and creates challenges in managing our operations and international sales and increases our exposure to foreign competitors. The U.S. government may promulgate additional export controls or license requirements that will further limit our ability to sell products and services to non-U.S. customers, including China. Additionally, the U.S. Department of Defense continues to issue lists of companies it has determined to be owned or controlled by China's People's Liberation Army on which sanctions could be levied by executive order, and the Department of Commerce continues to expand the list of designated military end users from China and Russia for whom export licenses are now required. In addition, the US Government has previously initiated the imposition of additional tariffs on certain foreign goods, including steel and aluminum, semiconductor manufacturing equipment and spare parts thereof and has also announced the imposition of import license requirements on aluminum articles.

China has passed numerous regulations, including the Export Control Law of the People's Republic of China, effective December 1, 2020, the Rules on Counteracting Unjustified Extra-territorial Application of Foreign Legislation and Other Measures promulgated on January 9, 2021, and the Anti-Foreign Sanctions Law of the People's Republic of China, released on July 24, 2021. These laws provide China with the framework to ban exports to specific foreign entities on its Control List, block application of foreign laws, impose its own sanctions on entities and countries and provides a counterweight to the U.S. government's restrictions through provisions for retaliatory action and extraterritorial jurisdiction. The potential imposition of retaliatory measures could adversely impact demand for our products, prohibit our ability to sell products or purchase necessary components, and could adversely affect our business.

Changes in U.S. trade policy could result in one or more U.S. trading partners adopting responsive trade policy making it more difficult or costly for us to export our products to those countries. As indicated above, these measures could also result in increased costs for goods imported into the U.S. This in turn could require us to increase prices to our customers which may reduce demand, or, if we are unable to increase prices, result in lowering our margin on goods and services sold. To the extent that trade tariffs and other restrictions imposed by the U.S. increase the price of semiconductor equipment and related parts imported into the U.S., the cost of our materials may be adversely affected and the demand from customers for products and services may be diminished, which could adversely affect our revenues and profitability.

The adoption and expansion of trade restrictions, the occurrence of a trade war, or other governmental action related to tariffs, trade sanctions, or policies has the potential to further adversely impact demand for our products, our costs, our customers, our suppliers, and the U.S. economy, which in turn could adversely impact our business, financial condition, and results of operations.

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.

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 a variety of methods including patents and non-disclosure agreements; however, we might not be able to protect our technology, and customers or competitors might be able to develop similar technology independently. Infringement, misappropriation, and unlawful use of our intellectual property rights, and resulting unauthorized manufacture or sale of equipment using our IP rights, could result in lost revenue. Monitoring and detecting any unauthorized use of intellectual property is difficult and costly and we cannot be certain that the protective measures we have implemented will completely prevent misuse. If we are unable to protect our intellectual property successfully, our business, financial condition, and results of operations could be materially and adversely affected.

Patent, trademark laws, and trade secret protection may not be adequate to deter infringement or misappropriation of our patents, trademarks, trade secrets and similar proprietary rights. In addition, patents issued to us may be challenged, invalidated, or circumvented. The loss or expiration of any of our key patents could lead to a significant loss of sales of certain of our products and could materially affect our future operating results. The process of seeking patent protection can be time consuming and expensive and patents may not be issued for currently pending or future applications. Moreover, our existing patents or any new patents that may be issued may not be sufficient in scope or strength to provide meaningful protection or any commercial advantage to us. We may initiate claims, enforcement actions or litigation against third parties for infringement of our proprietary rights, which claims could result in costly litigation, the diversion of our technical and management personnel, and the assertion of counterclaims by defendants.

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 or no patent protection in other countries, including China. Consequently, manufacturing our products in China may subject us to an increased risk that unauthorized parties may attempt to copy our products or otherwise obtain or use our intellectual property. Generally, our efforts to obtain international patents have been concentrated in the European Union and certain industrialized countries in Asia, Korea, Japan, and Taiwan.

Third parties may also assert claims against us and our products. Claims that our products infringe the rights of others, whether or not meritorious, can be expensive and time-consuming to defend and resolve, and may divert the efforts and attention of management and personnel. The inability to obtain rights to use third party intellectual property on commercially reasonable terms could also have an adverse impact on our business. In addition, we may face claims based on the theft or unauthorized use or disclosure of third-party trade secrets and other confidential business information. Any such incidents and claims could severely harm our business and reputation, result in significant expenses, harm our competitive position, and prevent us from selling certain products, all of which could have a material and adverse impact on our business and results of operations.

We are, and expect to continue to be, involved in litigation. Legal proceedings are costly and could have a material adverse effect on our commercial relationships, business, financial condition, and operating results.

We may be involved in legal proceedings, litigation, enforcement actions, or claims regarding product performance, product warranty, product certification, product liability, patent infringement, misappropriation of trade secrets, other intellectual property rights, antitrust, environmental regulations, securities, contracts, unfair competition, employment, workplace safety, and other matters. Legal proceedings, enforcement actions and claims, whether with or without merit, and associated internal investigations, may be time-consuming and expensive to prosecute, defend or conduct; divert management's attention and other resources; inhibit our ability to sell our products or services; prevent us from using our technology; result in adverse judgments for damages, injunctive relief, penalties, and fines; and

adversely affect our business. We can provide no assurance of the outcome of these legal proceedings, enforcement actions or claims or that the insurance we maintain will be adequate to cover them.

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 by their nature are complex and 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. As both domestic and foreign governments contemplate or make changes in tax law to raise more revenues, our results could be adversely affected. Further, 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 several other countries are actively considering changes in this regard.

Increased governmental action on income tax regulations could adversely 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. As we are subject to examination by tax authorities in every jurisdiction where we do business, an unfavorable audit outcome could adversely affect us.

Changes in our provision for income taxes or adverse outcomes resulting from examination of our income tax returns could adversely affect our results.

Our provision for income taxes is subject to volatility and could be adversely affected by earnings being lower than anticipated in countries that have lower tax rates and higher than anticipated in countries that have higher tax rates; by changes in the valuation of our deferred tax assets and liabilities; by changes, regulations, and interpretations of research and development capitalization and tax credit regulations, foreign-derived intangible income (“FDII”), global intangible low-tax income (“GILTI”) and base erosion and anti-abuse tax (“BEAT”) laws; by expiration of or lapses in tax incentives; by transfer pricing adjustments, including the effect of acquisitions on our legal structure; by tax effects of nondeductible compensation; by tax costs related to intercompany realignments; by changes in accounting principles; or by changes in tax laws and regulations, treaties, or interpretations thereof, including changes to the taxation of earnings of our foreign subsidiaries, the deductibility of expenses attributable to foreign income, and the foreign tax credit rules. Significant judgment is required to determine the recognition and measurement attribute prescribed in the accounting guidance for uncertainty in income taxes. The Organization for Economic Co-operation and Development (“OECD”), an international association comprised of 36 countries, including the United States, has made changes to numerous long-standing tax principles. There can be no assurance that these changes, once adopted by countries, will not have an adverse impact on our provision for income taxes. Further, because of certain of our ongoing employment and capital investment actions and commitments, our income in certain countries is subject to reduced tax rates. Our failure to meet these commitments could adversely impact our provision for income taxes. In addition, we are the subject of regular examination of our income tax returns by tax authorities. We regularly assess the likelihood of adverse outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. There can be no assurance that the outcomes from these continuous examinations will not have an adverse effect on our operating results and financial condition.

Our business is subject to complex and evolving U.S. and international laws and regulations regarding privacy and data protection. Many of these laws and regulations are subject to change and uncertain interpretation and could result in claims, changes to our business practices, penalties, increased cost of operations, or declines in customer growth or engagement, or otherwise harm our business.

Regulatory authorities around the world have implemented or are considering several legislative and regulatory proposals concerning data protection, including measures to ensure that encryption of users' data does not hinder law enforcement agencies' access to that data. In addition, the interpretation and application of consumer and data protection laws in the U.S., Europe, China and elsewhere are often uncertain and in flux. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our data practices. Violation of any of these rules could result in fines or orders requiring that we change our data practices, which could have an adverse effect on our business and results of operations. Complying with these various laws could cause us to incur substantial costs or require us to change our business practices in a manner adverse to our business.

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. In addition, through recent acquisitions, we expanded our presence in the medical market to include more highly regulated applications and added a medical-certified manufacturing center to our operating footprint. We may encounter increased costs to maintain compliance with the quality systems and other regulations and requirements that apply to the acquired business. 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 numerous imports, exports, 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.

We are subject to risks associated with environmental, health, and safety regulations.

We are subject to environmental, health, and safety regulations in connection with our global business operations, such as regulations related to the development, manufacture, sale, shipping, and use of our products; handling, discharge, recycling and disposal of hazardous materials used in our products or in producing our products; the operation of our facilities; and the use of our real property. The failure or inability to comply with existing or future environmental, health and safety regulations could result in significant remediation or other legal liabilities; the imposition of penalties and fines; restrictions on the development, manufacture, sale, shipping or use of certain of our products; limitations on the operation of our facilities or ability to use our real property; and a decrease in the value of our real property. We could also be required to alter our manufacturing, operations, and product design, and incur substantial expenses in order to comply with environmental, health and safety regulations. Any failure to comply with these regulations could subject us to significant costs and liabilities that could adversely affect our business, financial condition, and results of operations.

Our failure to maintain appropriate environmental, social, and governance (“ESG”) practices and disclosures could result in reputational harm, a loss of customer and investor confidence, and adverse business and financial results.

Governments, customers, investors, and employees are enhancing their focus on ESG practices and disclosures, and expectations in this area are rapidly evolving and increasing. Failure to adequately maintain appropriate ESG practices that meet diverse stakeholder expectations may result in an inability to attract customers, the loss of business, diluted market valuation, and an inability to attract and retain top talent. In addition, standards and processes for measuring and reporting carbon emissions and other sustainability metrics may change over time, resulting in inconsistent data, or could result in significant revisions to our sustainability commitments or our ability to achieve them. Any scrutiny of our carbon emissions or other sustainability disclosures or our failure to achieve related goals could adversely impact our reputation or performance.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Information concerning our principal properties is set forth below:

Location	Principal Activity	Ownership
Denver, Colorado	Corporate headquarters, general and administrative	Leased
Fort Collins, Colorado	Research and development, distribution, sales, and service	Leased
Penang, Malaysia	Manufacturing and distribution	Leased
Rosario, Philippines	Manufacturing	Owned
Santa Rosa, Philippines	Manufacturing	Leased
Shenzhen, China	Manufacturing, distribution, service, and research and development	Leased
Zhongshan, China	Manufacturing	Leased
Xianghe, China	Manufacturing	Leased
Mexicali, Mexico	Manufacturing	Leased
Lockport, New York	Manufacturing, distribution, service, and research and development	Leased
Singapore, Singapore	Global operations headquarters (sales, service, and research and development)	Leased
Quezon, Philippines	Engineering, research and development, administration, and support	Leased
Taipei, Taiwan	Sales, distribution, and service	Leased
Hong Kong, Hong Kong	Distribution and general and administrative	Leased

In addition to the above principal properties, we have several other facilities throughout the U.S., North America, Europe, and Asia. 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. At the end of 2022, we ceased operations in our Shenzhen, China facility and completed the transfer of production activity to our manufacturing operations in Penang, Malaysia. The Shenzhen, China facility is expected to close in early 2023.

ITEM 3. LEGAL PROCEEDINGS

We are involved in disputes and legal actions arising in the normal course of our business. Although it is not possible to predict the outcome of these matters, we believe that the results of these proceedings will not have a material adverse effect on our financial condition, results of operations, or liquidity. For further information see *Note 19. Commitments and Contingencies* in Part II, Item 8 “Financial Statements and Supplementary Data.”

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Principal Market

Our common stock is listed on the NASDAQ Global Select Market under the symbol "AEIS." On January 31, 2023, the number of common stockholders of record was 258. This does not include stockholders whose shares are held in "street name" through brokers or other nominees.

Dividend Policy

In March 2021, the Board of Directors (the "Board") declared the first quarterly cash dividend since our inception as a public company. In each of the four quarters in 2022, we paid quarterly cash dividends of \$0.10 per share, totaling \$15.2 million for the full year. We currently anticipate that a quarterly cash dividend of \$0.10 per share will continue to be paid on a quarterly basis, although the declaration of any future cash dividend is at the discretion of the Board and will depend on our financial condition, results of operations, capital requirements, business conditions, and other factors.

Purchases of Equity Securities by the Issuer

The following table summarizes actions by our Board of Directors in relation to the stock repurchase program:

<u>Date</u>	<u>Action</u>
September 2015	Authorized a program to repurchase up to \$150.0 million of our common stock
May 2018	Approved a \$50.0 million increase in the repurchase program
December 2019	Authorized the removal of the expiration date and increased the balance available for the repurchase program by \$25.1 million
July 2021	Approved an increase to the repurchase program, which authorized the Company to repurchase up to \$200.0 million with no time limitation
July 2022	Approved an increase to the repurchase program from its remaining authorization of \$102.4 million, to repurchase up to \$200.0 million with no time limitation

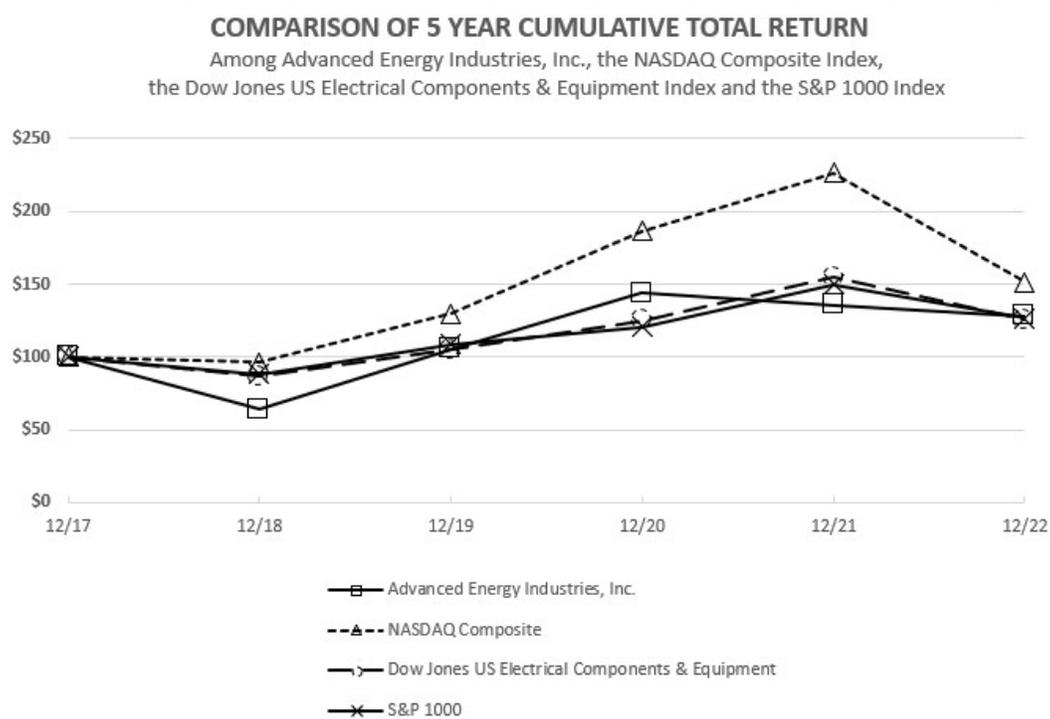
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To execute the repurchase of shares of our common stock, we periodically enter into stock repurchase agreements. The following table summarizes these repurchases during the year ended December 31, 2022:

Month	Total Number of Shares Purchased	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Dollar Value of Shares that May Yet be Purchased Under the Plans or Programs
		(in thousands, except price per share data)		
January	82	\$ 80.02	82	\$ 121,783
February	—	\$ —	—	\$ 121,783
March	—	\$ —	—	\$ 121,783
First quarter	82	\$ 80.02	82	
April	—	\$ —	—	\$ 121,783
May	103	\$ 76.23	103	\$ 113,969
June	127	\$ 72.42	127	\$ 104,765
Second quarter	230	\$ 74.12	230	
July	34	\$ 69.39	34	\$ 200,000
August	—	\$ —	—	\$ 200,000
September	—	\$ —	—	\$ 200,000
Third quarter	34	\$ 69.39	34	
October	10	\$ 69.16	10	\$ 199,320
November	—	\$ —	—	\$ 199,320
December	—	\$ —	—	\$ 199,320
Fourth quarter	10	\$ 69.16	10	
Total	356	\$ 74.90	356	\$ 199,320

Performance Graph

The performance graph below shows the five-year cumulative total stockholder return on our common stock in comparison to certain other indices during the period from December 31, 2017 through December 31, 2022. The comparison assumes \$100 invested on December 31, 2017 in Advanced Energy common stock and in each of the 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.



	December 31,					
	2017	2018	2019	2020	2021	2022
Advanced Energy Industries, Inc.	\$ 100.00	\$ 63.62	\$ 105.51	\$ 143.70	\$ 135.52	\$ 128.26
NASDAQ Composite	\$ 100.00	\$ 96.12	\$ 129.97	\$ 186.69	\$ 226.63	\$ 151.61
Dow Jones US Electrical Components & Equipment	\$ 100.00	\$ 86.48	\$ 105.18	\$ 124.75	\$ 154.36	\$ 125.51
S&P 1000	\$ 100.00	\$ 88.33	\$ 108.70	\$ 120.84	\$ 149.60	\$ 126.61

Information relating to compensation plans under which our equity securities are authorized for issuance is set forth in Part III, Item 12 “Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters” of this annual report on Form 10-K.

ITEM 6. RESERVED

Not applicable.

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 this annual report on Form 10-K for additional factors relating to such statements and see “Risk Factors” in Part I, Item 1A for a discussion of certain risks applicable to our business, financial condition, and results of operations.

The following section discusses our results of operations for 2022 and 2021 and year-to-year comparisons between those periods. Discussions of 2020 and year-to-year comparisons between 2021 and 2020 are not included in this Form 10-K and can be found within Part II, Item 7 “Management’s Discussion and Analysis for Financial Condition and Results of Operations” in our Form 10-K for the year ended December 31, 2021.

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, refine, and modify the raw electrical power coming from either the utility or the building facility and convert it into various types of highly controllable, usable power that is predictable, repeatable, and customizable to meet the necessary requirements for powering a wide range of complex equipment. Many of our products enable customers to reduce or optimize their energy consumption through increased power conversion efficiency, power density, power coupling, and process control across a wide range of applications.

Our plasma power solutions enable innovation in complex semiconductor and thin film plasma processes such as dry etch and deposition. Our broad portfolio of high and low voltage power products are used in a wide range of applications, such as semiconductor equipment, industrial production, medical and life science equipment, data centers computing, networking, and telecommunications. We also supply related sensing, controls, and instrumentation products primarily for advanced measurement and calibration of power and temperature for multiple industrial markets. Our network of global service support centers provides repair services, calibration, conversions, upgrades, refurbishments, and used equipment to companies using our products.

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 us to make judgments, assumptions, and estimates that affect the amounts reported. *Note 1. Summary of Operations and Significant Accounting Policies and Estimates* in Part II, 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.

Business Combinations

We record the assets acquired and liabilities assumed in a business combination at their acquisition date fair values. Fair values of assets acquired, and liabilities assumed are based upon available information and may involve engaging an independent third party to perform an appraisal. Estimating fair values can be complex and subject to significant business judgment. We must also identify and include in the allocation all acquired tangible and intangible assets that meet certain criteria, including assets that were not previously recorded by the acquired entity. The estimates most commonly involve intangible assets. The excess of the purchase price over the net fair value of acquired assets and assumed liabilities is recorded as goodwill, which is not amortized but instead is evaluated for impairment at least annually. Pursuant to U.S. GAAP, an entity is allowed a reasonable period of time (not to exceed one year) to obtain the information necessary to identify and measure the fair value of the assets acquired and liabilities assumed in a business combination.

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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 adjust 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 5. Income Taxes* in Part II, Item 8 “Financial Statements and Supplementary Data.”

Inventories

Inventories are valued at the lower of cost (using the first-in, first-out method) or net realizable value. General market conditions, as well as our design activities, can cause certain products to become obsolete and we adjust our inventory carrying value for estimated excess and obsolescence equal to the difference between the cost of inventory and the estimated net realizable value based on projected end-user demand, which is determined by considering historical usage, customer orders and forecast, and qualitative considerations such as market and economic conditions. The determination of projected end-user demand requires the use of estimates and assumptions related to projected unit sales for each product. 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.

Defined Benefit Pension Plans

Accounting for pension plans requires that we make assumptions that involve considerable judgment which are significant inputs in the actuarial models that measure our net pension obligations and ultimately impact our earnings. These include the discount rate, long-term expected rate of return on assets, compensation trends, inflation considerations, health care cost trends and other assumptions, as well as determining the fair value of assets in our funded plans. Specifically, the discount rates, as well as the expected rates of return on assets and plan asset fair value determination, are important assumptions used in determining the plans’ funded status and annual net periodic pension and benefit costs. We evaluate these critical assumptions at least annually on a plan and country-specific basis. We also, with the help of actuaries, periodically evaluate other assumptions involving demographic factors, such as retirement age, mortality, and turnover, and update them to reflect our experience and expectations for the future. We believe the accounting estimates related to our pension plans are critical accounting estimates because they are highly susceptible to change from period to period based on the performance of plan assets, actuarial valuations, market conditions and contracted benefit changes. While we believe that our assumptions are appropriate, significant differences in our actual experience or significant changes in our assumptions may materially affect our net pension and postretirement benefit obligations and related expenses.

Business Environment and Trends

Advanced Energy is organized on a global, functional basis and operates in the single segment for power electronics conversion products. Within this segment, our products are sold into the Semiconductor Equipment, Industrial and Medical, Data Center Computing, and Telecom and Networking markets.

In April 2022, we acquired SL Power. See *Note 2. Acquisitions* in Part II, Item 8 “Financial Statements and Supplementary Data.” This acquisition added complementary products to Advanced Energy’s medical power offerings and extends our presence in several advanced industrial markets.

The demand environment in each of our markets is impacted by various market trends, customer buying patterns, design wins, macroeconomic and other factors. During 2022, growth in all four of our markets was strong driven by investment in new technology, capacity, and macroeconomic recovery. However, we were limited in our ability to fulfill this demand due to supply chain shortages for critical integrated circuits, resulting in longer lead times for our products. These supply constraints have led to longer lead times in procuring materials and subcomponents and, in some cases, meaningfully higher costs for the subcomponents. We have implemented measures to improve the supply of critical materials and components and to mitigate the impact of these higher input costs, and these actions have enabled us to better meet customer demand. However, it is not clear how long global supply constraint conditions will continue, how quickly the supply chain will recover, the extent to which our mitigating actions will be successful, or to what extent we can recover our higher costs. One result of the supply chain constraints is that our backlog throughout the first three quarters of the year remained above backlog at the end of 2021. Backlog declined at the end of 2022 to \$875.3 million, a decrease as compared to \$1,093.0 million at the end of the third quarter of 2022, driven by approximately 40% of sequential decline from China-based semiconductor customers’ orders as a result of U.S. export controls introduced in October 2022, and the remainder from lower demand and changes in ordering patterns from our semiconductor customers as we improved our lead times. Despite the decline at the end of 2022, backlog remains high compared to previous years.

COVID related disruptions did materially impact our liquidity, ability to access capital, ability to comply with our debt covenants or the fair value of our assets in 2022.

SEMICONDUCTOR EQUIPMENT MARKET

The Semiconductor Equipment market is driven by the long-term growing need for more semiconductor production capacity and new process technologies. While the semiconductor and semiconductor equipment industries are inherently cyclical, over the long-term, integrated circuits content is growing across many industries driven by increased demand for processing, storing, and transmitting the growing amount of data. To meet the growing demand, the chip industry continues to invest in production capacity for both leading-edge and trailing-edge nodes logic devices, the latest memory devices, back-end test, and advanced wafer-level packaging. The industry’s transition to advanced technology nodes and to increased layers in memory devices require an increased number of plasma-based etch and deposition process tools and higher content of our advanced power solutions per tool. As etching and deposition processes become more challenging due to shrinking device geometry and increasing aspect ratios in advanced 3D devices, more advanced RF and DC plasma generation technologies are needed. We strive to provide a broad range of best-in-class, industry-leading RF and DC power solutions. Beyond etch and deposition processes, growing complexity at advanced nodes also drives a higher number of other process steps across the wafer fab, including inspection, metrology, thermal, ion implantation, and semiconductor test and assembly, where Advanced Energy is actively participating as a critical technology provider. In addition, our global support services group offers comprehensive local repair service, upgrade, and retrofit offerings to extend the useable life of our customers’ capital equipment for additional technology generations. Our strategy in the Semiconductor Equipment market is to defend our proprietary positions in our core applications by capturing new design and product generations, growing our market position in applications where we have lower market share, such as remote plasma source and dielectric etch, and leveraging our product portfolio in areas including embedded power, high voltage power systems, and critical sensing and controls to grow our market share and content at our original OEM customers.

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The Semiconductor Equipment market continued to experience demand growth driven by investments in both leading and trailing edge semiconductor capacity throughout the first three quarters of 2022. Advanced Energy participated in the market growth while overcoming supply chain challenges and delivered record revenue from the Semiconductor Equipment market in 2022. Starting in the fourth quarter of 2022, the market entered a cyclical downturn due to changing macroeconomic conditions, overcapacity in the market for memory devices, general semiconductor inventory digestion resulting in falling fab utilization and reduced fab expansion plans, and new export restrictions to China for certain semiconductor equipment. These factors adversely impacted our demand, backlog, and revenue in the fourth quarter of 2022 and are expected to continue in 2023. We believe long-term drivers for demand growth in this market will eventually resume, due to the need to invest in new fab capacity to support growing demand for semiconductor devices in a wide range of applications, the continued transition to next generation processing nodes, increased complexity of advanced processes requiring more complex and innovative power solutions, and the regionalization of some semiconductor capacity.

INDUSTRIAL AND MEDICAL MARKET

Advanced Energy serves the Industrial and Medical market with mission-critical power components that deliver high reliability, precise, low noise or differentiated power to the equipment they serve. Growth in the Industrial and Medical market is driven by investment in complex manufacturing processes or automation, increased adoption of smart power, sensing, and control solutions across many industrial applications, new investments in clean and sustainable technologies, and growing investment in medical devices and life science equipment. Our customers in the Industrial and Medical market are primarily global and regional original equipment manufacturers, incorporating our advanced power, embedded power, and measurement products into a wide variety of equipment used in applications, such as advanced material fabrication, medical devices, analytical instrumentation, test and measurement equipment, robotics, industrial production, and large-scale connected light-emitting diode applications. Examples of products sold into the Industrial and Medical market include high voltage and low voltage power supplies used in applications such as medical devices, scientific instrumentation and industrial equipment, power control modules and thermal instrumentation products for material fabrication, production process control and many precision industrial sensing applications. Our strategy in the Industrial and Medical market is to expand our product offerings and channel reach, leveraging common platforms, derivatives, and customizations to further penetrate a broader set of applications.

During 2022, we saw increased demand in the Industrial and Medical market as our customers increased investments in their production capacity and the medical technology industry recovered from the pandemic-related slowdown. Although overall customer demand increased, supply constraints of critical components limited our ability to fulfill product shipments at the level of customer demand and resulted in increased backlog. Going into 2023, we expect product delivery and revenue levels will depend on the level of customers' demand and on resolving supply chain constraints. It is not clear how long these supply chain constraints will persist or on what timeline our supply chain will recover.

DATA CENTER COMPUTING MARKET

Advanced Energy serves the Data Center Computing market with industry leading power conversion products and technologies, which we sell to OEMs and original design manufacturers ("ODMs") of data center server and storage systems, as well as cloud service providers and their partners. Driven by the growing adoption of cloud computing, market demand for server and storage equipment has shifted from traditional enterprise on-premises computing to the data center, driving investments in data center infrastructure. Beyond the cloud, demand for edge computing is also growing, driven by the need for faster processing, lower latency, and higher data security at edge applications. In addition, the data center industry has begun transitioning from 12 Volt to 48 Volt infrastructure in data center server racks to improve overall power efficiency. Advanced Energy benefits from these trends by being an industry leader in providing high-efficiency 48 Volt server power solutions to the data center industry. Further, the rapid growth and adoption of artificial intelligence and machine learning are driving accelerated demand for server and storage racks with increased power density and higher efficiency, which complements Advanced Energy's strengths. With a growing presence at both cloud service providers and industry-leading data center server and storage vendors, our strategy in the Data Center and Computing market is to penetrate selected customers and applications based on our differentiated capability and competitive strengths in power density, efficiency, and controls.

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Customer demand for our products rose during 2022 with continued demand for cloud and network applications. In addition, we were able to secure additional critical components compared to the prior year, allowing us to deliver higher revenue in the Data Center Computing market. Despite the improved performance, the supply of the critical components remains highly constrained, impacting our ability to fulfill product shipments at the level of customer demand. Although we expect lower overall demand in 2023 as cloud and enterprise customers slow investments to digest capacity investments, we continue to be supply constrained and our performance will be partially dependent on our ability to secure critical components and customers' timing of new programs. It is not clear how long these supply chain constraints will persist or how quickly our supply chain will recover.

TELECOM AND NETWORKING MARKET

Our customers in the Telecom and Networking market include many leading vendors of wireless infrastructure equipment, telecommunication equipment and computer networking. The wireless telecom market continues to evolve with more advanced mobile standards. 5G wireless technology promises to drive substantial growth opportunities for the telecom industry as it enables new advanced applications such as autonomous vehicles and virtual/augmented reality. Telecom service providers are investing in 5G infrastructure, and this trend is expected to drive demand for our products into the Telecom and Networking market. In datacom, demand is driven by networking investments by telecom service providers and enterprises upgrading their networks, as well as cloud service providers and data centers investing in their networks for increased bandwidth. Our strategy in the Telecom and Networking market is to optimize our portfolio of products to more differentiated applications, and to focus on 5G infrastructure applications.

Revenues in the Telecom and Networking market increased in 2022 compared to the same period in the prior year due to increased customer demand and our ability to secure additional critical components. We expect demand to remain stable in this market in 2023, but supply chain constraints continue to prevent us from fulfilling product shipments at the level of customer demand. It is not clear how long these supply shortages will persist or how quickly our supply chain will recover.

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Results of Continuing Operations

The analysis presented below is organized to provide the information we believe will be helpful for 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 Part II, Item 8 “Financial Statements and Supplementary Data” of this annual report on Form 10-K.

The following table sets forth certain data derived from our Consolidated Statements of Operations (in thousands):

	Year Ended December 31,	
	2022	2021
Sales	\$ 1,845,422	\$ 1,455,954
Gross profit	675,506	532,322
Operating expenses	442,411	380,641
Operating income from continuing operations	233,095	151,681
Other income (expense), net	8,646	(2,970)
Income from continuing operations, before income taxes	241,741	148,711
Provision for income taxes	39,850	14,004
Income from continuing operations	<u>\$ 201,891</u>	<u>\$ 134,707</u>

The following table sets forth the percentage of sales represented by certain items reflected in our Consolidated Statements of Operations:

	Year Ended December 31,	
	2022	2021
Sales	100.0 %	100.0 %
Gross profit	36.6	36.6
Operating expenses	24.0	26.1
Operating income from continuing operations	12.6	10.4
Other income (expense), net	0.5	(0.2)
Income from continuing operations, before income taxes	13.1	10.2
Provision for income taxes	2.2	1.0
Income from continuing operations	<u>10.9 %</u>	<u>9.3 %</u>

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SALES, NET

The following tables summarize net sales and percentages of sales by markets (in thousands):

	Year Ended December 31,		Change 2022 v. 2021	
	2022	2021	Dollar	Percent
Semiconductor Equipment	\$ 930,809	\$ 710,174	\$ 220,635	31.1 %
Industrial and Medical	426,763	341,176	85,587	25.1
Data Center Computing	327,466	270,924	56,542	20.9
Telecom and Networking	160,384	133,680	26,704	20.0
Total	<u>\$ 1,845,422</u>	<u>\$ 1,455,954</u>	<u>\$ 389,468</u>	<u>26.8 %</u>

	Year Ended December 31,	
	2022	2021
Semiconductor Equipment	50.5 %	48.8 %
Industrial and Medical	23.1	23.4
Data Center Computing	17.7	18.6
Telecom and Networking	8.7	9.2
Total	<u>100.0 %</u>	<u>100.0 %</u>

OPERATING EXPENSE

The following table summarizes our operating expenses (in thousands) and as a percentage of sales:

	Years Ended December 31,			
	2022		2021	
Research and development	\$ 191,020	10.4 %	\$ 161,831	11.1 %
Selling, general, and administrative	218,463	11.8	191,998	13.2
Amortization of intangible assets	26,114	1.4	22,060	1.5
Restructuring charges	6,814	0.4	4,752	0.3
Total operating expenses	<u>\$ 442,411</u>	<u>24.0 %</u>	<u>\$ 380,641</u>	<u>26.1 %</u>

SALES AND BACKLOG

Sales

Sales increased \$389.5 million, or 26.8%, to \$1,845.4 million, as compared to \$1,456.0 million in the prior year. The increase in sales was primarily due to increased demand for our products across all four of our markets and measures we took to improve material availability and capacity, which allowed us to better meet higher demand. In addition, premium recoveries, which are revenues we collected from our customers to partially reimburse us for premiums we paid to secure scarce materials, represented \$68.3 million in revenue in 2022 compared to \$14.3 million in 2021. The acquisition of SL Power contributed \$50.3 million to our total sales in 2022. For additional information, see *Note 2. Acquisitions* in Part II, Item 8 “Financial Statements and Supplementary Data.”

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Backlog

The following table summarizes our backlog (in thousands):

	December 31, 2022	December 31, 2021	Change from Year End	
			Dollar	Percent
Backlog	\$ 875,346	\$ 927,810	\$ (52,464)	(5.7)%

Backlog represents outstanding orders for products we expect to deliver within the next 12 months. Backlog at the end of 2022 decreased from the end of 2021 primarily due to the impact of the China export controls regulation announced in October 2022 by the U.S. Commerce Department, lower demand in the Semiconductor Equipment market, and changes in order patterns for our semiconductor customers as we improved lead times, which occurred in the fourth quarter of 2022. Backlog in our other markets increased for the year.

We believe the current backlog levels provide some level of revenue protection if demand levels are reduced due to macroeconomic factors. We expect to bring our backlog back into normalized levels of \$400 million to \$500 million over the next several quarters as parts availability improves and lead times are reduced.

Backlog at any particular date is not necessarily indicative of actual sales which may be generated for any succeeding period. In addition, there is uncertainty of the timing of when backlog can convert into revenue due to continuing supply constraints. Because our customers generally order on a purchase order basis, they can typically cancel, change, or delay product purchase commitments with little or no notice.

Sales by Market

Sales in the Semiconductor Equipment market increased \$220.6 million, or 31.1%, to \$930.8 million, as compared to \$710.2 million in the prior year. The increase in sales was primarily due to the growth in the Semiconductor Equipment market, particularly highlighted by the 40% increase in sales to our top two customers who are primarily in this market. In addition, we improved our ability to secure critical components and increased delivery to our customers in this market.

Sales in the Industrial and Medical market increased \$85.6 million, or 25.1%, to \$426.8 million, as compared to \$341.2 million in the prior year. The increase in sales was primarily due to the acquisition of SL Power, which added incremental sales of \$46.5 million in this market. The remainder of the increase in revenue was due to increased demand for our portfolio of products across our medical and industrial applications and improved material availability.

Sales in the Data Center Computing market increased \$56.5 million, or 20.9%, to \$327.5 million, as compared to \$270.9 million in the prior year. The increase in Data Center Computing market sales was due to better supply availability, enabling us to partially fulfill product shipments against higher customer demand.

Sales in the Telecom and Networking market increased \$26.7 million, or 20.0%, to \$160.4 million as compared to \$133.7 million in the prior year. The increase in sales was primarily due to improved material availability, allowing us to meet the increased demand.

GROSS PROFIT AND GROSS MARGIN

Gross profit dollars in 2022 increased by \$143.2 million to \$675.5 million, or 36.6% of revenue, as compared to prior year's \$532.3 million, or 36.6% of revenue, primarily driven by higher revenue.

Gross margin percentage remained flat year over year as the benefit of higher volume and favorable mix was offset primarily by higher material costs related to premiums paid to brokers for scarce parts. Premium recoveries, which represent revenue at zero gross margin, impacted gross margins by approximately 140 basis points, compared to approximately 35 basis points in the prior year. Additionally, higher material costs not recovered impacted gross margins

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by approximately 200 basis points, compared to approximately five basis points in the prior year. We expect that the amount of higher material costs and related recoveries will abate as the supply chain normalizes and scarce parts become more available from original manufacturers.

OPERATING EXPENSE

Research and Development

We perform R&D of products to develop new or emerging applications, technological advances 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 and related software 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.

R&D expenses increased \$29.2 million to \$191.0 million, as compared to \$161.8 million in the prior year. The increase in research and development expense is primarily driven by increased headcount and compensation costs of \$20.4 million, as we invest in new programs to maintain and increase our technological leadership and provide solutions to our customers' evolving needs.

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 \$26.5 million to \$218.5 million, as compared to \$192.0 million in the prior year. The increase in SG&A is primarily related to \$16.9 million from increased headcount and associated costs including sales commissions and compensation driven by higher revenue and \$6.0 million from the addition of SL Power. See *Note 2. Acquisitions* in Part II, Item 8 "Financial Statements and Supplementary Data" for additional details.

Amortization of Intangibles

Amortization expense increased \$4.1 million to \$26.1 million, as compared to \$22.1 million in the prior year. The increase was primarily driven by incremental amortization of newly acquired intangible assets from the SL Power acquisition. For additional information, see *Note 2. Acquisitions* and *Note 13. Intangible Assets* in Part II, Item 8 "Financial Statements and Supplementary Data."

Restructuring

In the fourth quarter of 2022, management approved a restructuring plan (the "2022 Plan"), which is expected to further improve our operating efficiencies and drive the realization of synergies from our business combinations by consolidating our operations, optimizing our factory footprint including moving certain production into our higher volume factories, and reducing redundancies. The majority of these actions impact our factory operations and should partially mitigate the impact of lower volumes on gross margins. We anticipate the 2022 Plan will be substantially completed, and associated expenses will be incurred by 2024.

In 2018, we committed to a restructuring plan (the "2018 Plan") to optimize our manufacturing footprint and to improve our operating efficiencies and synergies related to business combinations. We incurred severance costs primarily related to the transition and exit of our facility in Shenzhen, China and actions associated with synergies related to the acquisition of Artesyn Embedded Technologies, Inc.'s embedded power business ("Artesyn"). This plan is

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substantially complete with the closure of our Shenzhen facility expected in 2023. For additional information, see *Note 14. Restructuring Costs* in Part II, Item 8 “Financial Statements and Supplementary Data.”

Other Income (Expense), net

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), net was \$8.6 million in 2022, as compared to (\$3.0) million in the prior year. The increase in income between periods is primarily a result of higher unrealized foreign exchange gains of \$4.2 million due to the strengthening U.S. dollar compared to our other foreign currencies and a one-time gain on the sale of intellectual property from a previous acquisition. This was partially offset by higher interest expenses because of increasing interest rates.

Provision for Income Taxes

(in thousands)

	Years Ended December 31,	
	2022	2021
Income from continuing operations, before income taxes	\$ 241,741	\$ 148,711
Provision for income taxes	\$ 39,850	\$ 14,004
Effective tax rate	16.5 %	9.4 %

Our effective tax rate increased in 2022 compared to 2021, primarily driven by a change in tax law from the 2017 Tax Cuts and Jobs Act related to the capitalization of R&D expenses, as it impacts the net U.S. tax on foreign operations, that went into effect in January 2022, offset by the benefit of earnings in foreign jurisdictions which are subject to lower tax rates.

The Inflation Reduction Act (“IRA”) and CHIPS and Science Act (“CHIPS Act”) were both enacted in August 2022. The IRA introduced new provisions including a 15% corporate alternative minimum tax for certain large corporations that have at least an average of \$1 billion adjusted financial statement income over a consecutive three-tax-year period and a 1% excise tax surcharge on stock repurchases. The CHIPS Act provides a variety of incentives associated with investments in domestic semiconductor manufacturing and related activities. The IRA and the CHIPS Act are applicable for tax years beginning after December 31, 2022 and had no benefit to our consolidated financial statements for any of the periods presented, and we do not expect them to have a direct material impact on our future results of operations, financial condition, or cash flows.

Our future effective income tax rate depends on various factors, such as changes in tax laws, regulations, accounting principles, or interpretations thereof, and the geographic composition of our pre-tax income. We carefully monitor these factors and adjust our effective income tax rate accordingly.

Non-GAAP Results

Management uses non-GAAP operating income and non-GAAP earnings per share (“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.

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The non-GAAP results presented below exclude the impact of non-cash related charges, such as stock-based compensation and amortization of intangible assets. In addition, they exclude discontinued operations and other non-recurring items such as acquisition-related costs and restructuring expenses, 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 and effect of adoption of the 2017 Tax Cuts and Jobs Act.

Reconciliation of non-GAAP measure Operating expenses and operating income from continuing operations, excluding certain items (in thousands)	Years Ended December 31,	
	2022	2021
Gross profit from continuing operations, as reported	\$ 675,506	\$ 532,322
Adjustments to gross profit:		
Stock-based compensation	1,478	764
Facility expansion, relocation costs and other	5,295	6,189
Acquisition-related costs	(299)	3,585
Non-GAAP gross profit	681,980	542,860
Non-GAAP gross margin	37.0%	37.3%
Operating expenses from continuing operations, as reported	442,411	380,641
Adjustments:		
Amortization of intangible assets	(26,114)	(22,060)
Stock-based compensation	(18,371)	(14,975)
Acquisition-related costs	(8,637)	(6,803)
Facility expansion, relocation costs and other	—	(229)
Restructuring	(6,814)	(4,752)
Non-GAAP operating expenses	382,475	331,822
Non-GAAP operating income	\$ 299,505	\$ 211,038
Non-GAAP operating margin	16.2%	14.5%

Reconciliation of non-GAAP measure Income from continuing operations, excluding certain items (in thousands, except per share amounts)	Years Ended December 31,	
	2022	2021
Income from continuing operations, less non-controlling interest, net of income taxes	\$ 201,875	\$ 134,663
Adjustments:		
Amortization of intangible assets	26,114	22,060
Acquisition-related costs	8,338	10,388
Facility expansion, relocation costs, and other	5,295	6,418
Restructuring	6,814	4,752
Unrealized foreign currency gain	(7,645)	(3,543)
Acquisition-related costs and other included in other (income) expense, net	(8,417)	(2,186)
Tax effect of non-GAAP adjustments	(3,008)	(1,346)
Non-GAAP income, net of income taxes, excluding stock-based compensation	229,366	171,206
Stock-based compensation, net of taxes	15,444	12,042
Non-GAAP income, net of income taxes	\$ 244,810	\$ 183,248
Non-GAAP diluted earnings per share	\$ 6.49	\$ 4.78

Impact of Inflation

In previous years, inflation did not have a material impact on our operations. However, more recently, we have experienced inflationary pressure from price increases in select components driven by factors such as higher global demand, supply chain disruptions, higher labor expenses, and increased freight costs. In this environment, we are actively working with our customers to adjust pricing that helps offset the inflationary pressure on the cost of our components. We have also been able to recover some premiums on pricing related to securing scarce materials with our customers, thus limiting the financial impact of inflationary pressures.

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, cash generated from current operations, and available borrowing capacity under the Revolving Facility (defined below).

The following table summarizes our cash, cash equivalents, and marketable securities (in thousands):

	December 31, 2022	
Cash and cash equivalents	\$	458,818
Marketable securities		2,128
Total cash, cash equivalents, and marketable securities	\$	<u>460,946</u>

We believe the above sources of liquidity will be adequate to meet anticipated working capital needs, anticipated levels of capital expenditures, contractual obligations, debt repayment, share repurchase programs, and dividends for the next 12 months and on a long-term basis. In addition, we may, depending upon the number or size of additional acquisitions, seek additional debt or equity financing from time to time; however, such additional financing may not be available on acceptable terms, if at all.

Credit Facility

In September 2019, in connection with the acquisition of Artesyn, we entered into a credit agreement (“Credit Agreement”) that provided aggregate financing of \$500.0 million, consisting of a \$350.0 million senior unsecured term loan facility (the “Term Loan Facility”) and a \$150.0 million senior unsecured revolving facility (the “Revolving Facility” and together with the Term Loan Facility, the “Credit Facility”).

In April 2020, we executed interest rate swap contracts with independent financial institutions to partially reduce the variability of cash flows in LIBOR indexed debt interest payments on our Term Loan Facility. The interest rate swap contracts fixed a portion of the outstanding principal balance on our term loan to a total interest rate of 1.271%. For information additional information, see *Note 8. Derivative Financial Instruments* in Part II, Item 8 “Financial Statements and Supplementary Data.”

In September 2021, we amended the Credit Agreement whereby we borrowed an additional \$85.0 million, which increased the aggregate amount outstanding under the Term Loan Facility to \$400.0 million. In addition, we increased the Revolving Facility capacity by \$50.0 million to \$200.0 million. Both the Term Loan Facility and Revolving Facility mature on September 9, 2026.

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The following table summarizes borrowings under our Credit Facility and the associated interest rate (in thousands, except for interest rates).

	December 31, 2022		
	Balance	Interest Rate	Unused Line Fee
Term Loan Facility subject to a fixed interest rate due to interest rate swap	\$ 238,219	1.271%	—
Term Loan Facility subject to a variable interest rate	136,781	5.134%	—
Revolving Facility subject to a variable interest rate	—	5.134%	0.10%
Total borrowings under the Credit Agreement	<u>\$ 375,000</u>		

As of December 31, 2022, we had \$200.0 million in available funding under the Revolving Facility. The Term Loan Facility requires quarterly repayments of \$5.0 million plus accrued interest, with the remaining balance due in September 2026.

In addition to the available capacity on the Revolving Facility, prior to the maturity date of our Credit Agreement, we may also request an increase to the financing commitments in either the Term Loan Facility or Revolving Facility by an aggregate amount not to exceed \$250.0 million at identical terms to our existing Credit Facility.

For additional information on our Credit Facility, see *Note 21. Credit Facility* in Part II, Item 8 “Financial Statements and Supplementary Data.”

Dividends

In March 2021, the Board of Directors (the “Board”) declared the first quarterly cash dividend since our inception as a public company. During 2022, we paid quarterly cash dividends of \$0.10 per share, totaling \$15.2 million for the full year. We currently anticipate that a cash dividend of \$0.10 per share will continue to be paid on a quarterly basis, although the declaration of any future cash dividend is at the discretion of the Board and will depend on our financial condition, results of operations, capital requirements, business conditions, and other factors.

Share Repurchases

To execute the repurchase of shares of our common stock, we periodically enter into stock repurchase agreements. The following table summarizes these repurchases:

(in thousands, except per share amounts)	Years Ended December 31,		
	2022	2021	2020
Amount paid or accrued to repurchase shares	\$ 26,635	\$ 78,125	\$ 11,630
Number of shares repurchased	356	901	244
Average repurchase price per share	\$ 74.90	\$ 86.76	\$ 47.75

In July 2022, the Board of Directors approved an increase to the share repurchase plan that increased the remaining amount authorized for future repurchases to a maximum of \$200.0 million with no time limitation. At December 31, 2022, the remaining amount authorized by the Board of Directors for future share repurchases was \$199.3 million.

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Cash Flows

A summary of our cash from operating, investing, and financing activities was as follows (in thousands):

	Years Ended December 31,	
	2022	2021
Net cash from operating activities from continuing operations	\$ 183,731	\$ 140,914
Net cash from operating activities from discontinued operations	(144)	(669)
Net cash from operating activities	183,587	140,245
Net cash from investing activities	(208,272)	(47,302)
Net cash from financing activities	(61,865)	(25,372)
Effect of currency translation on cash and cash equivalents	996	(3,567)
Net change in cash and cash equivalents	(85,554)	64,004
Cash and cash equivalents, beginning of period	544,372	480,368
Cash and cash equivalents, end of period	\$ 458,818	\$ 544,372

Net Cash From Operating Activities

Net cash from operating activities from continuing operations was \$183.7 million, an increase of \$42.8 million, compared to \$140.9 million in the prior year. The increase is primarily due to an increase in net income. This was partially offset by an unfavorable increase in net operating assets driven primarily by an increase in accounts receivable due to our strong revenue growth.

Net Cash From Investing Activities

Net cash from investing activities in 2022 was (\$208.3) million, driven by the following:

- (\$58.9) million in purchases of property and equipment as we invested in our manufacturing footprint and capacity; and
- (\$149.4) million for business combinations.

Net cash from investing activities in 2021 was (\$47.3) million, and primarily related to investment in facilities and capacity.

Net Cash From Financing Activities

Net cash from financing activities in 2022 was (\$61.9) million and included:

- (\$15.2) million for dividend payments;
- (\$20.0) million for repayment of long-term debt; and
- (\$26.6) million related to repurchases of our common stock.

The net cash from financing activities in 2021 was (\$25.4) million and included:

- \$83.7 million in proceeds from borrowings, net of debt-issuance costs paid;
- (\$15.4) million for dividend payments;
- (\$13.8) million for repayment of long-term debt;

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- (\$78.1) million related to repurchases of our common stock; and
- (\$1.8) million related to stock-based award activities.

Off-Balance Sheet Arrangements

As of December 31, 2022, we did not have any off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of Regulation S-K.

Contractual Obligations

In the normal course of business, we enter into contracts and commitments that obligate us to make payments in the future. Information regarding our obligations relating to income taxes, lease obligations, pension liabilities, and debt are provided in *Note 5. Income Taxes*, *Note 16. Leases*, *Note 17. Employee Retirement Plans and Postretirement Benefits*, and *Note 21. Credit Facility*, respectively, in Part II, 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. Summary of Operations and Significant Accounting Policies and Estimates* in Part II, 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 and Credit Facility. We also have exposure to foreign exchange rate risk related to our foreign operations and foreign currency transactions.

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.

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 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 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.

The functional currencies of our worldwide facilities primarily include the United States Dollar (USD), Euro, South Korean Won, New Taiwan Dollar, Japanese Yen, Pound Sterling, Chinese Yuan, and Mexican Peso. Our purchasing and sales activities are primarily denominated in the USD, Japanese Yen, Euro, and Chinese Yuan.

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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.

As currencies fluctuate against each other we are exposed to foreign currency exchange rate risk on sales, purchasing transactions, and labor. Exchange rate fluctuations could require us to increase prices to foreign customers, which could result in lower net sales. 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. Changes in the relative buying power of our customers may impact sales volumes.

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 may be denominated in foreign currency. Changes in exchange rates therefore may have a material impact on their valuation in USD and 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.

Interest Rate Risk

Our market risk exposure relates primarily to changes in interest rates on our Credit Facility. The following table summarizes borrowings (in thousands) under our Credit Facility and the associated interest rate.

	December 31, 2022		
	Balance	Interest Rate	Unused Line Fee
Term Loan Facility subject to a fixed interest rate	\$ 238,219	1.271%	—
Term Loan Facility subject to a variable interest rate	136,781	5.134%	—
Revolving Facility subject to a variable interest rate	—	5.134%	0.10%
Total borrowings under the Credit Agreement	<u>\$ 375,000</u>		

For more information on the Term Loan Facility see *Note 21. Credit Facility* in Part II, Item 8 “Financial Statements and Supplementary Data.” For more information on the interest rate swap that fixes the interest rate for a portion of our Term Loan Facility, see *Note 8. Derivative Financial Instruments* in Part II, Item 8 “Financial Statements and Supplementary Data.” The Term Loan Facility and Revolving Facility bear interest, at our option, at a rate based on a reserve adjusted “Eurodollar Rate” or “Base Rate,” as defined in the Credit Agreement, plus an applicable margin.

Our interest payments are impacted by interest rate fluctuations. With respect to the portion of our Credit Facility that is subject a variable interest rate, a hypothetical increase of 100 basis points (1%) in interest rates would have a \$1.4 million annual impact on our interest expense. A change in interest rates does not have a material impact upon our future earnings and cash flow for fixed rate debt. However, increases in interest rates could impact our ability to refinance existing maturities and acquire additional debt on favorable terms.

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ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Advanced Energy Industries, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Advanced Energy Industries, Inc. (the Company) as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2022, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

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, 2022, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 17, 2023 expressed an unqualified opinion thereon.

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 regarding 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.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of the critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

<i>Description of the Matter</i>	<p><i>Inventory Valuation</i></p> <p>As more fully described in Notes 1 and 10 to the consolidated financial statements, the Company has inventories with a carrying value of \$376.0 million as of December 31, 2022. The Company adjusts its inventory carrying value for estimated excess or obsolescence equal to the difference between the cost of inventory and the estimated net realizable value based on projected end-user demand, which is determined by considering historical usage, customer orders and forecast, and qualitative considerations such as market and economic conditions.</p> <p>Auditing management’s inventory valuation was complex and involved a high degree of judgment because a critical factor in determining excess and obsolete inventory requires management to determine projected end-user demand, which could be impacted by future market and economic conditions.</p>
<i>How We Addressed the Matter in Our Audit</i>	<p>We obtained an understanding, evaluated the design and tested the operating effectiveness of internal controls related to the Company’s process for evaluating inventory valuation inclusive of controls related to the development of and management’s review of the underlying data, including historical usage and the estimation of projected end-user demand.</p> <p>We evaluated certain inventories for excess or obsolescence by testing key inputs, including historical usage and projected end-user demand, and by testing the completeness and accuracy of the underlying data supporting management’s inventory valuation assessment. Specifically, we compared the Company’s projected end-user demand to historical sales and inventory usage. We assessed historical trends of management’s estimates and performed analyses to evaluate management’s excess and obsolete inventory estimates and underlying assumptions. We also performed a retrospective review of the prior year valuation assumptions, including inventory write-off history.</p>

/s/ Ernst & Young LLP

We have served as the Company’s auditor since 2019.

Denver, Colorado
February 17, 2023

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Advanced Energy Industries, Inc.

Opinion on Internal Control Over Financial Reporting

We have audited Advanced Energy Industries, Inc.'s internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Advanced Energy Industries, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on the COSO criteria.

As indicated in the accompanying Management's Annual Report on Internal Control over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of SL Power Electronics, which is included in the 2022 consolidated financial statements of the Company and constituted 2% and 3% of total and net assets, respectively, as of December 31, 2022 and 3% and 3% of revenues and net income, respectively, for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of SL Power Electronics.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2022 and 2021, the related consolidated statements of operations, comprehensive income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2022, and the related notes and our report dated February 17, 2023 expressed an unqualified opinion thereon.

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 Control over Financial Reporting. 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.

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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/ Ernst & Young LLP

Denver, Colorado
February 17, 2023

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

	December 31, 2022	December 31, 2021
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 458,818	\$ 544,372
Accounts and other receivable, net	300,683	237,227
Inventories	376,012	338,410
Other current assets	53,001	42,225
Total current assets	1,188,514	1,162,234
Property and equipment, net	148,462	114,830
Operating lease right-of-use assets	100,177	101,769
Other assets	84,056	66,911
Intangible assets, net	189,526	159,406
Goodwill	281,433	212,190
TOTAL ASSETS	\$ 1,992,168	\$ 1,817,340
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 170,467	\$ 193,708
Accrued payroll and employee benefits	82,733	55,833
Other accrued expenses	76,750	62,671
Customer deposits and other	26,322	22,141
Current portion of long-term debt	20,000	20,000
Current portion of operating lease liabilities	16,771	15,843
Total current liabilities	393,043	370,196
Long-term debt, net	353,262	372,733
Operating lease liabilities	94,460	95,180
Pension benefits	44,031	67,255
Other long-term liabilities	41,105	40,480
Total liabilities	925,901	945,844
Commitments and contingencies (Note 19)		
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; 37,429 and 37,589 issued and outstanding at December 31, 2022 and December 31, 2021, respectively	37	38
Additional paid-in capital	134,640	115,706
Accumulated other comprehensive income (loss)	16,320	(1,216)
Retained earnings	915,270	756,323
Advanced Energy Industries, Inc. stockholders' equity	1,066,267	870,851
Noncontrolling interest	—	645
Total stockholders' equity	1,066,267	871,496
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	\$ 1,992,168	\$ 1,817,340

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,		
	2022	2021	2020
Sales, net	\$ 1,845,422	\$ 1,455,954	\$ 1,415,826
Cost of sales	1,169,916	923,632	873,957
Gross profit	675,506	532,322	541,869
Operating expenses:			
Research and development	191,020	161,831	143,961
Selling, general, and administrative	218,463	191,998	188,590
Amortization of intangible assets	26,114	22,060	20,129
Restructuring	6,814	4,752	13,166
Total operating expenses	442,411	380,641	365,846
Operating income	233,095	151,681	176,023
Other income (expense), net	8,646	(2,970)	(17,876)
Income from continuing operations, before income taxes	241,741	148,711	158,147
Provision for income taxes	39,850	14,004	22,996
Income from continuing operations	201,891	134,707	135,151
Income (loss) from discontinued operations, net of income taxes	(2,215)	73	(421)
Net income	\$ 199,676	\$ 134,780	\$ 134,730
Income from continuing operations attributable to noncontrolling interest	16	44	55
Net income attributable to Advanced Energy Industries, Inc.	\$ 199,660	\$ 134,736	\$ 134,675
Basic weighted-average common shares outstanding	37,463	38,143	38,314
Diluted weighted-average common shares outstanding	37,721	38,355	38,542
Earnings per share:			
Continuing operations:			
Basic earnings per share	\$ 5.39	\$ 3.53	\$ 3.53
Diluted earnings per share	\$ 5.35	\$ 3.51	\$ 3.51
Discontinued operations:			
Basic earnings (loss) per share	\$ (0.06)	\$ —	\$ (0.01)
Diluted earnings (loss) per share	\$ (0.06)	\$ —	\$ (0.01)
Net income:			
Basic earnings per share	\$ 5.33	\$ 3.53	\$ 3.52
Diluted earnings per share	\$ 5.29	\$ 3.51	\$ 3.50

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

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

	Years Ended December 31,		
	2022	2021	2020
Net income	\$ 199,676	\$ 134,780	\$ 134,730
Other comprehensive income (loss), net of income taxes			
Foreign currency translation	(10,543)	(12,262)	13,095
Change in fair value of cash flow hedges	9,741	4,246	(2,139)
Minimum pension benefit retirement liability	18,338	9,405	(7,664)
Comprehensive income	<u>217,212</u>	<u>136,169</u>	<u>138,022</u>
Comprehensive income attributable to noncontrolling interest	16	44	55
Comprehensive income attributable to Advanced Energy Industries, Inc.	<u>\$ 217,196</u>	<u>\$ 136,125</u>	<u>\$ 137,967</u>

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

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

Advanced Energy Industries, Inc. Stockholders' Equity							
Common Stock			Accumulated Other Comprehensive Income (Loss)		Retained Earnings	Non-controlling Interest	Total Stockholders' Equity
	Shares	Amount	Additional Paid-in Capital	Income (Loss)	Earnings	Interest	Equity
Balances, December 31, 2019	38,358	\$ 38	\$ 104,849	\$ (5,897)	\$ 577,724	\$ 546	\$ 677,260
Adoption of new accounting standards	—	—	—	—	(102)	—	(102)
Stock issued from equity plans	179	—	(482)	—	—	—	(482)
Stock-based compensation	—	—	12,272	—	—	—	12,272
Share repurchases	(244)	—	(11,630)	—	—	—	(11,630)
Other comprehensive income	—	—	—	3,292	—	—	3,292
Net income	—	—	—	—	134,675	55	134,730
Balances, December 31, 2020	38,293	38	105,009	(2,605)	712,297	601	815,340
Stock issued from equity plans	197	—	(1,931)	—	—	—	(1,931)
Stock-based compensation	—	—	15,428	—	—	—	15,428
Share repurchases	(901)	—	(2,800)	—	(75,325)	—	(78,125)
Dividends declared (\$0.10 per share)	—	—	—	—	(15,385)	—	(15,385)
Other comprehensive income	—	—	—	1,389	—	—	1,389
Net income	—	—	—	—	134,736	44	134,780
Balances, December 31, 2021	37,589	38	115,706	(1,216)	756,323	645	871,496
Stock issued from equity plans	196	—	(26)	—	—	—	(26)
Stock-based compensation	—	—	19,624	—	—	—	19,624
Share repurchases	(356)	(1)	(1,125)	—	(25,509)	—	(26,635)
Dividends declared (\$0.10 per share)	—	—	—	—	(15,204)	—	(15,204)
Other comprehensive income	—	—	—	17,536	—	—	17,536
Acquisition of non-controlling interest	—	—	461	—	—	(661)	(200)
Net income	—	—	—	—	199,660	16	199,676
Balances, December 31, 2022	37,429	\$ 37	\$ 134,640	\$ 16,320	\$ 915,270	\$ —	\$ 1,066,267

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,		
	2022	2021	2020
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net income	\$ 199,676	\$ 134,780	\$ 134,730
Less: income (loss) from discontinued operations, net of income taxes	(2,215)	73	(421)
Income from continuing operations, net of income taxes	201,891	134,707	135,151
Adjustments to reconcile net income to net cash from operating activities:			
Depreciation and amortization	60,296	52,893	47,770
Stock-based compensation expense	19,849	15,739	12,272
Provision for deferred income taxes	(5,736)	1,326	(622)
(Gain) loss from discount on notes receivable	—	(638)	721
(Gain) loss on disposal and sale of assets	(3,962)	1,496	1,296
Changes in operating assets and liabilities, net of assets acquired			
Accounts and other receivable, net	(59,630)	5,271	15,412
Inventories	(32,244)	(115,737)	11,658
Other assets	(19,673)	(2,910)	1,750
Accounts payable	(28,703)	67,111	(48,163)
Other liabilities and accrued expenses	51,643	(18,344)	24,914
Net cash from operating activities from continuing operations	183,731	140,914	202,159
Net cash from operating activities from discontinued operations	(144)	(669)	(923)
Net cash from operating activities	183,587	140,245	201,236
CASH FLOWS FROM INVESTING ACTIVITIES:			
Receipt (issuance) of notes receivable	—	3,050	(1,000)
Purchases of property and equipment	(58,885)	(28,817)	(36,364)
Acquisitions, net of cash acquired	(149,387)	(21,535)	(5,476)
Net cash from investing activities	(208,272)	(47,302)	(42,840)
CASH FLOWS FROM FINANCING ACTIVITIES:			
Proceeds from long-term borrowings	—	85,000	—
Payment of debt-issuance costs	—	(1,350)	—
Payments on long-term borrowings	(20,000)	(13,750)	(17,500)
Dividend payments	(15,204)	(15,385)	—
Purchase and retirement of common stock	(26,635)	(78,125)	(11,630)
Net payments related to stock-based awards	(26)	(1,762)	(482)
Net cash from financing activities	(61,865)	(25,372)	(29,612)
EFFECT OF CURRENCY TRANSLATION ON CASH AND CASH EQUIVALENTS	996	(3,567)	5,143
NET CHANGE IN CASH AND CASH EQUIVALENTS	(85,554)	64,004	133,927
CASH AND CASH EQUIVALENTS, beginning of period	544,372	480,368	346,441
CASH AND CASH EQUIVALENTS, end of period	<u>\$ 458,818</u>	<u>\$ 544,372</u>	<u>\$ 480,368</u>
SUPPLEMENTAL DISCLOSURE OF CASH FLOW INFORMATION:			
Cash paid for interest	\$ 6,608	\$ 4,040	\$ 5,278
Cash paid for income taxes	\$ 17,546	\$ 32,543	\$ 21,032

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 amounts)

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

Advanced Energy Industries, Inc., a Delaware corporation, and its consolidated subsidiaries (“we,” “us,” “our,” “Advanced Energy,” or the “Company”) design, manufacture, sell, and support precision power products that transform, refine, and modify the raw electrical power coming from either the utility or the building facility and convert it into various types of highly controllable, usable power that is predictable, repeatable, and customizable to meet the necessary requirements for powering a wide range of complex equipment.

Our plasma power solutions enable innovation in complex semiconductor and thin film plasma processes such as dry etch and deposition. Our broad portfolio of high and low voltage power products are used in a wide range of applications, such as semiconductor equipment, industrial production, medical and life science equipment, data centers computing, networking, and telecommunications. We also supply related sensing, controls, and instrumentation products primarily for advanced measurement and calibration of power and temperature for multiple industrial markets. Our network of global service support centers provides repair services, calibration, conversions, upgrades, refurbishments, and used equipment to companies using our products.

As of December 31, 2015, we discontinued our engineering, production, and sales of our inverter product line. As such, all inverter product revenues, costs, assets, and liabilities are reported in Discontinued Operations for all periods presented herein. See *Note 4. Discontinued Operations* for more information. Ongoing inverter repair and service operations are reported as part of our continuing operations.

Principles of Consolidation — Our consolidated financial statements include the Company and its subsidiaries. All intercompany accounts and transactions have been eliminated. Our consolidated financial statements are stated in United States (“U.S.”) Dollars and have been prepared in accordance with accounting principles generally accepted in the United States (“U.S. GAAP”). We reclassified certain prior period amounts to conform to the current year presentation.

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, the disclosure of contingent liabilities at the date of the financial statements, and the reported amounts of revenue and expenses during the reporting period. The significant estimates, assumptions, and judgments include, but are not limited to:

- excess and obsolete inventory;
- pension obligations;
- acquisitions and asset valuations, and
- income taxes and other provisions.

Segment Information — Our Chief Executive Officer is the chief operating decision maker who reviews financial information on a consolidated basis for purposes of allocating resources and evaluating financial performance. Accordingly, we determined we operate in a single reporting segment.

Foreign Currency Translation — The functional currency of certain of our foreign subsidiaries is the local currency. Assets and liabilities of these foreign subsidiaries are translated to the United States Dollar at prevailing exchange rates on the balance sheet date. Revenues and expenses are translated at the average exchange rates in effect for each period. Translation adjustments resulting from this process are reported as a separate component of other comprehensive income.

For certain other subsidiaries, the functional currency is the U.S. Dollar. Foreign currency transactions are recorded based on exchange rates at the time such transactions arise. Subsequent changes in exchange rates for foreign

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

currency denominated monetary assets and liabilities result in foreign currency transaction gains and losses, which are reflected as unrealized (based on period end remeasurement) or realized (upon settlement of the transactions) in other income (expense), net in our Consolidated Statements of Operations.

Derivatives — We use derivative financial instruments to manage risks associated with foreign currency and interest rate fluctuations. Unless we meet specific hedge accounting criteria, changes in the fair value of derivative financial instruments are recognized in the Consolidated Statements of Operations within other income (expense), net.

For derivatives designated as cash flow hedges, changes in fair value are recorded to accumulated other comprehensive income (loss) on the Consolidated Balance Sheets and are reclassified into earnings when the underlying forecasted transaction affects earnings. We reassess the probability of the underlying forecasted transactions occurring on a quarterly basis.

Fair Value — We value our financial assets and liabilities using fair value measurements.

U.S. GAAP for fair value establishes a hierarchy that prioritizes fair value measurements based on the types of inputs used for the various valuation techniques (market approach, income approach, and cost approach). Our financial assets and liabilities are measured using inputs from the three levels of the fair value hierarchy. The three levels of the hierarchy and the related inputs are as follows:

- Level 1 — Quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access on the measurement date.
- Level 2 — Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.
- Level 3 — Unobservable inputs for the asset or liability.

We categorize fair value measurements within the fair value hierarchy based upon the lowest level of the most significant inputs used to determine fair value. Our assessment of the significance of a particular input to the fair value measurement requires judgment and may affect the valuation of the fair value of assets and liabilities and their placement within the fair value hierarchy levels.

We have various assets and liabilities measured at fair value on a recurring basis, including:

Foreign currency forward contracts

We estimate the fair value based on the movement in the forward rates of foreign currency cash flows in which the hedging instrument is denominated.

Interest rate swaps

We determine the fair value by estimating the net present value of the expected cash flows based on market rates and the associated yield curves, adjusted for non-performance credit risk, as applicable.

Contingent consideration associated with business combinations

We determine the fair value by estimating the net present value of the expected cash flows based on the probability of expected payment.

The carrying amounts of our cash and cash equivalents, accounts receivable, accounts payable and other current assets and liabilities approximate fair value as recorded due to the short-term nature of these instruments.

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

Our non-financial assets, which primarily consist of property and equipment, operating lease right-of-use assets, goodwill, and other intangible assets, are not required to be carried at fair value on a recurring basis and are reported at carrying value. However, on a periodic basis or whenever events or changes in circumstances indicate that their carrying value may not be fully recoverable (and at least annually for goodwill), non-financial instruments are assessed for impairment and, if applicable, written down to and recorded at fair value. See *Note 12. Goodwill* and *Note 13. Intangible Assets* for further discussion and presentation of these amounts.

The fair value of borrowings approximates the recorded borrowing value based upon market interest rates for similar facilities. See *Note 21. Credit Facility* for additional information. The fair value of contingent consideration and other acquired assets and liabilities associated with our acquisitions are based on Level 3 inputs.

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

In some instances, we invest excess cash in money market funds not insured by the Federal Deposit Insurance Corporation. We believe the investments in money market funds are on deposit with credit-worthy financial institutions and the funds are highly liquid. These investments are reported at fair value and included in cash and cash equivalents. We record interest income within other income (expense), net in our Consolidated Statement of Operations.

We classify investments with stated maturities of greater than three months at time of purchase as marketable securities.

Concentrations of Credit Risk — Financial instruments with potential 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.

We establish a reserve for credit losses based upon factors surrounding the credit risk of specific customers, historical trends, and other information.

Accounts Receivable and Reserve for Credit Losses — Accounts receivable are recorded at net realizable value. We maintain a credit approval process and we make judgments in connection with assessing our customers' ability to pay. 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. We do not require collateral from customers. Our principal customers are original equipment manufacturers ("OEM") and end user customers, which operate globally through wholly owned subsidiaries that purchase our products under substantially the same credit terms, with similar historical credit risks. As a result, we assess credit risks as a single group. We evaluate collection risk and establish expected credit loss primarily through a combination of the following: an assessment of customer credit risk ratings utilizing third party credit risk data, analysis of historical aging and credit loss experience, and customer specific information.

Inventories — Inventories are valued at the lower of cost (using the first-in, first-out method) or net realizable value. General market conditions, as well as our design activities, can cause certain products to become obsolete and we adjust our inventory carrying value for estimated excess and obsolescence equal to the difference between the cost of inventory and the estimated net realizable value based on projected end-user demand, which is determined by considering historical usage, customer orders and forecast, and qualitative considerations such as market and economic conditions. The determination of projected end-user demand requires the use of estimates and assumptions related to

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

projected unit sales for each product. 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.

Property and Equipment — Property and equipment are 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. 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 (expense), net, in our Consolidated Statements of Operations.

Business Combinations — Business combinations are accounted for using the purchase method of accounting. Under the purchase method, assets and liabilities, including intangible assets, are recorded at their fair values as of the acquisition date. Acquisition costs in excess of amounts assigned to assets acquired and liabilities assumed are recorded as goodwill. Transaction related costs associated with business combinations are expensed as incurred.

Leases — We lease manufacturing and office space under non-cancelable operating leases. Some of these leases contain provisions for landlord funded leasehold improvements, which we record as a reduction to right-of-use (“ROU”) assets and the related operating lease liabilities. Our lease agreements generally contain lease and non-lease components, and we combine fixed payments for non-lease components with lease payments and account for them together as a single lease component. Certain lease agreements may contain variable payments, which are expensed as incurred and not included in the right-of-use lease assets and operating lease liabilities. When renewal options are reasonably certain of exercise, we include the renewal period in the lease term. In many cases, we have leases with a term of less than one year. We elected the practical expedient to exclude these short-term leases from our ROU assets and operating lease liabilities. On an ongoing basis, we negotiate and execute new leases to meet business objectives.

Right-of-use assets and operating lease liabilities are recognized at the present value of the future lease payments on the lease commencement date. The interest rate used to determine the present value of the future lease payments is our incremental borrowing rate because the interest rate implicit in our leases is not readily determinable. Our incremental borrowing rate is estimated to approximate the interest rate on a collateralized basis with similar terms and payments. We have a centrally managed treasury function; therefore, we apply a portfolio approach for determining the incremental borrowing rate applicable to the lease term. Operating lease expense is recognized on a straight-line basis over the lease term.

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 judgments regarding future periods that are subject to some factors outside of our control. Changes in these estimates can result in revisions to our carrying value of these assets and may result in material charges to our results of operations.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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We conduct an annual goodwill impairment analysis 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.

Debt Issuance Costs — We incurred debt issuance costs in connection with our debt facilities. Amounts paid directly to lenders are classified as issuance costs. Commitment fees and other costs directly associated with obtaining credit facilities are classified as deferred financing costs, which are recorded in the Consolidated Balance Sheets and amortized over the term of the debt facility. We allocated deferred debt issuance costs incurred for the current credit facility between the revolver and term loan based on their relative borrowing capacity. Deferred debt issuance costs associated with the revolving credit facility are recorded within other assets and those associated with the term loan are recorded as a reduction of the carrying value of the debt on the Consolidated Balance Sheets. We amortize the majority of deferred debt issuance costs to interest expense using the effective interest rate method. Deferred debt issuance costs on the line of credit are amortized on the straight-line basis over the life of the debt agreement. Amortization of debt issuance costs is reflected in other income (expense), net on the Consolidated Statements of Operations. See *Note 21. Credit Facility* for additional details.

Revenue Recognition — Net sales consist of revenue from the sale of products and support services.

We recognize substantially all revenue at a point in time when we satisfy our performance obligations. Typically, this occurs on shipment of goods because, at that point, we transfer control to our customer. The transaction price is based upon the standalone selling price. In most transactions, we have no obligations to our customers after the date products are shipped, other than pursuant to warranty obligations. Revenue is recognized net of any taxes collected from customers, which are subsequently remitted to governmental authorities. Surcharges, cost recoveries, and shipping and handling fees billed to customers, if any, are recognized as revenue. The related cost for shipping and handling fees is recognized in cost of sales. We expense the incremental costs of obtaining contracts when the amortization period of the costs is less than one year. These costs are included in selling, general, and administrative expenses in our Consolidated Statements of Operations. Payment terms for customers' extended credit are typically net 30 days.

Support services include warranty and non-warranty repair services, upgrades, and refurbishments on the products we sell. Repairs covered under our standard warranty do not generate revenue. We recognize substantially all non-warranty revenue upon completion of service because that is the point in time when we satisfy our performance obligation.

As part of our ongoing service business, we satisfy our service obligations under preventative maintenance contracts and extended warranties, which had previously been offered on our discontinued inverter products. Any up-front fees received for extended warranties or maintenance plans are deferred. Revenue under these arrangements is recognized ratably over the underlying terms as we do not have historical information that would allow us to project the estimated service usage pattern at this time.

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

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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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 4. Discontinued Operations* for more information. See *Note 15. 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, considering 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.

Stock-Based Compensation — Accounting for stock-based compensation requires the measurement and recognition of compensation expense for all stock-based awards made to employees and directors based on estimated fair value at the grant date. We utilize the Black-Scholes Merton option pricing model to estimate the fair value of stock options and Employee Stock Purchase Plan (“ESPP”) purchase rights. This model requires various estimates and assumptions, including:

Fair value of the common stock

We use the market closing price of our common stock, as reported on the NASDAQ Exchange.

Expected term

The expected term is based on historical experience and represents the period we expect the stock option or ESPP purchase right to be outstanding.

Expected volatility

We derive the expected volatility from the historical volatility of our common stock over a period equivalent to the expected term.

Risk-free interest rate

We obtain the risk-free interest rate from the U.S. Treasury yield curve in effect at the time of grant for zero coupon U.S. Treasury notes with maturities approximately equal to the expected term of the stock-based award.

Expected dividend

The expected dividend is based on the assumption that future dividend payments will follow recent historical practice.

We estimate the fair value of restricted stock units (“RSUs”) on the grant date. For RSUs that contain a time-based and/or performance-based vesting condition, we estimate fair value using the closing share price on the grant date.

We record stock-based compensation expense for awards with time-based vesting conditions on a straight-line basis over the requisite service period. For awards with a performance-based vesting condition, we record stock-based compensation expense (based on management’s assessment of the probability of meeting the performance conditions) over the estimated period to achieve the performance conditions. Upon forfeiture or expiration of these awards, we reverse the stock-based compensation expense.

Certain RSUs vest based on a market condition. We estimate the fair value and probability of achievement for each tranche of these awards using a Monte Carlo simulation. Because the probability of achievement is a factor in the Monte Carlo simulation, we recognize stock-based compensation expense over each tranche’s estimated achievement period even if some or all of the shares never vest.

For all stock awards, we estimate forfeitures at the grant date and revise those estimates in subsequent periods if actual forfeitures differ from our estimates.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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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 carryforwards. 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 several 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.

Under U.S. GAAP, an accounting policy election can be made to either recognize deferred taxes for temporary basis differences expected to reverse as global intangible low-tax income (“GILTI”) in future years, or to provide for the tax expense related to GILTI in the year that the tax is incurred as a period expense only. We have elected to account for GILTI in the year that the tax is incurred.

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, will not have a material impact on the consolidated financial statements upon adoption.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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New Accounting Standards Adopted

In October 2021, the FASB issued ASU 2021-08, “Business Combinations (Topic 806) Accounting for Contract Assets and Contract Liabilities from Contracts with Customers.” The amendments in ASU 2021-08 address diversity and inconsistency related to the recognition and measurement of contract assets and contract liabilities acquired in a business combination. ASU 2021-08 requires an acquirer to recognize and measure contract assets and contract liabilities acquired in a business combination in accordance with ASC 606, Revenue from Contracts with Customers.

We adopted ASU 2021-08 on a prospective basis effective January 1, 2022. The adoption will impact business combinations subsequent to that date and require recognition and measurement of acquired contract assets and liabilities in accordance with ASC 606. Specifically, we will account for the related revenue contracts of the acquiree as if we originated the contracts. Adoption of ASU 2021-08 did not impact acquired contract assets or liabilities from prior business combinations.

New Accounting Standards Issued But Not Yet Adopted

The FASB issued the following ASUs:

Issuance Date	ASU	Title
March 2020	2020-04	Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting
January 2021	2021-01	Reference Rate Reform (Topic 848): Scope
December 2022	2022-06	Reference Rate Reform (Topic 848): Deferral of the Sunset Date of Topic 848

This collective guidance provides optional expedients and exceptions for applying U.S. GAAP to contract modifications and hedging relationships, subject to meeting certain criteria that reference LIBOR or another reference rate that is expected to be discontinued. The above accounting standards will be in effect through December 31, 2024.

Our Credit Facility (refer to *Note 21. Credit Facility*) and interest rate swap agreements (refer to *Note 8. Derivative Financial Instruments*) reference the one-month USD LIBOR rate. Both agreements contain provisions for transition to a new reference rate upon discontinuance of LIBOR. We expect the one-month USD LIBOR rate to be available through June 2023. We are currently assessing the potential timing of transitioning to a replacement interest rate benchmark for our Credit Facility (refer to *Note 21. Credit Facility*) and do not expect the above guidance to materially impact our consolidated financial statements.

NOTE 2. ACQUISITIONS

SL Power Electronics Corporation

On April 25, 2022, we acquired 100% of the issued and outstanding shares of capital stock of SL Power Electronics Corporation (“SL Power”), which is based in Calabasas, California. We accounted for this transaction as a business combination. This acquisition added complementary products to Advanced Energy’s medical power offerings and extends our presence in several advanced industrial markets.

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

The components of the fair value of the total consideration transferred were as follows:

Cash paid for acquisition	\$ 145,616
Less cash acquired	(3,484)
Total fair value of purchase consideration	\$ 142,132

We allocated the purchase consideration to the assets acquired and liabilities assumed based on their estimated fair values as of the acquisition date, with the excess allocated to goodwill.

	Fair Value
Current assets and liabilities, net	\$ 11,990
Property and equipment	4,191
Operating lease right-of-use assets	4,640
Deferred taxes and other liabilities	(2,335)
Intangible assets	57,600
Goodwill	70,686
Operating lease liability	(4,640)
Total fair value of net assets acquired	\$ 142,132

The following table summarizes the intangible assets acquired:

	Fair Value	Amortization Method	Useful Life (in years)
Customer relationships	\$ 50,500	Straight-line	10
Technology	7,100	Straight-line	5
Total	\$ 57,600		

To estimate the fair value of intangible assets, we used a multi-period excess earnings approach for the customer relationships and a relief from royalty approach for developed technology. Goodwill represents SL Power’s assembled workforce and the expected operating synergies from combining operations. We expect approximately 85% of goodwill to be deductible for tax purposes. We are still evaluating the fair value for the assets acquired and liabilities assumed. Accordingly, the purchase price allocation presented above is preliminary.

We included SL Power’s results of operations in our consolidated financial statements from the date of acquisition. The following table summarizes SL Power’s contribution to sales in our Consolidated Statements of Operations.

	Year Ended December 31,	
	2022	
Sales, net	\$	50,321

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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TEGAM, Inc.

On June 1, 2021, we acquired 100% of the issued and outstanding shares of capital stock of TEGAM, Inc., which is based in Geneva, Ohio. We accounted for this transaction as a business combination. This acquisition added metrology and calibration instrumentation to Advanced Energy's RF process power solutions in our Semiconductor and Industrial and Medical markets.

The components of the fair value of the total consideration transferred were as follows:

Cash paid at closing	\$ 15,430
Cash paid for indemnity holdback released in June 2022	1,800
Less cash acquired	(177)
Total fair value of purchase consideration	<u>\$ 17,053</u>

We allocated the purchase consideration to the assets acquired and liabilities assumed based on their estimated fair values as of the acquisition date, with the excess allocated to goodwill.

	Fair Value
Current assets and liabilities, net	\$ 3,475
Property and equipment	755
Operating lease right-of-use assets	425
Intangible assets	6,900
Goodwill (deductible for tax purposes)	5,917
Other	6
Operating lease liability	(425)
Total fair value of net assets acquired	<u>\$ 17,053</u>

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

	<u>Fair Value</u>	<u>Amortization Method</u>	<u>Useful Life (in years)</u>
Technology	\$ 1,100	Straight-line	5
Customer relationships	5,500	Straight-line	15
Tradename	300	Straight-line	5
Total	<u>\$ 6,900</u>		

Goodwill represents TEGAM's assembled workforce and the expected operating synergies from combining operations. We included TEGAM's results of operations in our consolidated financial statements from the date of acquisition.

Intangible Assets Acquired

In January 2021, we acquired certain intangible assets related to the manufacturing of fiber optic sensing equipment for a total purchase price of \$6.5 million in cash. These intangible assets have an estimated useful life of five years. See *Note 13. Intangible Assets* for additional details.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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NOTE 3. REVENUE

Disaggregation of Revenue

The following tables presents additional information regarding our revenue:

Revenue by Market

	Years Ended December 31,		
	2022	2021	2020
Semiconductor Equipment	\$ 930,809	\$ 710,174	\$ 611,864
Industrial and Medical	426,763	341,176	313,646
Data Center Computing	327,466	270,924	322,539
Telecom and Networking	160,384	133,680	167,777
Total	\$ 1,845,422	\$ 1,455,954	\$ 1,415,826

Revenue by Region

	Years Ended December 31,					
	2022		2021		2020	
North America	\$ 857,490	46.5 %	\$ 665,479	45.7 %	\$ 687,821	48.6 %
Asia	754,997	40.9	597,830	41.1	606,893	42.9
Europe	219,119	11.9	179,056	12.3	117,989	8.3
Other	13,816	0.7	13,589	0.9	3,123	0.2
Total	\$ 1,845,422	100.0 %	\$ 1,455,954	100.0 %	\$ 1,415,826	100.0 %

Revenue by Significant Countries

	Years Ended December 31,					
	2022		2021		2020	
United States	\$ 723,564	39.2 %	\$ 561,312	38.5 %	\$ 530,965	37.5 %
China	180,355	9.8	188,708	13.0	173,554	12.3
Mexico	131,573	7.1	102,199	7.0	150,896	10.7
All others	809,930	43.9	603,735	41.5	560,411	39.6
Total	\$ 1,845,422	100.0 %	\$ 1,455,954	100.0 %	\$ 1,415,826	100.0 %

We attribute sales to individual countries and regions based on the customer's ship to location. Apart from the United States, no revenue attributable to any individual country exceeded 10% of our total consolidated revenues in 2022.

Revenue by Category

	Years Ended December 31,		
	2022	2021	2020
Product	\$ 1,686,053	\$ 1,318,213	\$ 1,296,867
Services	159,369	137,741	118,959
Total	\$ 1,845,422	\$ 1,455,954	\$ 1,415,826

Remaining Performance Obligations

Our remaining performance obligations primarily relate to customer purchase orders for products we have not yet shipped. We expect to fulfill the majority of these performance obligations within one year.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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NOTE 4. DISCONTINUED OPERATIONS

In December 2015, we completed the wind down of engineering, manufacturing, and sales of our solar inverter product line. Accordingly, the results of our inverter business are reflected as income (loss) from discontinued operations, net of income taxes on our Consolidated Statements of Operations.

We defer revenue associated with sales of extended inverter warranties and include them within customer deposits and other 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. We no longer offer extended warranties related to the inverter product line.

NOTE 5. INCOME TAXES

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

	Years Ended December 31,		
	2022	2021	2020
Domestic	\$ 5,969	\$ 24,541	\$ 17,526
Foreign	235,772	124,170	140,621
Income from continuing operations, before income taxes	<u>\$ 241,741</u>	<u>\$ 148,711</u>	<u>\$ 158,147</u>

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

	Years Ended December 31,		
	2022	2021	2020
Current:			
Federal	\$ 23,370	\$ (2,468)	\$ 5,475
State	1,949	929	1,927
Foreign	20,267	14,217	16,216
Total current provision	<u>45,586</u>	<u>12,678</u>	<u>23,618</u>
Deferred:			
Federal	(6,742)	762	(312)
State	(1,030)	(200)	1,270
Foreign	2,036	764	(1,580)
Total deferred provision (benefit)	<u>(5,736)</u>	<u>1,326</u>	<u>(622)</u>
Total provision for income taxes	<u>\$ 39,850</u>	<u>\$ 14,004</u>	<u>\$ 22,996</u>

Our effective tax rate increased in 2022 compared to 2021, primarily driven by a change in tax law from the 2017 Tax Cuts and Jobs Act related to the capitalization of R&D expenses, as it impacts the net U.S. tax on foreign operations, that went into effect in January 2022, offset by the benefit of earnings in foreign jurisdictions which are subject to lower tax rates.

Our effective tax rate decreased in 2021 compared to 2020, primarily driven by one-time tax benefits due to reductions in uncertain tax positions and increased tax credits.

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The principal causes of the difference between the federal statutory rate and the effective income tax rate for each of the years below are as follows:

	Years Ended December 31,		
	2022	2021	2020
Income taxes per federal statutory rate	\$ 50,766	\$ 31,229	\$ 33,211
State income taxes, net of federal deduction	510	534	2,793
U.S. tax on foreign operations	28,726	5,786	9,666
Foreign derived intangible income deduction	(6,259)	(3,927)	(4,070)
Tax effect of foreign operations	(28,432)	(11,520)	(20,527)
Uncertain tax positions	1,080	(6,899)	(3,215)
Audit settlements	34	7,764	—
Unremitted earnings	—	261	(567)
Tax credits	(5,857)	(6,149)	(2,292)
Change in valuation allowance	—	(73)	(1,175)
Withholding taxes	413	756	4,265
Executive compensation limitation	641	1,926	1,070
Other permanent items, net	(1,772)	(5,684)	3,837
Total provision for income taxes	<u>\$ 39,850</u>	<u>\$ 14,004</u>	<u>\$ 22,996</u>

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:

	December 31, 2022	December 31, 2021
Deferred tax assets		
Net operating loss and tax credit carryforwards	\$ 47,733	\$ 54,210
Interest expense limitation	7,282	7,344
Pension obligation	7,301	10,778
Employee bonuses and commissions	9,276	3,861
Depreciation and amortization	25,879	26,358
Operating lease liabilities	10,136	19,405
Other	17,102	20,288
Deferred tax assets	<u>124,709</u>	<u>142,244</u>
Less: Valuation allowance	(36,046)	(42,051)
Net deferred tax assets	<u>88,663</u>	<u>100,193</u>
Deferred tax liabilities		
Depreciation and amortization	35,678	37,515
Unremitted earnings	4,115	4,435
Operating lease right-of-use assets	8,392	17,558
Other	1,801	3,364
Deferred tax liabilities	<u>49,986</u>	<u>62,872</u>
Net deferred tax assets	<u>\$ 38,677</u>	<u>\$ 37,321</u>

Of the \$38.7 million and \$37.3 million net deferred tax asset on December 31, 2022 and 2021, respectively, \$48.1 million and \$47.2 million, respectively, are included as a net non-current deferred tax asset within other assets on the Consolidated Balance Sheets. \$9.4 million and \$9.9 million, respectively, are included as a net non-current deferred tax liability within other long-term liabilities on the Consolidated Balance Sheets.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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As of December 31, 2022, we have recorded a valuation allowance on \$2.9 million of our U.S. domestic deferred tax assets, largely attributable to state carryforward attributes that are expected to expire before sufficient income can be realized in those jurisdictions. The remaining valuation allowance on deferred tax assets approximates \$33.1 million and is associated primarily with operations in Germany, Hong Kong, and Switzerland. As of December 31, 2022, there is not sufficient positive evidence to conclude that such deferred tax assets, presently reduced by a valuation allowance, will be recognized. The December 31, 2022 valuation allowance balance reflects a decrease of \$6.0 million during the year. The change in the valuation allowance is primarily due to decreases from foreign exchange movements and current year activity.

As of December 31, 2022, we had U.S., foreign and state tax loss carryforwards of \$45.2 million, \$120.1 million, and \$106.5 million, respectively. Additionally, we had \$0.7 million and \$30.5 million of capital loss and interest expense limitation carryforwards, respectively. Finally, we had U.S. and state tax credit carryforwards of \$0.9 million and \$1.9 million, respectively. The U.S. and state net operating losses, tax credits, and interest expense limitation are subject to various utilization limitations under Section 382 of the Internal Revenue Code and applicable state laws. These Section 382 limited attributes have various expiration periods through 2036 or, in the case of the interest expense limitation amount, no expiration period. Much of the foreign loss carryforwards, and \$8.0 million of the federal net operating loss carry forwards, have no expiration period.

We operate under a tax holiday in Singapore and China. These tax holidays are in effect through June 30, 2027 and December 31, 2022, respectively. The tax holiday is conditional upon our meeting certain employment and investment thresholds. The impact of the tax holidays decreased foreign taxes by \$19.4 million and \$13.3 million for 2022 and 2021, respectively. The benefit of the tax holiday on earnings per diluted share was \$0.52 and \$0.35 for 2022 and 2021, respectively.

As of December 31, 2022, we have undistributed earnings in certain foreign subsidiaries of approximately \$33.3 million that we have indefinitely invested, and on which we have not recognized deferred taxes. Estimating the amount of potential tax is not practicable because of the complexity and variety of assumptions necessary to compute the tax.

We account for uncertain tax positions by applying a minimum recognition threshold to tax positions before recognizing these positions in the consolidated financial statements. The following table provides a reconciliation of our total gross unrecognized tax benefits, which we include within other long-term liabilities on the Consolidated Balance Sheets:

	Years Ended December 31,		
	2022	2021	2020
Balance at beginning of period	\$ 5,513	\$ 9,673	\$ 13,009
Additions based on tax positions taken during a prior period	245	963	219
Additions based on tax positions taken during a prior period - acquisitions	1,025	—	—
Additions based on tax positions taken during the current period	836	566	—
Reductions based on tax positions taken during a prior period	—	—	—
Reductions related to a lapse of applicable statute of limitations	(152)	(4,575)	(3,555)
Reductions related to a settlement with taxing authorities	—	(1,114)	—
Balance at end of period	<u>\$ 7,467</u>	<u>\$ 5,513</u>	<u>\$ 9,673</u>

The unrecognized tax benefits of \$7.5 million, if recognized, will impact our 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 \$0.6 million and \$0.4 million of accrued interest and penalties on December 31, 2022

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(in thousands, except per share amounts)

and 2021, respectively. With few exceptions, we are no longer subject to federal, state, or foreign income tax examinations by tax authorities for years before 2019.

The Inflation Reduction Act (“IRA”) and CHIPS and Science Act (“CHIPS Act”) were both enacted in August 2022. The IRA introduced new provisions including a 15% corporate alternative minimum tax for certain large corporations that have at least an average of \$1 billion adjusted financial statement income over a consecutive three-tax-year period and a 1% excise tax surcharge on stock repurchases. The CHIPS Act provides a variety of incentives associated with investments in domestic semiconductor manufacturing and related activities. The IRA and the CHIPS Act are applicable for tax years beginning after December 31, 2022 and had no benefit to our consolidated financial statements for any of the periods presented, and we do not expect them to have a direct material impact on our future results of operations, financial condition, or cash flows.

NOTE 6. EARNINGS PER SHARE

We compute basic earnings per share (“EPS”) by dividing income available to common stockholders by the weighted-average number of common shares outstanding during the period. The diluted EPS computation is similar to basic EPS except we increase the denominator 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 (when such conversion is dilutive).

The following table summarizes our earnings per share:

	Years Ended December 31,		
	2022	2021	2020
Income from continuing operations	\$ 201,891	\$ 134,707	\$ 135,151
Less: income from continuing operations attributable to noncontrolling interest	16	44	55
Income from continuing operations attributable to Advanced Energy Industries, Inc.	<u>\$ 201,875</u>	<u>\$ 134,663</u>	<u>\$ 135,096</u>
Basic weighted-average common shares outstanding	37,463	38,143	38,314
Assumed exercise of dilutive stock options and restricted stock units	258	212	228
Diluted weighted-average common shares outstanding	<u>37,721</u>	<u>38,355</u>	<u>38,542</u>
Continuing operations:			
Basic earnings per share	\$ 5.39	\$ 3.53	\$ 3.53
Diluted earnings per share	\$ 5.35	\$ 3.51	\$ 3.51

Share Repurchases

To execute the repurchase of shares of our common stock, we periodically enter into stock repurchase agreements. The following table summarizes these repurchases:

	Years Ended December 31,		
	2022	2021	2020
(in thousands, except per share amounts)			
Amount paid or accrued to repurchase shares	\$ 26,635	\$ 78,125	\$ 11,630
Number of shares repurchased	356	901	244
Average repurchase price per share	\$ 74.90	\$ 86.76	\$ 47.75

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

There were no shares repurchased from related parties. Repurchased shares were retired and assumed the status of authorized and unissued shares.

In July 2022, the Board of Directors approved an increase to the share repurchase plan that increased the remaining amount authorized for future repurchases to a maximum of \$200.0 million with no time limitation. At December 31, 2022, the remaining amount authorized by the Board of Directors for future share repurchases was \$199.3 million.

NOTE 7. FAIR VALUE MEASUREMENTS

The following tables present information about our assets and liabilities measured at fair value on a recurring basis.

Description	Balance Sheet Classification	December 31, 2022			Total Fair Value
		Level 1	Level 2	Level 3	
Assets:					
Certificates of deposit	Other current assets	\$ —	\$ 2,128	\$ —	\$ 2,128
Interest rate swaps	Other assets	—	15,310	—	15,310
Total assets measured at fair value on a recurring basis		<u>\$ —</u>	<u>\$ 17,438</u>	<u>\$ —</u>	<u>\$ 17,438</u>
December 31, 2021					
Description	Balance Sheet Classification	Level 1	Level 2	Level 3	Total Fair Value
Assets:					
Certificates of deposit	Other current assets	\$ —	\$ 2,296	\$ —	\$ 2,296
Interest rate swaps	Other assets	—	2,739	—	2,739
Total assets measured at fair value on a recurring basis		<u>\$ —</u>	<u>\$ 5,035</u>	<u>\$ —</u>	<u>\$ 5,035</u>
Liabilities:					
Contingent consideration	Other current liabilities	\$ —	\$ —	\$ 1,738	\$ 1,738
Total liabilities measured at fair value on a recurring basis		<u>\$ —</u>	<u>\$ —</u>	<u>\$ 1,738</u>	<u>\$ 1,738</u>

For all periods presented, there were no transfers into or out of Level 3.

NOTE 8. DERIVATIVE FINANCIAL INSTRUMENTS

Changes in foreign currency exchange rates impact us. We may manage these risks through the use of derivative financial instruments, primarily forward contracts with banks. These forward contracts manage the exchange rate risk associated with assets and liabilities denominated in nonfunctional currencies. Typically, we execute these derivative instruments for one-month periods and do not designate them as hedges; however, they do partially offset the economic fluctuations of certain of our assets and liabilities due to foreign exchange rate changes.

Gains and losses related to foreign currency exchange contracts were offset by corresponding gains and losses on the revaluation of the underlying assets and liabilities. Both are included as a component of other income (expense),

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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net in our Consolidated Statements of Operations. As of December 31, 2022 and 2021, there were no foreign currency forward contracts outstanding.

In April 2020, we executed interest rate swap contracts with independent financial institutions to partially reduce the variability of cash flows in LIBOR indexed debt interest payments on our Term Loan Facility (under our existing Credit Agreement dated September 10, 2019, as amended). These transactions are accounted for as cash flow hedging instruments.

The interest rate swap contracts fixed a portion of the outstanding principal balance on our term loan to a total interest rate of 1.271%. This is comprised of an 0.521% average fixed rate per annum in exchange for a variable interest rate based on one-month USD-LIBOR-BBA plus the credit spread in our existing Credit Agreement (see *Note 21. Credit Facility*), which is 75 basis points at current leverage ratios.

The following table summarizes the notional amount of our qualified hedging instruments:

	December 31, 2022	December 31, 2021
Interest rate swap contracts	\$ 238,219	\$ 255,719

The following table summarizes the amounts recorded in accumulated other comprehensive income (loss) on the Consolidated Balance Sheets for qualifying hedges.

	December 31, 2022	December 31, 2021
Interest rate swap contract gains	\$ 11,779	\$ 2,107

See *Note 7. Fair Value Measurements* for information regarding the fair value of derivative instruments.

As a result of using derivative financial instruments, we are exposed to the risk that counterparties to contracts could fail to meet their contractual obligations. We manage this credit risk by reviewing counterparty creditworthiness on a regular basis and limiting exposure to any single counterparty.

NOTE 9. ACCOUNTS AND OTHER RECEIVABLE, NET

We record accounts and other receivable at net realizable value. Components of accounts and other receivable, net of reserves, were as follows:

	December 31, 2022	December 31, 2021
Amounts billed, net	\$ 283,617	\$ 217,549
Unbilled receivables	17,066	19,678
Total receivables, net	\$ 300,683	\$ 237,227

“Amounts billed, net” represents amounts invoiced to customers in accordance with our terms and conditions. These receivables are short term in nature and do not include any financing components.

“Unbilled receivables” consist of amounts where we satisfied our contractual obligations associated with customer inventory stocking agreements. Such amounts typically become billable upon the customer’s consumption of the inventory. We anticipate invoicing and collecting substantially all unbilled receivables within the next 12 months.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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The following table summarizes the changes in expected credit losses related to receivables:

	December 31, 2022	December 31, 2021
Balance at beginning of period	\$ 5,784	\$ 7,602
Additions	441	135
Deductions - write-offs, net of recoveries	(4,381)	(687)
Foreign currency translation	(30)	(18)
Other	—	(1,248)
Balance at end of period	<u>\$ 1,814</u>	<u>\$ 5,784</u>

NOTE 10. INVENTORIES

We value inventories at the lower of cost or net realizable value and computed on a first-in, first-out basis. Components of inventories were as follows:

	December 31, 2022	December 31, 2021
Parts and raw materials	\$ 286,955	\$ 261,365
Work in process	23,002	24,222
Finished goods	66,055	52,823
Total	<u>\$ 376,012</u>	<u>\$ 338,410</u>

NOTE 11. PROPERTY AND EQUIPMENT, NET

Property and equipment, net is comprised of the following:

	Estimated Useful Life (in years)	December 31, 2022	December 31, 2021
Buildings, machinery, and equipment	5 to 25	\$ 165,673	\$ 134,635
Computer equipment, furniture, fixtures, and vehicles	3 to 5	36,281	33,490
Leasehold improvements	2 to 10	63,103	48,370
Construction in process		18,226	5,914
		<u>283,283</u>	<u>222,409</u>
Less: Accumulated depreciation		(134,821)	(107,579)
Property and equipment, net		<u>\$ 148,462</u>	<u>\$ 114,830</u>

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

The following table summarizes property and equipment by geographic area:

	<u>December 31,</u>	
	<u>2022</u>	<u>2021</u>
United States	\$ 43,963	\$ 22,860
Asia	98,684	87,283
Europe and other	5,815	4,687
Total	<u>\$ 148,462</u>	<u>\$ 114,830</u>

The following table summarizes depreciation expense. All depreciation expense is recorded in income from continuing operations.

	<u>Years Ended December 31,</u>		
	<u>2022</u>	<u>2021</u>	<u>2020</u>
Depreciation expense	\$ 34,182	\$ 30,833	\$ 27,641

NOTE 12. GOODWILL

The following table summarizes the changes in goodwill:

	<u>December 31,</u>	<u>December 31,</u>
	<u>2022</u>	<u>2021</u>
Balance at beginning of period	\$ 212,190	\$ 209,983
Measurement period adjustments	40	(1,426)
Additions from acquisition	70,686	5,877
Foreign currency translation	(1,483)	(2,244)
Balance at end of period	<u>\$ 281,433</u>	<u>\$ 212,190</u>

Additions and adjustments are the result of business combinations. Refer to *Note 2. Acquisitions*.

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

NOTE 13. INTANGIBLE ASSETS

Intangible assets consisted of the following:

	December 31, 2022		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Technology	\$ 97,237	\$ (47,196)	\$ 50,041
Customer relationships	167,631	(44,774)	122,857
Trademarks and other	27,036	(10,408)	16,628
Total	\$ 291,904	\$ (102,378)	\$ 189,526

	December 31, 2021		
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Technology	\$ 91,461	\$ (35,854)	\$ 55,607
Customer relationships	118,706	(34,187)	84,519
Trademarks and other	27,244	(7,964)	19,280
Total	\$ 237,411	\$ (78,005)	\$ 159,406

At December 31, 2022, the weighted average remaining useful life of intangibles subject to amortization was 9.1 years.

Amortization expense related to intangible assets was as follows:

	Years Ended December 31,		
	2022	2021	2020
Amortization expense	\$ 26,114	\$ 22,060	\$ 20,129

Estimated amortization expense related to intangibles is as follows:

Year Ending December 31,	
2023	\$ 28,242
2024	25,175
2025	20,976
2026	19,260
2027	17,357
Thereafter	78,516
Total	\$ 189,526

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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NOTE 14. RESTRUCTURING COSTS

In the fourth quarter of 2022, management approved a restructuring plan (the “2022 Plan”), which is expected to further improve our operating efficiencies and drive the realization of synergies from business combinations by consolidating our operations, optimizing our factory footprint including moving certain production into our higher volume factories, and reducing redundancies. We anticipate the 2022 Plan will be substantially completed, and associated expenses will be incurred by 2024.

In 2018, we committed to a restructuring plan (the “2018 Plan”) to optimize our manufacturing footprint and to improve our operating efficiencies and synergies related to business combinations. We incurred severance costs primarily related to the transition and exit of our facility in Shenzhen, China and actions associated with synergies related to the acquisition of Artesyn Embedded Technologies, Inc.’s embedded power business (“Artesyn”). This plan is substantially complete with the final closure of our Shenzhen facility expected in early 2023. The table below summarizes the charges related to our restructuring plans:

	Years Ended December 31,		
	2022	2021	2020
Severance and related charges	\$ 6,469	\$ 3,467	\$ 9,632
Facility relocation and closure charges	345	1,285	3,534
Total restructuring charges	\$ 6,814	\$ 4,752	\$ 13,166

	2022 Plan		Cumulative Cost Through December 31, 2022
	2022 Plan	2018 Plan	2022
Severance and related charges	\$ 5,788	\$ 21,061	\$ 26,849
Facility relocation and closure charges	—	7,160	7,160
Total restructuring charges	\$ 5,788	\$ 28,221	\$ 34,009

Our restructuring liabilities are included in other accrued expenses in our Consolidated Balance Sheets. Changes in restructuring liabilities were as follows:

	2022 Plan	2018 Plan	Total
December 31, 2020	\$ —	\$ 10,641	\$ 10,641
Costs incurred and charged to expense	—	4,752	4,752
Costs paid or otherwise settled	—	(6,127)	(6,127)
Foreign currency translation	—	(3)	(3)
December 31, 2021	\$ —	\$ 9,263	\$ 9,263
Costs incurred and charged to expense	5,788	1,026	6,814
Costs paid or otherwise settled	—	(8,751)	(8,751)
Foreign currency translation	—	(116)	(116)
December 31, 2022	\$ 5,788	\$ 1,422	\$ 7,210

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

NOTE 15. WARRANTIES

Our sales agreements include customary product warranty provisions, which generally range from 12 to 24 months after shipment. We record the estimated warranty obligations cost when we recognize revenue. This estimate is based on historical experience by product and configuration.

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

	Years Ended December 31,	
	2022	2021
Balance at beginning of period	\$ 3,350	\$ 4,780
Additions from acquisitions	181	—
Increases to accruals	5,620	3,165
Warranty expenditures	(3,408)	(4,587)
Effect of changes in exchange rates	(41)	(8)
Balance at end of period	<u>\$ 5,702</u>	<u>\$ 3,350</u>

NOTE 16. LEASES

Components of operating lease cost were as follows:

	Years Ended December 31,		
	2022	2021	2020
Operating lease cost	\$ 22,626	\$ 23,443	\$ 22,920
Short-term and variable lease cost	4,838	2,555	1,895
Total operating lease cost	<u>\$ 27,464</u>	<u>\$ 25,998</u>	<u>\$ 24,815</u>

Maturities of our operating lease liabilities are as follows:

Year Ending December 31,	
2023	\$ 21,476
2024	19,019
2025	15,508
2026	13,458
2027	11,857
Thereafter	57,760
Total lease payments	<u>139,078</u>
Less: Interest	(27,847)
Present value of lease liabilities	<u>\$ 111,231</u>

The following tables present additional information about our lease agreements:

	December 31, 2022	December 31, 2021
Weighted average remaining lease term (in years)	8.9	9.8
Weighted average discount rate	4.6 %	4.5 %

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

	Year Ended December 31,		
	2022	2021	2020
Cash paid for operating leases	\$ 22,287	\$ 23,668	\$ 21,877
Right-of-use assets obtained in exchange for operating lease liabilities	\$ 17,022	\$ 16,399	\$ 33,741

NOTE 17. EMPLOYEE RETIREMENT PLANS AND POSTRETIREMENT BENEFITS

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 permitted by law. Participants are immediately vested in both their own contributions and profit-sharing contributions. Profit-sharing contributions, which are discretionary, are approved by the Board of Directors. For the year ended December 31, 2022 we based our profit-sharing contribution on matching 100% of employee contributions up to 3% of compensation plus an additional match of 50% on the next 2% of compensation. For the years ended December 31, 2021 and 2020 we based our profit-sharing contribution on matching 50% of employee contributions up to 6% of the employee's compensation.

During the years ended December 31, 2022, 2021, and 2020 we recognized total defined contribution plan costs of \$4.5 million, \$3.1 million, and \$2.6 million, respectively.

Defined Benefit Plans

We maintain defined benefit pension plans for certain of our non-U.S. employees in the United Kingdom, Germany, and Philippines. Each plan is managed locally and in accordance with respective local laws and regulations.

To measure the expense and related benefit obligation, we make various assumptions, including discount rates used to value the obligation, expected return on plan assets used to fund these expenses, and estimated future inflation rates. We base these assumptions on historical experience as well as current facts and circumstances. We use an actuarial analysis to measure the expense and liability associated with pension benefits.

The information provided below includes one pension plan which is part of discontinued operations. As such, for all periods presented, all related expenses are reported in discontinued operations in the Consolidated Statements of Operations.

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

Our projected benefit obligation and plan assets for defined benefit pension plans and the related assumptions used to determine the related liabilities are as follows:

	Years Ended December 31,	
	2022	2021
Projected benefit obligation, beginning of year	\$ 85,776	\$ 97,740
Service cost	1,133	1,282
Interest cost	1,819	1,452
Actuarial gain	(23,677)	(8,682)
Benefits paid	(1,502)	(2,010)
Translation adjustment	(7,029)	(4,006)
Projected benefit obligation, end of year	<u>56,520</u>	<u>85,776</u>
Fair value of plan assets, beginning of year	\$ 18,521	\$ 17,293
Expected return	535	641
Contributions	1,430	1,775
Benefits paid	(1,124)	(1,112)
Actuarial gain (loss)	(5,060)	71
Translation adjustment	(1,813)	(147)
Fair value of plan assets, end of year	<u>12,489</u>	<u>18,521</u>
Funded status of plan	<u>\$ (44,031)</u>	<u>\$ (67,255)</u>

The components of net periodic pension benefit cost recognized in our Consolidated Statements of Operations for the periods presented are as follows:

	Years Ended December 31,		
	2022	2021	2020
Service cost	\$ 1,133	\$ 1,282	\$ 1,068
Interest cost	1,819	1,452	1,716
Expected return on plan assets	(535)	(642)	(683)
Amortization of actuarial gains and losses	322	820	459
Net periodic pension cost	<u>\$ 2,739</u>	<u>\$ 2,912</u>	<u>\$ 2,560</u>

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

	Years Ended December 31,		
	2022	2021	2020
Discount rate	2.6 %	1.6 %	1.8 %
Expected long-term return on plan assets	3.2 %	3.2 %	3.7 %

The fair value of our qualified pension plan assets by category was as follows:

	December 31, 2022			
	Level 1	Level 2	Level 3	Total
Diversified Growth Fund	\$ —	\$ 9,100	\$ —	\$ 9,100
Corporate Bonds	—	2,333	—	2,333
Insurance Contracts	—	—	798	798
Cash	258	—	—	258
Total	<u>\$ 258</u>	<u>\$ 11,433</u>	<u>\$ 798</u>	<u>\$ 12,489</u>

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

	December 31, 2021			Total
	Level 1	Level 2	Level 3	
Diversified Growth Fund	\$ —	\$ 12,249	\$ —	\$ 12,249
Corporate Bonds	—	4,640	—	4,640
Insurance Contracts	—	—	984	984
Cash	648	—	—	648
Total	\$ 648	\$ 16,889	\$ 984	\$ 18,521

The diversified growth fund aims to generate an “equity-like” return over an economic cycle with significantly reduced volatility relative to equity markets and has the 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). These investments are intended to provide a degree of protection against changes in the value of our plan’s liabilities related to changes in long-term expectations for interest rates and inflation.

Expected future payments during the next ten years for our defined benefit pension plans are as follows:

Year Ending December 31,	
2023	\$ 1,755
2024	2,771
2025	2,274
2026	4,698
2027	3,421
2028 to 2032	20,085

NOTE 18. STOCK-BASED COMPENSATION

The Board of Directors Compensation Committee administers our stock plans. As of December 31, 2022, we had two active stock-based incentive compensation plans: the 2017 Omnibus Incentive Plan (“the 2017 Plan”) and the ESPP. We issue all new equity compensation grants 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.

On May 4, 2017, the stockholders approved the 2017 Plan, and all shares that were then available for issuance under the 2008 Omnibus Incentive Plan (“the 2008 Plan”) are now available for issuance under the 2017 Plan. 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. Any of the awards issued may be issued as performance-based awards to align stock compensation awards to the attainment of annual or long-term performance goals.

The following table summarizes information related to our stock-based incentive compensation plans:

	December 31, 2022
Shares available for future issuance under the 2017 Omnibus Incentive Plan	1,475
Shares available for future issuance under the Employee Stock Purchase Plan	619

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

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 was as follows:

	<u>Years Ended December 31,</u>		
	<u>2022</u>	<u>2021</u>	<u>2020</u>
Stock-based compensation expense	\$ 19,849	\$ 15,739	\$ 12,272

Estimated forfeiture rates for our stock-based compensation expense applicable to stock options and RSUs were approximately 9%, 8% and 5% for the years ended December 31, 2022, 2021 and 2020, respectively.

Restricted Stock Units

Generally, we grant RSUs with a three-year time-based vesting schedule. Certain RSUs contain performance-based or market-based vesting conditions in addition to the time-based vesting requirements. RSUs are generally granted with a grant date fair value based on the market price of our stock on the date of grant.

Changes in our unvested RSUs were as follows:

	<u>Year Ended December 31, 2022</u>	
	<u>Number of RSUs</u>	<u>Weighted- Average Grant Date Fair Value</u>
RSUs outstanding at beginning of period	627	\$ 76.37
RSUs granted	593	\$ 74.62
RSUs vested	(162)	\$ 83.16
RSUs forfeited	(255)	\$ 61.39
RSUs outstanding at end of period	<u>803</u>	<u>\$ 78.46</u>

The total intrinsic value of RSUs converted to shares for the years ended December 31, 2022, 2021 and 2020 was \$13.6 million, \$19.2 million, and \$9.2 million, respectively. As of December 31, 2022, there was \$35.3 million of total unrecognized compensation cost, net of expected forfeitures, related to non-vested RSUs, that we expect to recognize through December 2025, with a weighted-average remaining vesting period of 1.3 years.

Stock Options

Generally, we grant stock option awards 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. Stock option awards generally have a term of ten years.

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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Changes in our stock options were as follows:

	Year Ended December 31, 2022		Weighted-Average Remaining Contractual Life
	Number of Options	Weighted-Average Exercise Price per Share	
Options outstanding at beginning of period	112	\$ 24.41	
Options granted	76	\$ 85.97	
Options exercised	(37)	\$ 23.26	
Options outstanding at end of period	151	\$ 55.48	5.63 years
Options vested at end of period	75	\$ 24.97	2.04 years

The total intrinsic value of options exercised for the years ended December 31, 2022, 2021 and 2020 was \$2.6 million, \$2.6 million, and \$1.9 million, respectively. Options outstanding on December 31, 2022 have aggregate intrinsic value of \$4.6 million. As of December 31, 2022, there was \$1.8 million of total unrecognized compensation cost, net of expected forfeitures, related to the unvested options that we expect to recognize over a remaining period of 2.2 years.

Employee Stock Purchase Plan

The ESPP, a stockholder-approved plan, provides for the issuance of rights to purchase up to 1.5 million shares of common stock. Most employees are eligible to participate in the ESPP if employed 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.

As of December 31, 2022, there was \$0.5 million of total unrecognized compensation cost related to the ESPP that we expect to recognize over a remaining period of five months.

Estimating Fair Value

We estimated the fair value of each stock option and ESPP purchase right on the grant date using the Black-Scholes-Merton option pricing model with the following assumptions:

Stock Options	Year Ended December 31, 2022
Risk-free interest rate	2.18 %
Expected dividend yield rate	0.5 %
Expected term	4.7 years
Expected volatility	48.6 %
Weighted average grant date fair value of options granted	\$ 35.84

ESPP	Years Ended December 31,		
	2022	2021	2020
Risk-free interest rates	1.63% - 4.65% %	0.04% - 0.10 %	0.10% - 0.18% %
Expected dividend yield rate	0.1 %	— %	— %
Expected term	0.5 years	0.5 years	0.5 years
Expected volatility	43.7 %	42.7 %	70.1 %

ADVANCED ENERGY INDUSTRIES, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS – (continued)
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NOTE 19. COMMITMENTS AND CONTINGENCIES

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 intellectual property 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 intellectual property 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. We are not currently a party to any legal action that we believe would reasonably have a material adverse impact on our business, financial condition, results of operations or cash flows.

NOTE 20. SIGNIFICANT CUSTOMER INFORMATION

During the year ended December 31, 2022, Applied Materials, Inc. and Lam Research Corporation accounted for 20% and 14%, respectively, of our total revenue compared to 20% and 10%, respectively, of our total revenue during the year ended December 31, 2021 and 18% and 10%, respectively, of our total revenue during the year ended December 31, 2020.

As of December 31, 2022 and 2021, the account receivable balance from Applied Materials, Inc. accounted for 18% of our total accounts receivable. No other customer's account receivable exceeded 10% of our total accounts receivable in the periods presented.

NOTE 21. CREDIT FACILITY

In September 2019, in connection with the acquisition of Artesyn, we entered into a credit agreement ("Credit Agreement") that provided aggregate financing of \$500.0 million, consisting of a \$350.0 million senior unsecured term loan facility (the "Term Loan Facility") and a \$150.0 million senior unsecured revolving facility (the "Revolving Facility" and together with the Term Loan Facility, the "Credit Facility").

In September 2021, we amended the Credit Agreement whereby we borrowed an additional \$85.0 million, which increased the aggregate amount outstanding under the Term Loan Facility to \$400.0 million. In addition, we increased the Revolving Facility capacity by \$50.0 million to \$200.0 million. Both the Term Loan Facility and Revolving Facility mature on September 9, 2026.

The following table summarizes borrowings under our Credit Facility and the associated interest rate.

	December 31, 2022		
	Balance	Interest Rate	Unused Line Fee
Term Loan Facility subject to a fixed interest rate due to interest rate swap	\$ 238,219	1.271%	—
Term Loan Facility subject to a variable interest rate	136,781	5.134%	—
Revolving Facility subject to a variable interest rate	—	5.134%	0.10%
Total borrowings under the Credit Agreement	<u>\$ 375,000</u>		

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

For more information on the interest rate swap that fixes the interest rate for a portion of our Term Loan Facility, see *Note 8. Derivative Financial Instruments*. The Term Loan Facility and Revolving Facility bear interest, at our option, at a rate based on a reserve adjusted “Eurodollar Rate” or “Base Rate,” as defined in the Credit Agreement, plus an applicable margin.

For all periods presented, we were in compliance with the Credit Agreement covenants. The following table summarizes our availability to withdraw on the Revolving Facility.

	December 31, 2022	December 31, 2021
Available capacity on Revolving Facility	\$ 200,000	\$ 200,000

In addition to the available capacity on the Revolving Facility, prior to the maturity date of our Credit Agreement, we may also request an increase to the financing commitments in either the Term Loan Facility or Revolving Facility by an aggregate amount not to exceed \$250.0 million at identical terms to our existing Credit Facility.

The fair value of the Term Loan Facility approximates the outstanding balance of \$375.0 million as of December 31, 2022.

The debt obligation on our Consolidated Balance Sheets consists of the following:

	December 31, 2022	December 31, 2021
Term Loan Facility	\$ 375,000	\$ 395,000
Less: debt discount	(1,738)	(2,267)
Total debt	373,262	392,733
Less current portion of long-term debt	(20,000)	(20,000)
Total long-term debt	<u>\$ 353,262</u>	<u>\$ 372,733</u>

Contractual maturities of our debt obligations, excluding amortization of debt issuance costs, are as follows:

Year Ending December 31,	
2023	\$ 20,000
2024	20,000
2025	20,000
2026	315,000
Total	<u>\$ 375,000</u>

Interest expense and unused line of credit fees were recorded in other income (expense), net in our Consolidated Statements of Operations as follows:

	Years Ended December 31,		
	2022	2021	2020
Interest expense	\$ 6,607	\$ 3,969	\$ 5,080
Amortization of debt issuance costs	547	822	519
Unused line of credit fees and other	202	168	153
Total interest expense	<u>\$ 7,356</u>	<u>\$ 4,959</u>	<u>\$ 5,752</u>

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

Not applicable.

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 (“Exchange 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 Exchange Act is accumulated and communicated to management, including our Principal Executive Officer (Stephen D. Kelley, President and Chief Executive Officer) and Principal Financial Officer (Paul Oldham, 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, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of December 31, 2022. The conclusions of the Chief Executive Officer and Chief Financial Officer from this evaluation were communicated to the Audit and Finance Committee. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. We intend to continue to review and document our disclosure controls and procedures, including our internal controls over 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.

In April 2022, we acquired SL Power. Refer to *Note 2. Acquisitions* in Part II, Item 8 “Financial Statements and Supplementary Data” for additional information. SL Power’s objectives regarding internal controls over financial reporting are consistent, in all material respects, with Advanced Energy’s objectives. We are in the process of completing a more comprehensive review of SL Power’s internal control over financial reporting and will be implementing changes to better align their reporting and controls with the rest of Advanced Energy. As a result of the timing of the acquisition, anticipated changes, and general guidance issued by the SEC regarding exclusion of certain acquired businesses, we excluded SL Power from Advanced Energy’s December 31, 2022 assessment of internal controls over financial reporting. SL Power accounted for approximately 2% of our total assets at December 31, 2022, and 3% of our total net sales for the year ended December 31, 2022.

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, 2022, 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, 2022.

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Ernst & Young 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 audit report, included herein, on the effectiveness of our internal control over financial reporting as of December 31, 2022.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting that occurred during 2022 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

Not applicable.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

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 2023 annual meeting of stockholders (the “2023 Proxy Statement”), as set forth below. The 2023 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 2023 Proxy Statement under the headings “Management” and “Proposal No. 1 - Election of Directors” is incorporated herein by reference.

We adopted a Code of Ethical Conduct that applies to all employees, including our Chief Executive Officer, Chief Financial Officer, and others performing similar functions. We posted a copy of the Code of Ethical Conduct on our website at www.advancedenergy.com, and such Code of Ethical Conduct is available, in print, without charge, to any stockholder who requests it from the Company’s Secretary. We intend 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 our website at www.advancedenergy.com. We are not including the information contained on our website as part of, or incorporating it by reference into, this report.

ITEM 11. EXECUTIVE COMPENSATION

The information set forth in the 2023 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 2023 Proxy Statement under the headings “Security Ownership of Certain Beneficial Owners and Management” and “Equity Compensation Plan Information” is incorporated herein by reference.

Securities Authorized for Issuance under Equity Compensation Plans

The following table summarizes information about the equity incentive compensation plans as of December 31, 2022. All outstanding awards relate to our common stock.

Plan Category	(A) Number of securities to be issued upon exercise of outstanding options, warrants and rights	(B) Weighted average exercise price of outstanding options, warrants and rights <small>(in thousands, except exercise price per share)</small>	(C) Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column A)
Equity compensation plans approved by security holders	151	\$ 55.48	2,094 (1)
Equity compensation plans not approved by security holders	—	—	—
Total	151	\$ 55.48	2,094

(1) This number includes 618 thousand shares available for future issuance under the Employee Stock Purchase Plan.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

The information set forth in the 2023 Proxy Statement under the heading “Certain Relationships and Related Transactions” is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information set forth in the 2023 Proxy Statement under the caption “Proposal No. 2 - Ratification of the Appointment of Ernst & Young LLP as Advanced Energy’s Independent Registered Public Accounting Firm for 2023” 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:

See Index to Financial Statements at Part II, Item 8 herein.

2. Financial Statement Schedules for the years ended December 31, 2022, 2021 and 2020

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.

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(B) Exhibits:

Exhibit Number	Description	Incorporated by Reference			
		Form	File No.	Exhibit	Filing Date
2.1	Stock Purchase Agreement by and among Advanced Energy Industries, Inc., Artesyn Embedded Technologies, Inc., Pontus Intermediate Holdings II, LLC and Pontus Holdings, LLC, dated May 14, 2019 **	8-K	000-26966	2.1	May 15, 2019
2.2	First Amendment to the Stock Purchase Agreement by and among Advanced Energy Industries, Inc., Artesyn Embedded Technologies, Inc., Pontus Intermediate Holdings II, LLC and Pontus Holdings, LLC, dated September 9, 2019 **	8-K	000-26966	2.2	September 10, 2019
2.3	Stock Purchase Agreement, dated April 1, 2022, by and among SL Power Electronics Corporation, SL Delaware Holdings, Inc., Steel Partners Holdings L.P., AEI US Subsidiary, LLC and Advanced Energy Industries, Inc. **	8-K	000-26966	2.1	April 4, 2022
3.1	Amended and Restated Certificate of Incorporation of Advanced Energy Industries, Inc.	10-Q	000-26966	3.1	August 5, 2019
3.2	Second Amended and Restated By-Laws of Advanced Energy Industries, Inc.	8-K	000-26966	3.1	May 20, 2020
4.1	Form of Specimen Certificate for Common Stock	S-1	33-97188	4.1	September 21, 1995
4.2	Description of Advanced Energy Industries, Inc. Securities	10-K	000-26966	4.2	March 2, 2020
10.1	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	10-K	000-26966	10.18	February 24, 2004
10.2	Form of Director and Officer Indemnification Agreement				Filed herewith
10.3	Form of Notice of Grant Stock Option under 2008 Omnibus Incentive Plan *	8-K	000-26966	10.3	May 10, 2013
10.4	Form of Non-Qualified Stock Option Agreement under 2008 Omnibus Incentive Plan *	8-K	000-26966	10.5	May 10, 2013
10.5	2017 Omnibus Incentive Plan*	DEF 14A	000-26966	Appendix A	March 14, 2017
10.6	2008 Omnibus Incentive Plan, as amended May 4, 2010 *	10-K	000-26966	10.37	March 2, 2011
10.7	Employee Stock Purchase Plan *	S-1	33-97188	10.17	September 21, 1995
10.8	Offer Letter dated February 8, 2021 *	8-K	000-26966	10.2	February 10, 2021

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Exhibit Number	Description	Incorporated by Reference			
		Form	File No.	Exhibit	Filing Date
10.9	Global Supply Agreement by and between Advanced Energy Industries, Inc. and Applied Materials, Inc. dated August 29, 2005 +	10-Q	000-26966	10.1	November 7, 2005
10.10	Shipping Amendment to the Global Supply Agreement by and between Advanced Energy Industries, Inc. and Applied Materials, Inc. dated August 29, 2005 +	10-Q	000-26966	10.2	November 7, 2005
10.11	Bridge Amendment to the Global Supply Agreement by and between Advanced Energy Industries, Inc. and Applied Materials, Inc. dated January 28, 2011 +	10-Q	000-26966	10.1	May 6, 2011
10.12	Offer Letter to Paul Oldham, dated March 26, 2018 *	8-K	000-26966	10.1	March 29, 2018
10.13	Form of Executive Change in Control and General Severance Agreement	8-K	000-26966	10.1	August 6, 2018
10.14	Credit Agreement, dated September 10, 2019, by and among Advanced Energy Industries, Inc., Bank of America N.A. as the Administrative Agent, Bank of America N.A., Bank of the West and HSBC Bank USA, N.A. as the Joint Lead Arrangers and Joint Book Runners, and Citibank N.A., as the Co-Manager	8-K	000-26966	10.1	September 10, 2019
10.15	ISDA 2002 Master Agreement, by and between Advanced Energy Industries, Inc. and HSBC Bank USA, National Association, dated as of April 2, 2020 (the "HSBC ISDA Master Agreement")	8-K	000-26966	10.1	April 10, 2020
10.16	ISDA 2002 Master Agreement, by and between Advanced Energy Industries, Inc. and Citibank, N.A., dated as of April 7, 2020 (the "Citibank ISDA Master Agreement")	8-K	000-26966	10.2	April 10, 2020
10.17	Schedule to the HSBC ISDA Master Agreement	8-K	000-26966	10.3	April 10, 2020
10.18	Schedule to the Citibank ISDA Master Agreement	8-K	000-26966	10.4	April 10, 2020
10.19	Rate Swap Transaction Confirmation, by and between Advanced Energy Industries, Inc. and HSBC Bank USA, National Association, dated April 7, 2020	8-K	000-26966	10.5	April 10, 2020
10.20	Rate Swap Transaction Confirmation, by and between Advanced Energy Industries, Inc. and Citibank, N.A., dated April 9, 2020	8-K	000-26966	10.6	April 10, 2020

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Exhibit Number	Description	Incorporated by Reference			
		Form	File No.	Exhibit	Filing Date
10.21	Amendment No. 1 to Credit Agreement, dated September 9, 2021, by and among Advanced Energy Industries, Inc., the guarantors party thereto, Bank of America N.A. as the Administrative Agent, and the lenders party thereto (which included the marked Credit Agreement as Exhibit A thereto)	8-K	000-26966	10.2	September 9, 2021
10.22	Offer of Employment to Eduardo Bernal Acebedo dated August 2, 2021 *	8-K	000-26966	10.1	September 8, 2021
10.23	Form of Long-Term Incentive Plan	8-K	000-26966	10.1	February 4, 2021
10.24	Amended and Restated Deferred Compensation Plan *	10-Q	000-26966	10.1	November 1, 2022
10.25	Form of Restricted Stock Unit Agreement under 2017 Omnibus Incentive Plan *				Filed herewith
10.26	Form of LTI Performance Stock Unit Agreement under 2017 Omnibus Incentive Plan *				Filed herewith
21.1	Subsidiaries of Advanced Energy Industries, Inc.				Filed herewith
23.1	Consent of Independent Registered Public Accounting Firm				Filed herewith
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				Filed herewith
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				Filed herewith
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				Filed herewith
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				Filed herewith
101.INS	Inline XBRL Instance Document				Filed herewith
101.SCH	Inline XBRL Taxonomy Extension Schema Document				Filed herewith
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document				Filed herewith

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Exhibit Number	Description	Incorporated by Reference			
		Form	File No.	Exhibit	Filing Date
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document				Filed herewith
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document				Filed herewith
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document				Filed herewith
104	Cover Page Interactive Data File (formatted as Inline XBRL with applicable taxonomy extension information contained in Exhibits 101)				Filed herewith

* Compensation Plan

** Schedules have been omitted pursuant to Item 601(b)(2) of Regulation S-K.

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

ITEM 16. FORM 10-K SUMMARY

None.

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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/ Stephen D. Kelley

Stephen D. Kelley

Chief Executive Officer

Date: February 17, 2023

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/ Stephen D. Kelley</u> Stephen D. Kelley	Chief Executive Officer and Director (Principal Executive Officer)	February 17, 2023
<u>/s/ Paul Oldham</u> Paul Oldham	Chief Financial Officer and Executive Vice President (Principal Financial and Accounting Officer)	February 17, 2023
<u>/s/ Grant H. Beard</u> Grant H. Beard	Chairman of the Board	February 17, 2023
<u>/s/ Frederick A. Ball</u> Frederick A. Ball	Director	February 17, 2023
<u>/s/ Anne T. DelSanto</u> Anne T. DelSanto	Director	February 17, 2023
<u>/s/ Tina M. Donikowski</u> Tina M. Donikowski	Director	February 17, 2023
<u>/s/ Ronald C. Foster</u> Ronald C. Foster	Director	February 17, 2023
<u>/s/ Edward C. Grady</u> Edward C. Grady	Director	February 17, 2023
<u>/s/ Lanesha T. Minnix</u> Lanesha T. Minnix	Director	February 17, 2023
<u>/s/ David W. Reed</u> David W. Reed	Director	February 17, 2023
<u>/s/ John A. Roush</u> John A. Roush	Director	February 17, 2023
<u>/s/ Brian M. Shirley</u> Brian M. Shirley	Director	February 17, 2023

FORM OF
INDEMNIFICATION AGREEMENT

THIS INDEMNIFICATION AGREEMENT (the “**Agreement**”) is made and entered into as of _____ between Advanced Energy Industries, Inc., a Delaware corporation (the “**Company**”), and _____ (“**Indemnatee**”).

RECITALS:

WHEREAS, highly competent persons have become more reluctant to serve publicly held corporations as directors, officers, or in other capacities unless they are provided with adequate protection through insurance or adequate indemnification against inordinate risks of claims and actions against them arising out of their service to and activities on behalf of the corporation;

WHEREAS, the Board of Directors of the Company (the “**Board**”) has determined that, in order to attract and retain qualified individuals, the Company will attempt to maintain on an ongoing basis, at its sole expense, liability insurance to protect persons serving the Company and its subsidiaries from certain liabilities. Although the furnishing of such insurance has been a customary and widespread practice among U.S.-based corporations and other business enterprises, the Company believes that, given current market conditions and trends, such insurance may be available to it in the future only at higher premiums and with more exclusions. At the same time, directors, officers, and other persons in service to corporations or business enterprises are being increasingly subjected to expensive and time-consuming litigation relating to, among other things, matters that traditionally would have been brought only against the Company or business enterprise itself. The Second Amended and Restated Bylaws (the “**Bylaws**”) and Restated Certificate of Incorporation (the “**Certificate**”) of the Company require indemnification of the officers and directors of the Company. Indemnatee may also be entitled to indemnification pursuant to the General Corporation Law of the State of Delaware (“**DGCL**”). The Bylaws, the Certificate, and the DGCL expressly provide that the indemnification provisions set forth therein are not exclusive, and thereby contemplate that contracts may be entered into between the Company and members of the Board, officers, and other persons with respect to indemnification;

WHEREAS, the uncertainties relating to such insurance and to indemnification have increased the difficulty of attracting and retaining such persons;

WHEREAS, the Board has determined that the increased difficulty in attracting and retaining such persons is detrimental to the best interests of the Company’s stockholders and that the Company should act to assure such persons that there will be increased certainty of such protection in the future;

WHEREAS, it is reasonable, prudent, and necessary for the Company contractually to obligate itself to indemnify, and to advance expenses on behalf of, such persons to the fullest extent permitted by applicable law so that they will serve or continue to serve the Company free from

undue concern that they will not be so indemnified;

WHEREAS, this Agreement is a supplement to and in furtherance of the Bylaws and the Certificate and any resolutions adopted pursuant thereto, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnatee thereunder; and

WHEREAS, Indemnatee does not regard the protection available under the Bylaws, the Certificate, and insurance as adequate in the present circumstances, and may not be willing to serve as a director or officer without adequate protection, and the Company desires Indemnatee to serve in such capacity. Indemnatee is willing to serve, continue to serve, and to take on additional service for or on behalf of the Company on the condition that he be so indemnified.

NOW, THEREFORE, in consideration of Indemnatee's agreement to serve and/or continue to serve as a director or officer after the date hereof, the parties hereto agree as follows:

1. Services to the Company. This Agreement shall not be deemed an employment contract between the Company (or any of its subsidiaries or any Enterprise (as hereinafter defined)) and Indemnatee. The foregoing notwithstanding, this Agreement shall continue in force after Indemnatee has ceased to serve as a director or officer of the Company.

2. Indemnity of Indemnatee. The Company hereby agrees to hold harmless and indemnify Indemnatee to the fullest extent permitted by law, as such may be amended from time to time. In furtherance of the foregoing indemnification, and without limiting the generality thereof:

(a) Proceedings Other Than Proceedings by or in the Right of the Company. Indemnatee shall be entitled to the rights of indemnification provided in this Section 2(a), if, by reason of Indemnatee's Corporate Status (as hereinafter defined), Indemnatee is, or is threatened to be made, a party to or participant in any Proceeding (as hereinafter defined) other than a Proceeding by or in the right of the Company. Pursuant to this Section 2(a), Indemnatee shall be indemnified against all Expenses (as hereinafter defined), judgments, penalties, fines, and amounts paid in settlement actually and reasonably incurred by Indemnatee, or on Indemnatee's behalf, in connection with such Proceeding or any claim, issue, or matter therein, if Indemnatee acted in good faith and in a manner Indemnatee reasonably believed to be in or not opposed to the best interests of the Company, and with respect to any criminal Proceeding, had no reasonable cause to believe Indemnatee's conduct was unlawful.

(b) Proceedings by or in the Right of the Company. Indemnatee shall be entitled to the rights of indemnification provided in this Section 2(b) if, by reason of Indemnatee's Corporate Status, Indemnatee is, or is threatened to be made, a party to or participant in any Proceeding brought by or in the right of the Company. Pursuant to this Section 2(b), Indemnatee shall be indemnified to the fullest extent permitted by applicable law against all Expenses actually and reasonably incurred by Indemnatee, or on Indemnatee's behalf, in connection with such Proceeding or any claim, issue, or matter therein if Indemnatee acted in good faith and in a manner Indemnatee reasonably believed to be in or not opposed to the best interests of the Company; provided, however, if applicable law so provides, no indemnification against such Expenses shall be made in respect of any claim, issue, or matter in such Proceeding as to which Indemnatee shall have been finally adjudged to be liable to the Company unless and only to the

extent that the Court of Chancery of the State of Delaware or any court in which such Proceeding was brought shall determine upon application that such indemnification may be made, despite the adjudication of liability.

(c) Indemnification for Expenses of a Party Who is Wholly or Partly Successful. Notwithstanding any other provision of this Agreement, to the extent that Indemnitee is, by reason of Indemnitee's Corporate Status, a party to and is successful, on the merits or otherwise, in any Proceeding or in defense of any claim, issue, or matter therein, in whole or in part, Indemnitee shall be indemnified to the maximum extent permitted by law, as such may be amended from time to time, against all Expenses actually and reasonably incurred by Indemnitee or on Indemnitee's behalf in connection therewith. If Indemnitee is not wholly successful in such Proceeding but is successful, on the merits or otherwise, as to one or more but less than all claims, issues, or matters in such Proceeding, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee or on Indemnitee's behalf in connection with each successfully resolved claim, issue, or matter. For purposes of this Section and without limitation, the termination of any claim, issue, or matter in such a Proceeding by dismissal, with or without prejudice, shall be deemed to be a successful result as to such claim, issue, or matter.

(d) Indemnification for Expenses of a Witness. Notwithstanding any other provision of this Agreement, to the fullest extent permitted by applicable law, to the extent that Indemnitee is, by reason of Indemnitee's Corporate Status, a witness in any Proceeding to which Indemnitee is not a party, he or she shall be indemnified against all Expenses actually and reasonably incurred by Indemnitee or on Indemnitee's behalf in connection therewith.

3. Additional Indemnity. In addition to, and without regard to any limitations on, the indemnification provided for in Section 2 of this Agreement, the Company shall and hereby does indemnify and hold harmless to the fullest extent permitted by applicable law Indemnitee against all Expenses, judgments, penalties, fines, and amounts paid in settlement actually and reasonably incurred by Indemnitee or on Indemnitee's behalf if, by reason of Indemnitee's Corporate Status, Indemnitee is, or is threatened to be made, a party to or participant in any Proceeding including, without limitation, all liability arising out of the negligence or active or passive wrongdoing of Indemnitee. The only limitation that shall exist upon the Company's obligations pursuant to this Agreement shall be that the Company shall not be obligated to make any payment to Indemnitee that is finally determined (under the procedures, and subject to the presumptions, set forth in Sections 6 and 7 hereof) to be unlawful.

4. Contribution.

(a) Whether or not the indemnification provided in Sections 2 and 3 hereof is available, in respect of any threatened, pending, or completed Proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such Proceeding), the Company shall pay, in the first instance, the entire amount of any judgment or settlement of such Proceeding without requiring Indemnitee to contribute to such payment and the Company hereby waives and relinquishes any right of contribution it may have against Indemnitee. The Company shall not enter into any settlement of any Proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such Proceeding) unless such settlement provides for a full and final release of all claims asserted against Indemnitee.

(b) Without diminishing or impairing the obligations of the Company set forth in the preceding subparagraph, if, for any reason, Indemnitee shall elect or be required to pay all or any portion of any judgment or settlement in any threatened, pending, or completed Proceeding in which the Company is jointly liable with Indemnitee (or would be if joined in such Proceeding), the Company shall contribute to the amount of expenses (including attorneys' fees), judgments, fines, and amounts paid in settlement actually and reasonably incurred and paid or payable by Indemnitee in proportion to the relative benefits received by the Company and all officers, directors, or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such Proceeding), on the one hand, and Indemnitee, on the other hand, from the transaction from which such Proceeding arose; provided, however, that the proportion determined on the basis of relative benefit may, to the extent necessary to conform to law, be further adjusted by reference to the relative fault of the Company and all officers, directors or employees of the Company other than Indemnitee who are jointly liable with Indemnitee (or would be if joined in such Proceeding), on the one hand, and Indemnitee, on the other hand, in connection with the transaction or events that resulted in such expenses, judgments, fines, or settlement amounts, as well as any other equitable considerations which applicable law may require to be considered. The relative fault of the Company and all officers, directors, or employees of the Company, other than Indemnitee, who are jointly liable with Indemnitee (or would be if joined in such Proceeding), on the one hand, and Indemnitee, on the other hand, shall be determined by reference to, among other things, the degree to which their actions were motivated by intent to gain personal profit or advantage, the degree to which their liability is primary or secondary, and the degree to which their conduct is active or passive.

(c) The Company hereby agrees to fully indemnify and hold Indemnitee harmless from any claims of contribution which may be brought by officers, directors, or employees of the Company, other than Indemnitee, who may be jointly liable with Indemnitee.

(d) To the fullest extent permissible under applicable law, if the indemnification provided for in this Agreement is unavailable to Indemnitee for any reason whatsoever, the Company, in lieu of indemnifying Indemnitee, shall contribute to the amount incurred by Indemnitee, whether for judgments, fines, penalties, excise taxes, amounts paid or to be paid in settlement, and/or Expenses, in connection with any claim relating to an indemnifiable event under this Agreement, in such proportion as is deemed fair and reasonable in light of all of the circumstances of such Proceeding in order to reflect (i) the relative benefits received by the Company and Indemnitee as a result of the event(s) and/or transaction(s) giving cause to such Proceeding; and/or (ii) the relative fault of the Company (and its directors, officers, employees, and agents) and Indemnitee in connection with such event(s) and/or transaction(s).

5. Advancement of Expenses. Notwithstanding any other provision of this Agreement, the Company shall advance, to the extent not prohibited by law, all Expenses incurred by or on behalf of Indemnitee in connection with any Proceeding by reason of Indemnitee's Corporate Status within thirty (30) days after the receipt by the Company of a statement or statements from Indemnitee requesting such advance or advances from time to time, whether prior to or after final disposition of such Proceeding. Such statement or statements shall reasonably evidence the Expenses incurred by Indemnitee and shall include or be preceded or accompanied by an undertaking by or on behalf of Indemnitee to repay any Expenses advanced if it shall ultimately be determined that Indemnitee is not entitled to be indemnified against such Expenses.

Advances shall include any and all reasonable Expenses incurred pursuing an action to enforce this right of advancement. Any advances and undertakings to repay pursuant to this Section 5 shall be unsecured and interest free. This Section 5 shall not apply to any claim made by Indemnitee for which indemnity is excluded pursuant to Section 9.

6. Procedures and Presumptions for Determination of Entitlement to Indemnification. It is the intent of this Agreement to secure for Indemnitee rights of indemnity that are as favorable as may be permitted under the DGCL and public policy of the State of Delaware. Accordingly, the parties agree that the following procedures and presumptions shall apply in the event of any question as to whether Indemnitee is entitled to indemnification under this Agreement:

(a) To obtain indemnification (which in each case in this Agreement shall include but not be limited to the advancement of Expenses or contribution by the Company) under this Agreement, Indemnitee shall submit to the Company a written request, including therein or therewith such documentation and information as is reasonably available to Indemnitee and is reasonably necessary to determine whether and to what extent Indemnitee is entitled to indemnification without waiver of privilege, as soon as is reasonably practicable following the receipt by Indemnitee of written notice thereof. Such written request to the Company shall include a description of the nature of the Proceeding and the facts underlying such Proceeding. The omission by Indemnitee to notify the Company hereunder will not relieve the Company from any liability that it may have to Indemnitee hereunder or otherwise than under this Agreement, and any delay in so notifying the Company shall not constitute a waiver by Indemnitee of any rights under this Agreement. The Secretary of the Company shall, promptly upon receipt of such a request for indemnification, advise the Board in writing that Indemnitee has requested indemnification.

(b) Upon written request by Indemnitee for indemnification pursuant to Section 6(a) hereof, a determination, if required by applicable law, with respect to Indemnitee's entitlement thereto shall be made in the specific case by one of the following four (4) methods, which shall be at the election of the Board: (1) by a majority vote of the Disinterested Directors, even though less than a quorum, (2) by a committee comprised of Disinterested Directors designated by a majority vote of the Disinterested Directors, even though less than a quorum, (3) if there are no Disinterested Directors or if the Disinterested Directors so direct, by Independent Counsel (as hereinafter defined) in a written opinion to the Board, a copy of which shall be delivered to Indemnitee, or (4) if so directed by the Board, by the stockholders of the Company; provided, however, that if a Change in Control shall have occurred, such determination as to Indemnitee's entitlement to indemnification hereunder shall be made, (A) if the Indemnitee so requests in writing, by a majority vote of the Disinterested Directors, even if less than a quorum of the Board or (B) otherwise, by Independent Counsel in a written opinion to the Board, a copy of which shall be delivered to Indemnitee.

(c) If the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to Section 6(b) hereof, the Independent Counsel shall be selected as provided in this Section 6(c). If a Change in Control shall not have occurred, the Independent Counsel shall be selected by the Board, and the Board shall give written notice to Indemnitee of the identity of such Independent Counsel. If a Change in Control shall have occurred, the Independent Counsel shall be selected by Indemnitee (unless Indemnitee shall request that such selection be made by the Board, in which event the preceding sentence shall apply) and Indemnitee

shall give written notice to the Company of the identity of such Independent Counsel. In either event, the Company or Indemnitee, as the case may be, may, within 10 days after such written notice of selection shall have been given, deliver to Indemnitee or the Company, as the case may be, a written objection to such selection; provided, however, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of “**Independent Counsel**” as defined in Section 13 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If a written objection is made and substantiated, the Independent Counsel selected may not serve as Independent Counsel unless and until such objection is withdrawn or a court has determined that such objection is without merit. If, within 20 days after submission by Indemnitee of a written request for indemnification pursuant to Section 6(a) hereof, no Independent Counsel shall have been selected and not objected to, either the Company or Indemnitee may petition the Court of Chancery of the State of Delaware or other court of competent jurisdiction for resolution of any objection which shall have been made by Indemnitee or the Company to the other’s selection of Independent Counsel and/or for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate, and the person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 6(b) hereof. The Company shall pay any and all reasonable fees and expenses of Independent Counsel incurred by such Independent Counsel in connection with acting pursuant to Section 6(b) hereof, and the Company shall pay all reasonable fees and expenses incident to the procedures of this Section 6(c), regardless of the manner in which such Independent Counsel was selected or appointed. Upon the commencement of any Proceeding or arbitration pursuant to Section 7(a) hereof, the Independent Counsel shall be discharged and relieved of any further responsibility in such capacity (subject to the applicable standards of professional conduct then prevailing).

(d) In making a determination with respect to entitlement to indemnification hereunder, the person or persons or entity making such determination shall presume that Indemnitee is entitled to indemnification under this Agreement, to the fullest extent not prohibited by law if Indemnitee has submitted a request for indemnification in accordance with this Agreement. Anyone seeking to overcome this presumption, including the Company, shall have the burden of proof and the burden of persuasion by clear and convincing evidence, to the fullest extent not prohibited by law. Neither the failure of the Company (including by its directors or Independent Counsel) to have made a determination prior to the commencement of any action pursuant to this Agreement that indemnification is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor an actual determination by the Company (including by its directors or Independent Counsel) that Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that Indemnitee has not met the applicable standard of conduct.

(e) Indemnitee shall be deemed to have acted in good faith if Indemnitee’s action is based on the records or books of account of the Enterprise, including financial statements, or on information supplied to Indemnitee by the officers of the Enterprise in the course of their duties, or on the advice of legal counsel for the Enterprise or on information or records given or reports made to the Enterprise by an independent certified public accountant or by an appraiser or other expert selected with reasonable care by the Enterprise. In addition, the knowledge and/or actions, or failure to act, of any director, officer, agent, or employee of the

Enterprise shall not be imputed to Indemnitee for purposes of determining the right to indemnification under this Agreement. Whether or not the foregoing provisions of this Section 6(e) are satisfied, it shall in any event be presumed that Indemnitee has at all times acted in good faith and in a manner Indemnitee reasonably believed to be in or not opposed to the best interests of the Company. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence.

(f) If the person, persons, or entity empowered or selected under this Section 6 to determine whether Indemnitee is entitled to indemnification shall not have made a determination within sixty (60) days after receipt by the Company of the request therefor, the requisite determination of entitlement to indemnification shall be deemed to have been made and Indemnitee shall be entitled to such indemnification absent a prohibition of such indemnification under applicable law; provided, however, that such 60-day period may be extended for a reasonable time, not to exceed an additional thirty (30) days, if the person, persons or entity making such determination with respect to entitlement to indemnification in good faith requires such additional time to obtain or evaluate documentation and/or information relating thereto; and provided, further, that the foregoing provisions of this Section 6(f) shall not apply (1) if the determination of entitlement to indemnification is to be made by the stockholders pursuant to Section 6(b) of this Agreement and if (A) within fifteen (15) days after receipt by the Company of the request for such determination, the Board or the Disinterested Directors, if appropriate, resolve to submit such determination to the stockholders for their consideration at an annual meeting thereof to be held within seventy-five (75) days after such receipt and such determination is made thereat, or (B) a special meeting of stockholders is called within fifteen (15) days after such receipt for the purpose of making such determination, such meeting is held for such purpose within sixty (60) days after having been so called and such determination is made thereat, or (2) if the determination of entitlement to indemnification is to be made by the Independent Counsel.

(g) Indemnitee shall cooperate with the person, persons, or entity making such determination with respect to Indemnitee's entitlement to indemnification, including providing to such person, persons, or entity upon reasonable advance request any documentation or information that is not privileged or otherwise protected from disclosure and that is reasonably available to Indemnitee and reasonably necessary to such determination. Any Independent Counsel, member of the Board or stockholder of the Company shall act reasonably and in good faith in making a determination regarding Indemnitee's entitlement to indemnification under this Agreement. Any costs or expenses (including attorneys' fees and disbursements) incurred by Indemnitee in so cooperating with the person, persons, or entity making such determination shall be borne by the Company (irrespective of the determination as to Indemnitee's entitlement to indemnification), and the Company hereby indemnifies and agrees to hold Indemnitee harmless therefrom.

(h) The Company acknowledges that a settlement or other disposition short of final judgment may be successful if it permits a party to avoid expense, delay, distraction, disruption, and uncertainty. In the event that any action, claim, or proceeding to which Indemnitee is a party is resolved in any manner other than by adverse judgment against Indemnitee (including, without limitation, settlement of such action, claim, or proceeding with or without payment of money or other consideration) it shall be presumed that Indemnitee has been successful on the

merits or otherwise in such Proceeding. Anyone seeking to overcome this presumption shall have the burden of proof and the burden of persuasion by clear and convincing evidence.

(i) The termination of any Proceeding or of any claim, issue, or matter therein, by judgment, order, settlement, or conviction, or upon a plea of nolo contendere or its equivalent, shall not (except as otherwise expressly provided in this Agreement) of itself adversely affect the right of Indemnitee to indemnification or create a presumption that Indemnitee did not act in good faith and in a manner which Indemnitee reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that Indemnitee had reasonable cause to believe that Indemnitee's conduct was unlawful.

7. Remedies of Indemnitee.

(a) Subject to Section 7(f), in the event that (i) a determination is made pursuant to Section 6 of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 5 of this Agreement, (iii) no determination of entitlement to indemnification is made pursuant to Section 6(b) of this Agreement within 90 days after receipt by the Company of the request for indemnification, (iv) payment of indemnification is not made pursuant to this Agreement within ten (10) days after receipt by the Company of a written request therefor, (v) payment of indemnification is not made within ten (10) days after a determination has been made that Indemnitee is entitled to indemnification or such determination is deemed to have been made pursuant to Section 6 of this Agreement, or (vi) in the event that the Company or any other person takes or threatens to take any action to declare this Agreement void or unenforceable, or institutes any litigation or other action or Proceeding designed to deny, or to recover from, Indemnitee the benefits provided or intended to be provided to Indemnitee hereunder, Indemnitee shall be entitled to an adjudication in an appropriate court of the State of Delaware of Indemnitee's entitlement to such indemnification.

(b) In the event that a determination shall have been made pursuant to Section 6(b) of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding commenced pursuant to this Section 7 shall be conducted in all respects as a de novo trial on the merits, and Indemnitee shall not be prejudiced by reason of the adverse determination under Section 6(b). In any judicial proceeding commenced pursuant to this Section 7, the Company shall have the burden of proving Indemnitee is not entitled to indemnification or advancement of Expenses, as the case may be.

(c) If a determination shall have been made pursuant to Section 6(b) of this Agreement that Indemnitee is entitled to indemnification, the Company shall be bound by such determination in any judicial proceeding commenced pursuant to this Section 7, absent (i) a misstatement by Indemnitee of a material fact, or an omission of a material fact necessary to make Indemnitee's misstatement not materially misleading in connection with the application for indemnification, or (ii) a prohibition of such indemnification under applicable law.

(d) In the event that Indemnitee, pursuant to this Section 7, seeks a judicial adjudication of Indemnitee's rights under, or to recover damages for breach of, this Agreement, or to recover under any directors' and officers' liability insurance policies maintained by the Company, the Company shall pay on Indemnitee's behalf, in advance, any and all expenses

(of the types described in the definition of Expenses in Section 14(e) of this Agreement) actually and reasonably incurred by Indemnitee regardless of whether Indemnitee is ultimately determined to be entitled to such indemnification, advancement of expenses or insurance recovery.

(e) The Company shall be precluded from asserting in any judicial proceeding commenced pursuant to this Section 7 that the procedures and presumptions of this Agreement are not valid, binding, and enforceable and shall stipulate in any such court that the Company is bound by all the provisions of this Agreement. The Company shall indemnify Indemnitee against any and all Expenses and, if requested by Indemnitee, shall (within ten (10) days after receipt by the Company of a written request therefore) advance, to the extent not prohibited by law, such expenses to Indemnitee, which are incurred by Indemnitee in connection with any action brought by Indemnitee for indemnification or advance of Expenses from the Company under this Agreement or under any directors' and officers' liability insurance policies maintained by the Company, regardless of whether Indemnitee is ultimately determined to be entitled to such indemnification, advancement of expenses or insurance recovery.

(f) Notwithstanding anything in this Agreement to the contrary, no determination as to entitlement to indemnification under this Agreement shall be required to be made prior to the final disposition of the Proceeding.

8. Non-Exclusivity; Survival of Rights; Insurance; Subrogation.

(a) The rights of indemnification as provided by this Agreement shall not be deemed exclusive of any other rights to which Indemnitee may at any time be entitled under applicable law, the Certificate, the Bylaws, any agreement, a vote of stockholders, a resolution of directors, or otherwise. No amendment, alteration, or repeal of this Agreement or of any provision hereof shall limit or restrict any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in Indemnitee's Corporate Status prior to such amendment, alteration, or repeal. To the extent that a change in the DGCL, whether by statute or judicial decision, permits greater indemnification than would be afforded currently under the Certificate, the Bylaws, and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change. To the extent that a change in the DGCL, whether by statute or judicial decision, limits the indemnification rights that would be afforded currently under the Certificate, the Bylaws, and this Agreement, it is the intent of the parties hereto that such change, to the extent not otherwise required by such law, statute, or rule to be applied to this Agreement, shall have no effect on this Agreement or the parties' rights and obligations hereunder. No right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. The assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

(b) To the extent that the Company maintains an insurance policy or policies providing liability insurance for directors, officers, employees, agents, or fiduciaries of the Company or of any Enterprise, Indemnitee shall be covered by such policy or policies in accordance with its or their terms to the maximum extent of the coverage available for any director, officer, employee, agent, or fiduciary under such policy or policies. If, at the time of the receipt of a notice of a claim pursuant to the terms hereof, the Company has director and officer liability

insurance in effect, the Company shall give prompt notice of the commencement of such proceeding to the insurers in accordance with the procedures set forth in the respective policies. The Company shall thereafter take all necessary or desirable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such proceeding in accordance with the terms of such policies.

(c) In the event of any payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee, who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Company to bring suit to enforce such rights.

(d) The Company shall not be liable under this Agreement to make any payment of amounts otherwise indemnifiable hereunder if and to the extent that Indemnitee has otherwise actually received such payment under any insurance policy, contract, agreement, or otherwise.

(e) The Company's obligation to indemnify or advance Expenses hereunder to Indemnitee who is or was serving at the request of the Company as a director, officer, employee, or agent of any other corporation, partnership, joint venture, trust, employee benefit plan, or other enterprise shall be reduced by any amount Indemnitee has actually received as indemnification or advancement of expenses from such other corporation, partnership, joint venture, trust, employee benefit plan, or other enterprise.

9. Exception to Right of Indemnification. Notwithstanding any provision in this Agreement, the Company shall not be obligated under this Agreement to make any indemnity in connection with any claim made against Indemnitee:

(a) for which payment has actually been made to or on behalf of Indemnitee under any insurance policy or other indemnity provision, except with respect to any excess beyond the amount paid under any insurance policy or other indemnity provision; or

(b) (i) for an accounting of profits made from the purchase and sale (or sale and purchase) by Indemnitee of securities of the Company within the meaning of Section 16(b) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), or similar provisions of state statutory law or common law, or (ii) any reimbursement of the Company by Indemnitee of any bonus or other incentive-based or equity-based compensation or of any profits realized from the sale of the Company's securities, as required in each case under the Exchange Act or applicable national securities exchange rules (including any such reimbursements that arise from an accounting restatement of the Company pursuant to Section 304 of the Sarbanes-Oxley Act of 2002 (the "**Sarbanes-Oxley Act**"), or the payment to the Company of profits arising from the purchase and sale by Indemnitee of securities in violation of Section 306 of the Sarbanes-Oxley Act); or

(c) in connection with any Proceeding (or any part of any Proceeding) initiated by Indemnitee, including any Proceeding (or any part of any Proceeding) initiated by Indemnitee against the Company or its directors, officers, employees, or other indemnitees, unless (i) the Board authorized the Proceeding (or any part of any Proceeding) prior to its initiation, (ii)

the Company provides the indemnification, in its sole discretion, pursuant to the powers vested in the Company under applicable law, (iii) the proceeding was initiated to establish or enforce a right to indemnification under this Agreement, any other agreement or insurance policy, or under the Bylaws or the Certificate, or (iv) as otherwise required under the laws of the State of Delaware.

10. Duration of Agreement. All agreements and obligations of the Company contained herein shall continue during the period Indemnitee is a director, officer, or key employee of the Company (or is or was serving at the request of the Company as a director, officer, employee, or agent of another corporation, partnership, joint venture, trust or other enterprise) and shall continue thereafter so long as Indemnitee shall be subject to any Proceeding (or any proceeding commenced under Section 7 hereof) by reason of Indemnitee's Corporate Status, whether or not Indemnitee is acting or serving in any such capacity at the time any liability or expense is incurred for which indemnification can be provided under this Agreement.

11. Period of Limitations. No legal action shall be brought and no cause of action shall be asserted by or in the right of the Company against Indemnitee, Indemnitee's estate, spouse, heirs, executors, or personal or legal representatives after the expiration of two (2) years from the date of accrual of such cause of action, and any claim or cause of action of the Company shall be extinguished and deemed released unless asserted by the timely filing of a legal action within such two-year (2) period; provided, however, that if any shorter period of limitations is otherwise applicable to any such cause of action, such shorter period shall govern.

12. Security. To the extent requested by Indemnitee and approved by the Board, the Company may at any time and from time to time provide security to Indemnitee for the Company's obligations hereunder through an irrevocable bank line of credit, funded trust, or other collateral. Any such security, once provided to Indemnitee, may not be revoked or released without the prior written consent of Indemnitee.

13. Enforcement.

(a) The Company expressly confirms and agrees that it has entered into this Agreement and assumes the obligations imposed on it hereby in order to induce Indemnitee to serve, or continue to serve, as a director, officer, or key employee of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving as a director, officer, or key employee of the Company.

(b) This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral, written and implied, between the parties hereto with respect to the subject matter hereof; provided, however, that this Agreement is a supplement to and in furtherance of the Certificate, the Bylaws, and any applicable law, and shall not be deemed a substitute therefor, nor to diminish or abrogate any rights of Indemnitee thereunder.

(c) The Company shall not seek from a court, or agree to, a "bar order" which would have the effect of prohibiting or limiting Indemnitee's rights to receive advancement of expenses or any other rights under this Agreement.

14. Definitions. For purposes of this Agreement:

(a) A “**Change of Control**” shall be deemed to have occurred upon the earliest to occur after the date of this Agreement of any of the following events:

(i) *Acquisition of Stock by Third Party.* The acquisition by any Person of beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of 50% or more of either (A) the then-outstanding Shares (the “Outstanding Company Common Stock”) or (B) the combined voting power of the then-outstanding voting securities of the Company entitled to vote generally in the election of directors (the “Outstanding Company Voting Securities”); provided, however, that the following acquisitions shall not constitute a Change of Control: (1) any acquisition directly from the Company, (2) any acquisition by the Company, (3) any acquisition by any employee benefit plan (or related trust) sponsored or maintained by the Company or any Affiliate or (4) any acquisition by any corporation pursuant to a transaction that complies with Sections 14(a)(iii)(A) – 14(a)(iii)(C) below;

(ii) *Change in Board of Directors.* Any time at which individuals who, as of the date hereof, constitute the Board (the “Incumbent Board”) cease for any reason to constitute at least a majority of the Board; provided, however, that any individual becoming a director subsequent to the date hereof whose election, or nomination for election by the Company’s stockholders, was approved by a vote of at least a majority of the directors then comprising the Incumbent Board shall be considered as though such individual were a member of the Incumbent Board, but excluding, for this purpose, any such individual whose initial assumption of office occurs as a result of an actual or threatened election contest with respect to the election or removal of directors or other actual or threatened solicitation of proxies or consents by or on behalf of a Person other than the Board;

(iii) *Corporate Transaction.* Consummation of a reorganization, merger, statutory share exchange or consolidation or similar corporate transaction involving the Company or any of its Subsidiaries, a sale or other disposition of the Company’s assets which occurs on the date that any Person acquires (or has acquired during the 12 month period ending on the date of the most recent acquisition by such person or persons) assets from the Company that have a total gross fair market value equal to or more than 50% of the total gross fair market value of all of the assets of the Company immediately prior to such acquisition or acquisitions, or the acquisition of assets or stock of another entity by the Company or any of its Subsidiaries (each, a “Business Combination”), in each case unless, following such Business Combination, (A) all at least 50% of the individuals and entities that were the beneficial owners of the Outstanding Company Common Stock and the Outstanding Company Voting Securities immediately prior to such Business Combination beneficially own, directly or indirectly, more than 50% of the then-outstanding common equity and the combined voting power of the then outstanding voting securities entitled to vote generally in the election of directors, as the case may be, of the entity resulting from such Business Combination (including, without limitation, an entity that, as a result of such transaction, owns the Company or all or substantially all of the Company’s assets either directly or through one or more subsidiaries) in substantially

the same proportions as their ownership immediately prior to such Business Combination of the Outstanding Company Common Stock and the Outstanding Company Voting Securities, as the case may be, (B) no Person (excluding any entity resulting from such Business Combination or any employee benefit plan (or related trust) of the Company or an Affiliate or such entity resulting from such Business Combination) beneficially owns, directly or indirectly, 50% or more of, respectively, the then-outstanding common equity of the entity resulting from such Business Combination or the combined voting power of the then-outstanding voting securities of such entity, except to the extent that such ownership existed prior to the Business Combination, and (C) at least a majority of the members of the board of directors of the entity resulting from such Business Combination were members of the Incumbent Board at the time of the execution of the initial agreement or of the action of the Board providing for such Business Combination; or

(iv) *Liquidation*. Approval by the stockholders of the Company of a complete liquidation or dissolution of the Company.

For purposes of this Section 14(a), the following terms shall have the following meanings:

(A) “**Affiliate**” has the meaning ascribed to such term in Rule 12b-2 under the Exchange Act.

(B) “**Person**” has the meaning given in Section 3(a)(9) of the Exchange Act, as modified and used in Sections 13(d) and 14(d) thereof, or any group of Persons acting in concert that would be considered “persons acting as a group” within the meaning of Treas. Reg. § 1.409A-3(i)(5).

(C) “**Subsidiary**” means any corporation, limited liability company or other limited liability entity in an unbroken chain of entities beginning with the Company if each of the entities (other than the last entities in the chain) owns the stock or equity interest possessing more than fifty percent (50%) of the total combined voting power of all classes of stock or other equity interests in one of the other entities in the chain.

(b) “**Corporate Status**” describes the status of a person who is or was a director, officer, employee, agent or fiduciary of the Company or of any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that such person is or was serving at the express written request of the Company.

(c) “**Disinterested Director**” means a director of the Company who is not and was not interested in the transaction or conduct giving rise to the Proceeding in respect of which indemnification is sought by Indemnitee.

(d) “**Enterprise**” shall mean the Company and any other corporation, partnership, joint venture, trust, employee benefit plan or other enterprise that Indemnitee is or was serving at the express written request of the Company as a director, officer, employee, agent or fiduciary.

(e) “**Expenses**” shall include all reasonable attorneys’ fees, retainers, court costs, transcript costs, fees of experts, witness fees, travel expenses, duplicating costs,

printing and binding costs, telephone charges, postage, delivery service fees and all other disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, participating or being or preparing to be a witness in a Proceeding, or responding to, or objecting to, a request to provide discovery in any Proceeding. Expenses also shall include Expenses incurred in connection with any appeal resulting from any Proceeding, and any federal, state, local or foreign taxes imposed on Indemnitee as a result of the actual or deemed receipt of any payments under this Agreement, including without limitation the premium, security for and other costs relating to any cost bond, supersede as bond or other appeal bond or its equivalent. Expenses, however, shall not include amounts paid in settlement by Indemnitee or the amount of judgments or fines against Indemnitee.

(f) “**Independent Counsel**” means a law firm, or a member of a law firm, that is experienced in matters of corporation law and neither presently is, nor in the past five years has been, retained to represent: (i) the Company or Indemnitee in any matter material to either such party (other than with respect to matters concerning Indemnitee under this Agreement, or of other indemnitees under similar indemnification agreements), or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term “Independent Counsel” shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee’s rights under this Agreement. The Company agrees to pay the reasonable fees of the Independent Counsel referred to above and to fully indemnify such counsel against any and all Expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto.

(g) “**Proceeding**” includes any threatened, pending or completed action, suit, arbitration, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or any other actual, threatened or completed proceeding, whether brought by or in the right of the Company or otherwise and whether civil, criminal, administrative or investigative, in which Indemnitee was, is or will be involved as a party or otherwise, by reason of the fact that Indemnitee’s Corporate Status, by reason of any action taken by Indemnitee or of any inaction on Indemnitee’s part while acting as a director, officer or key employee of the Company, or by reason of the fact that Indemnitee is or was serving at the request of the Company as a director, officer, employee, agent or fiduciary of another corporation, partnership, joint venture, trust or other Enterprise; in each case whether or not he is acting or serving in any such capacity at the time any liability or expense is incurred for which indemnification can be provided under this Agreement; including one pending on or before the date of this Agreement, but excluding one initiated by Indemnitee pursuant to Section 7 of this Agreement to enforce Indemnitee’s rights under this Agreement.

15. Severability. If any provision or provisions of this Agreement shall be held to be invalid, illegal, or unenforceable for any reason whatsoever: (a) the validity, legality, and enforceability of the remaining provisions of this Agreement (including without limitation, each portion of any Section of this Agreement containing any such provision held to be invalid, illegal, or unenforceable that is not itself invalid, illegal, or unenforceable) shall not in any way be affected or impaired thereby and shall remain enforceable to the fullest extent permitted by law; (b) such provision or provisions shall be deemed reformed to the extent necessary to conform to applicable law and to give the maximum effect to the intent of the parties hereto; and (c) to the fullest extent

possible, the provisions of this Agreement (including, without limitation, each portion of any Section of this Agreement containing any such provision held to be invalid, illegal, or unenforceable that is not itself invalid, illegal, or unenforceable) shall be construed so as to give effect to the intent manifested thereby. Without limiting the generality of the foregoing, this Agreement is intended to confer upon Indemnitee indemnification rights to the fullest extent permitted by applicable laws. In the event any provision hereof conflicts with any applicable law, such provision shall be deemed modified, consistent with the aforementioned intent, to the extent necessary to resolve such conflict.

16. Modification and Waiver. No supplement, modification, termination or amendment of this Agreement shall be binding unless executed in writing by both of the parties hereto. No waiver of any of the provisions of this Agreement shall be deemed or shall constitute a waiver of any other provisions hereof (whether or not similar) nor shall such waiver constitute a continuing waiver.

17. Assignment. This Agreement shall be binding upon and inure to the benefit of and be enforceable by the parties hereto and their respective successors (including any direct or indirect successor by purchase, merger, consolidation or otherwise to all or substantially all of the business and/or assets of the Company), assigns, spouses, heirs, and personal and legal representatives. The Company may not assign this Agreement without prior approval of Indemnitee; provided that, the Company may assign to and shall require and cause any successor (whether direct or indirect by purchase, merger, consolidation or otherwise) to all, substantially all or a substantial part, of the business and/or assets of the Company expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place. This Agreement shall continue in effect regardless of whether Indemnitee continues to serve as a director, officer, employee, or agent of the Company or of any other enterprise at the Company's request.

18. Notice By Indemnitee. Indemnitee agrees promptly to notify the Company in writing upon being served with or otherwise receiving any summons, citation, subpoena, complaint, indictment, information or other document relating to any Proceeding or matter which may be subject to indemnification covered hereunder. The failure to so notify the Company shall not relieve the Company of any obligation which it may have to Indemnitee under this Agreement or otherwise unless and only to the extent that such failure or delay materially prejudices the Company.

19. Notices. All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given: (a) upon personal delivery to the party to be notified, (b) when sent by confirmed electronic mail or facsimile if sent during normal business hours of the recipient, and if not so confirmed, then on the next business day, (c) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid, or (d) one (1) day after deposit with a nationally recognized overnight courier, specifying next day delivery, with written verification of receipt. All communications shall be sent:

(a) To Indemnitee at the address set forth below Indemnitee's signature hereto.

(b) To the Company at:

Advanced Energy Industries, Inc.
1595 Wynkoop Street, Suite 800
Denver, Colorado 80202
Attention: President & CEO
General Counsel

or to such other address as may have been furnished to Indemnitee by the Company or to the Company by Indemnitee, as the case may be.

20. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same Agreement. This Agreement may also be executed and delivered by facsimile signature and in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

21. Headings. The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.

22. Governing Law and Consent to Jurisdiction. This Agreement and the legal relations among the parties shall be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of law rules. The Company and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Chancery Court of the State of Delaware (the “**Delaware Court**”), and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) appoint, to the extent such party is not otherwise subject to service of process in the State of Delaware, irrevocably the Company’s agent for service of process in Delaware as such party’s agent for acceptance of legal process in connection with any such action or proceeding against such party with the same legal force and validity as if served upon such party personally within the State of Delaware, (iv) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court and (v) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court has been brought in an improper or inconvenient forum.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on and as of the day and year first above written.

**ADVANCED ENERGY INDUSTRIES, INC.
(THE COMPANY)**

By: _____
Name:
Title:

INDEMNITEE

Name:
Address:

[SIGNATURE PAGE TO INDEMNIFICATION AGREEMENT]

ADVANCED ENERGY INDUSTRIES, INC.
2017 OMNIBUS INCENTIVE PLAN

RESTRICTED STOCK UNIT AGREEMENT

Advanced Energy Industries, Inc., a Delaware corporation (the “**Company**”), hereby grants restricted stock units (“**RSUs**”) relating to shares of its common stock, \$0.001 par value (the “**Stock**”), to the individual named below as the Grantee. The terms and conditions of the grant are set forth in this Agreement and in the Advanced Energy Industries, Inc. 2017 Omnibus Incentive Plan (the “**Plan**”). Capitalized terms used but not defined in this Agreement have the meanings given to them in the Plan.

Attachment

This is not a stock certificate or a negotiable instrument.

Stock Unit Transferability

This grant is an award of restricted stock units in the number set forth on the cover sheet, subject to the vesting conditions described below (“**RSUs**”). Your RSUs may not be transferred, assigned, pledged or hypothecated, whether by operation of law or otherwise, nor may your RSUs be made subject to execution, attachment or similar process.

Vesting

Your RSUs shall vest according to the schedule set forth on the cover sheet; **provided**, that, you remain in Service on the relevant vesting dates. If your Service terminates for any reason, you will forfeit any RSUs in which you have not yet become vested.

Notwithstanding anything in this Agreement to the contrary, your RSUs shall not vest unless and until you confirm that you are not obliged to make any Hart-Scott-Rodino filings in connection with the vesting of your award of RSUs.

Delivery of Stock Pursuant to Vesting of RSUs

A certificate for the shares of Stock represented by your RSUs typically shall be delivered to you upon vesting, unless the Administrator (in its sole discretion) allows you to elect to defer delivery of such Stock and you make such election in a timely manner. If your Service terminates for a reason other than for Cause prior to such date of election, you will instead be delivered a certificate for the vested portion of your RSUs represented by this Agreement. If your Service terminates for Cause, you shall forfeit of all of your RSUs.

Notwithstanding the preceding paragraph:

- If you are a “key employee” within the meaning of Section 409A of the Code and shares would otherwise be delivered to you on account of your separation from Service, then such
-

shares shall not be delivered to you until six months after your separation from Service; and

If the shares relating to the vested RSUs would otherwise be delivered during a period in which you are (i) subject to a lock-up agreement restricting your ability to sell shares of Stock in the open market or (ii) restricted from selling shares of Stock in the open market because you are not then eligible to sell under the Company's insider trading or similar plan or policy as then in effect (whether because a trading window is not open or you are otherwise restricted from trading), delivery of the shares related to the vested RSUs may be delayed until no earlier than the first date on which you are no longer prohibited from selling shares of Stock due to a lock-up agreement or insider trading plan or policy restriction; provided, however, that the delivery of the shares related to vested RSUs will be made within 2 ½ months after the end of taxable year in which the RSUs vest or such other time as is required to comply with the requirements of Section 409A of the Internal Revenue Code.

Deferral of Delivery of Stock

The American Jobs Creation Act of 2004 added Section 409A to the Internal Revenue Code. Section 409A of the Internal Revenue Code provides that deferred compensation that is not structured to satisfy Section 409A may result in accelerated federal income taxation, a 20% penalty tax applied in addition to federal income tax otherwise owed and, potentially, interest for any underpayment of tax at the ordinary underpayment rate plus one percentage point. RSUs that allow for deferral of delivery of stock following vesting are likely to be impacted. For this reason, unless you have received written notice otherwise, the Administrator does not intend to allow for such deferral.

Withholding Taxes

You agree, as a condition of this grant, that you will make acceptable arrangements to pay any withholding or other taxes that may be due as a result of vesting in RSUs or your acquisition of Stock under this grant. In the event that the Company determines that any federal, state, local or foreign tax or withholding payment is required relating to your RSUs, the Company will have the right to: (i) require that you arrange such payments to the Company, (ii) withhold such amounts from other payments due to you from the Company or any affiliate, or (iii) cause an immediate forfeiture of shares of Stock subject to the RSUs granted pursuant to this Agreement in an amount equal to the withholding or other taxes due.

Corporate Transaction

Notwithstanding the vesting schedule set forth above, upon the consummation of a Corporate Transaction, the RSUs will become

100% vested if it is not assumed, or equivalent RSUs are not substituted for the RSUs, by the Company or its successor.

Employment Rights

This Agreement does not confer on you any right with respect to continuance of employment or other service with the Company or of its affiliates, nor will it interfere in any way with any right the Company or its affiliates would otherwise have to terminate or modify the terms of your employment or other service at any time.

You acknowledge and understand that this grant of RSUs and any future RSUs granted under the Plan are wholly discretionary in nature and are not to be considered part of any normal or expected compensation that is or would be subject to severance, resignation, redundancy or similar pay, other than to the extent required by local law.

Shareholder Rights

You do not have any of the rights of a shareholder with respect to the RSUs, unless and until the Stock relating to the RSUs has been delivered to you.

Adjustments

In the event of a stock split, a stock dividend or a similar change in the Company stock, the number of RSUs covered by this grant will be adjusted (and rounded down to the nearest whole number) in accordance with the terms of the Plan.

Applicable Law

This Agreement will be interpreted and enforced under the laws of the State of Colorado, other than any conflicts or choice of law rule or principle that might otherwise refer construction or interpretation of this Agreement to the substantive law of another jurisdiction.

Consent to Electronic Delivery

The Company may choose to deliver certain statutory materials relating to the Plan in electronic form. By accepting this grant you agree that the Company may deliver the Plan prospectus and the Company's annual report to you in an electronic format. If at any time you would prefer to receive paper copies of these documents, as you are entitled to receive, the Company would be pleased to provide copies. Please contact the Stock Plan Administrator to request paper copies of these documents.

Consent to Process Personal Data

You acknowledge that in order to perform its requirements under this Plan, the Company and its affiliates may process sensitive personal data about you. Such data include but are not limited to the information provided above and any changes thereto and other appropriate personal and financial data about you. You hereby give explicit consent to the Company to process any such personal data and/or sensitive personal data. You also hereby give explicit consent to the Company to transfer any such personal data and/or sensitive personal data outside the country

in which you are employed, and to the United States. The legal persons for whom such personal data are intended are Advanced Energy Industries, Inc. and E*TRADE. You have been informed of your right of access and correction to your personal data by applying to Advanced Energy's stock plan administrator.

The Plan

The text of the Plan is incorporated in this Agreement by reference. This Agreement and the Plan constitute the entire understanding between you and the Company regarding this grant of RSUs. Any prior agreements, commitments or negotiations concerning this grant are superseded. The Plan will control in the event any provision of this Agreement should appear to be inconsistent with the terms of the Plan.

You understand that the Company has reserved the right to amend or terminate the Plan at any time, and that the grant of an RSU under the Plan at one time does not in any way obligate the Company or its affiliates to grant additional RSUs in any future year or in any given amount.

The following shall apply with respect to the vesting of a RSU if, on the date of such vesting, you are a resident in a country where stock is not offered but instead is settled in Cash at vesting. (Please contact Human Resources for a list of such countries):

Withholding Taxes

As soon as reasonably practical, you shall be entitled to payment of the proceeds of the transaction. You agree as a condition of this grant that any resulting taxes due, the Company shall have the right to take such action, so as to satisfy and pay an amount equal to the withholding or other taxes due to the Company.

By accepting this Agreement, you agree to all of the terms and conditions described above and in the Plan.

ADVANCED ENERGY INDUSTRIES, INC.
LONG TERM INCENTIVE PLAN
2017 OMNIBUS INCENTIVE PLAN

LTI PERFORMANCE STOCK UNIT AGREEMENT

Advanced Energy Industries, Inc., a Delaware corporation (the “*Company*”), hereby awards performance stock units (“*PSUs*”) relating to shares of its common stock, \$0.001 par value (the “*Stock*”), to you in the amounts outlined in the attached Notice of Award of Performance Stock Units (the “*Notice of Award*”). The terms and conditions of the award are set forth in this Agreement, the _____ Long-Term Incentive Plan (“*LTI Plan*”) and the Advanced Energy Industries, Inc. 2017 Omnibus Incentive Plan (the “*2017 Plan*”). Capitalized terms used but not defined in this Agreement have the meanings given to them in the LTI Plan and 2017 Plan.

Attachment

This is not a stock certificate or a negotiable instrument.

Stock Unit Transferability

This is an award of performance stock units in the number identified in the Notice of Award, subject to the vesting conditions described below (“*PSUs*”). Your PSUs may not be transferred, assigned, pledged or hypothecated, whether by operation of law or otherwise, nor may your PSUs be made subject to execution, attachment or similar process.

Vesting

This is a performance-based award of PSUs that may result in shares of the Company’s common stock being granted and vested if the Company’s meets or exceeds the performance metrics outlined in the LTI Plan. Please note that the Company may settle all or a portion of the shares underlying the PSUs by the payment of cash, or a combination of cash and shares, as outlined in the LTI Plan.

Your PSUs only vest as set forth in the LTI Plan; **provided**, that, you remain in Service on the relevant vesting dates if allowed under the LTI Plan. If your Service terminates for any reason, you will forfeit any PSUs in which you have not yet become vested.

Notwithstanding anything in this Agreement to the contrary, your PSUs shall not vest unless and until you confirm that you are not obliged to make any Hart-Scott-Rodino filings in connection with the vesting of your award of PSUs.

Delivery of Stock Pursuant to Vesting of PSUs

A certificate for the shares of Stock represented by your PSUs typically shall be delivered to you upon vesting, unless the Administrator (in its sole discretion) allows you to elect to defer delivery of such Stock and you make such election in a timely manner. If your Service terminates for Cause, you shall forfeit of all of your PSUs.

Notwithstanding the preceding paragraph:

If you are a “key employee” within the meaning of Section 409A of the Code and shares would otherwise be delivered to you on account of your separation from Service, then such shares shall not be delivered to you until six months after your separation from Service; and

If the shares relating to the vested PSUs would otherwise be delivered during a period in which you are (i) subject to a lock-up agreement restricting your ability to sell shares of Stock in the open market or (ii) restricted from selling shares of Stock in the open market because you are not then eligible to sell under the Company’s insider trading or similar plan as then in effect (whether because a trading window is not open or you are otherwise restricted from trading), delivery of the shares related to the vested PSUs may be delayed until no earlier than the first date on which you are no longer prohibited from selling shares of Stock due to a lock-up agreement or insider trading plan restriction; provided, however, that the delivery of the shares related to vested PSUs will be made within 2 ½ months after the end of taxable year in which the PSUs vest or such other time as is required to comply with the requirements of Section 409A of the Internal Revenue Code.

Deferral of Delivery of Stock

The American Jobs Creation Act of 2004 added Section 409A to the Internal Revenue Code. Section 409A of the Internal Revenue Code provides that deferred compensation that is not structured to satisfy Section 409A may result in accelerated federal income taxation, a 20% penalty tax applied in addition to federal income tax otherwise owed and, potentially, interest for any underpayment of tax at the ordinary underpayment rate plus one percentage point. PSUs that allow for deferral of delivery of stock following vesting are likely to be impacted. For this reason, unless you have received written notice otherwise, the Administrator does not intend to allow for such deferral.

Withholding Taxes

You agree, as a condition of this award, that you will make acceptable arrangements to pay any withholding or other taxes that may be due as a result of vesting in PSUs or your acquisition of Stock under this award. In the event that the Company determines that any federal, state, local or foreign tax or withholding payment is required relating to the delivery of shares under your PSUs, the

Company will have the right to: (i) require that you arrange such payments to the Company, (ii) withhold such amounts from other payments due to you from the Company or any affiliate, or (iii) cause an immediate forfeiture of shares of Stock subject to the PSUs awarded pursuant to this Agreement in an amount equal to the withholding or other taxes due.

Corporate Transaction

Notwithstanding the vesting schedule set forth in the LTI Plan, upon the consummation of a Corporate Transaction, the PSUs will become 100% vested if it is not assumed, or equivalent PSUs are not substituted for the PSUs, by the Company or its successor. Vesting may also occur pursuant to the terms of a separate authorized agreement.

Employment Rights

This Agreement does not confer on you any right with respect to continuance of employment or other service with the Company or of its affiliates, nor will it interfere in any way with any right the Company or its affiliates would otherwise have to terminate or modify the terms of your employment or other service at any time.

You acknowledge and understand that this award of PSUs and any future PSUs awarded under the LTI Plan and 2017 Plan are wholly discretionary in nature and are not to be considered part of any normal or expected compensation that is or would be subject to severance, resignation, redundancy or similar pay, other than to the extent required by local law.

Shareholder Rights

You do not have any of the rights of a shareholder with respect to the PSUs, unless and until the Stock relating to the PSUs has been delivered to you.

Adjustments

In the event of a stock split, a stock dividend or a similar change in the Company stock, the number of PSUs covered by this award will be adjusted (and rounded down to the nearest whole number) in accordance with the terms of the LTI Plan and 2017 Plan.

Applicable Law

This Agreement will be interpreted and enforced under the laws of the State of Colorado, other than any conflicts or choice of law rule or principle that might otherwise refer construction or interpretation of this Agreement to the substantive law of another jurisdiction.

Consent to Electronic Delivery

The Company may choose to deliver certain statutory materials relating to the LTI Plan and 2017 Plan in electronic form. By accepting this award, you agree that the Company may deliver the 2017 Plan prospectus and the Company's annual report to you in an electronic format. If at any time you would prefer to receive paper copies of these documents, as you are entitled to receive, the Company would be pleased to provide copies. Please contact

the Stock Plan Administrator to request paper copies of these documents.

Consent to Process Personal Data

You acknowledge that to perform its requirements under the LTI Plan and 2017 Plan, the Company and its affiliates may process sensitive personal data about you. Such data include but are not limited to the information provided in the Notice of Award and any changes thereto and other appropriate personal and financial data about you. You hereby give explicit consent to the Company to process any such personal data and/or sensitive personal data. You also hereby give explicit consent to the Company to transfer any such personal data and/or sensitive personal data outside the country in which you are employed, and to the United States. The legal persons for whom such personal data are intended are Advanced Energy Industries, Inc. and E*TRADE. You have been informed of your right of access and correction to your personal data by applying to Advanced Energy's stock plan administrator.

The Plan

The text of the LTI Plan and the 2017 Plan is incorporated in this Agreement by reference. This Agreement, LTI Plan and the 2017 Plan constitute the entire understanding between you and the Company regarding this award of PSUs. Any prior agreements, commitments or negotiations concerning this award are superseded. The LTI Plan and the 2017 Plan will control in the event any provision of this Agreement should appear to be inconsistent with the terms of the LTI Plan and 2017 Plan.

You understand that the Company has reserved the right to amend or terminate the LTI Plan and the 2017 Plan at any time, and that the award of a PSU under the LTI Plan and 2017 Plan at one time does not in any way obligate the Company or its affiliates to award additional PSUs in any future year or in any given amount.

The following shall apply with respect to the vesting of a PSU if, on the date of such vesting, you are a resident in a country where stock is not offered (please contact Human Resources for a list of such countries):

Delivery of Stock Pursuant to Vesting of PSUs

Upon the vesting of this PSU, you shall authorize the Company to direct the broker to immediately sell any and all shares of Stock that otherwise would have been delivered net of applicable withholding taxes and acquisition consideration due to the Company. This Agreement shall serve as your express authorization to immediately sell any and all shares of Stock to be acquired upon the vesting of this PSU. As soon as reasonably practical, you shall be entitled to payment of the proceeds resulting from such sale, net of the applicable tax withholding and acquisition consideration (if any) due to the Company.

Withholding Taxes

You agree, as a condition of this award, that the Company shall have the right to either (1) cause an immediate forfeiture of a

number of shares of Stock subject to the PSUs awarded pursuant to this Agreement, or (2) take such other action, so as to satisfy and pay an amount equal to the withholding or other taxes due to the Company.

By accepting this Agreement, you agree to all of the terms and conditions described above and in the LTI Plan and the 2017 Plan.

SUBSIDIARIES OF THE REGISTRANT

Name	Jurisdiction of Incorporation or Organization
Advanced Energy Industries, Inc.	United States
Advanced Energy Industries (Shenzhen) Co., Ltd.	China
Advanced Energy Industries AE - Israel Ltd.	Israel
Advanced Energy Industries, GmbH	Germany
Advanced Energy Industries Limited	Hong Kong
Advanced Energy Industries U.K., Ltd.	United Kingdom
Advanced Energy Industries, Inc. Shanghai	China
Advanced Energy Japan K.K.	Japan
Advanced Energy Services PTE. Ltd.	Singapore
Advanced Energy Singapore PTE. Ltd.	Singapore
Advanced Energy Taiwan, Ltd.	Taiwan
Advanced Energy Xi'an Co., Ltd.	China
Advanced Energy Industries (Malaysia) SDN. BHD.	Malaysia
AE Korea, Ltd.	South Korea
AE Power Singapore Pte Ltd.	Singapore
AEI Canada, Inc.	Canada
AEI Finance GmbH & Co., KG	Germany
AEI Finance Limited	Hong Kong
AEI Finance Verwaltungs GmbH	Germany
AEI Holdings GmbH	Germany
AEI Irish Holdings Ltd.	Ireland
AEI Korea Services, Ltd.	South Korea
AEI Power GmbH	Germany
AEI Power India PVT. Ltd.	India
AEI US Subsidiary, LLC	United States
AES Global Holding PTE Ltd.	Singapore
Artesyn Embedded Technologies (Hong Kong) Limited	Hong Kong
Artesyn Embedded Technologies GmbH	Germany
Artesyn Embedded Technologies Philippines Inc.	Philippines
Artesyn Embedded Technologies, Inc.	United States
Artesyn Technologies Asia-Pacific Ltd.	Hong Kong
Astec Agencies Limited	Hong Kong
Astec Agencies Limited [Philippines ROHQ]	Philippines
Astec Agencies Limited [Taiwan Branch]	Taiwan
Astec America, LLC	United States
Astec Custom Power (Singapore) Pte. Ltd.	Singapore
Astec Electronics Company Limited	China
Astec Electronics Company Limited [Beijing Branch]	China
Astec Electronics Company Limited [Xi'an Branch]	China
Astec Europe Limited	United Kingdom
Astec Europe Limited [Austria Branch]	Austria
Astec Europe Limited [Italy Branch]	Italy
Astec Europe Limited [Ireland Branch]	Ireland
Astec International Limited	Hong Kong
Astec Power Philippines, Inc.	Philippines
Astec Power Supply (Shenzhen) Company Limited	China
Embedded Computing & Power (India) Private Limited	India
Excelsys Group Ltd.	Ireland
Excelsys Holdings Ltd.	Ireland
Excelsys Technologies Ltd.	Ireland
HiTek DB Pension Scheme Trustees Ltd	England
HiTek Power GmbH	Germany

Name	Jurisdiction of Incorporation or Organization
HiTek Power Ltd.	United Kingdom
Industrias SL S.A. de C.V.	Mexico
LumaSense Equipments India Pvt. Ltd.	India
LumaSense Europe GmbH	Germany
LumaSense Sensor GmbH	Germany
LumaSense Technologies A/S	Denmark
LumaSense Technologies B.V.	Netherlands
LumaSense Technologies GmbH	Germany
LumaSenseTechnologies Holdings, Inc.	United States
LumaSense Technologies SARL	France
LumaSenseTechnologies, Inc.	United States
Microware Manufacturing Limited	United Kingdom
Sekidenko, Inc.	United States
Siren Acquisition Sub, Inc.	United States
SL Power Electronics Corporation	United States
SL Power Electronics Limited	United Kingdom
SL Xianghe Power Electronics Corporation	China
SL Shanghai Power Electronics Corporation	China
Solvix GmbH	Switzerland
Solvix LLC	United States
Stourbridge Holdings (UK) Limited	United Kingdom
String Inverter Repair Services LLC	United States
TJ Acquisition Subsidiary, Inc.	United States
Tegam, Inc.	United States
Trek Holdings Co., Ltd.	Japan
Trek Japan K.K.	Japan
Trek, Inc.	United States
UltraVolt Group Inc.	United States
UltraVolt, Inc.	United States
Versatile Power, Inc.	United States
Zhongshan Artesyn Technologies Co., Ltd.	China

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

- (1) Registration Statements (Form S-3 Nos. 333-167027; 333-87459; and 333-34039) of Advanced Energy Industries, Inc., and
- (2) Registration Statements (Form S-8 Nos. 333-221376; 333-168519; 333-167741; 333-152865; 333-129858; 333-105367; 333-69150; and 333-04073) of Advanced Energy Industries, Inc.

of our reports dated February 17, 2023, with respect to the consolidated financial statements of Advanced Energy Industries, Inc. and the effectiveness of internal control over financial reporting of Advanced Energy Industries, Inc. included in this Annual Report (Form 10-K) of Advanced Energy Industries, Inc. for the year ended December 31, 2022.

/s/ Ernst & Young LLP

Denver, Colorado
February 17, 2023

SECTION 302 CERTIFICATION OF CHIEF EXECUTIVE OFFICER

I, Stephen D. Kelley, certify that:

1. I have reviewed this annual report on Form 10-K for the period ended December 31, 2022 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 17, 2023

/s/ Stephen D. Kelley

Stephen D. Kelley
Chief Executive Officer

SECTION 302 CERTIFICATION OF CHIEF FINANCIAL OFFICER

I, Paul Oldham, certify that:

1. I have reviewed this annual report on Form 10-K for the period ended December 31, 2022 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 17, 2023

/s/ Paul Oldham

Paul Oldham
Chief Financial Officer & Executive Vice President

**WRITTEN STATEMENT OF CHIEF EXECUTIVE OFFICER
FURNISHED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002 (18 U.S.C. SECTION 1350)
AND FOR THE PURPOSE OF COMPLYING WITH RULE 13a-14(b)
OF THE SECURITIES EXCHANGE ACT OF 1934**

The undersigned, the Chief Executive Officer of Advanced Energy Industries, Inc. (the “Company”), hereby certifies that to his knowledge on the date hereof:

- a) the Annual Report on Form 10-K of the Company for the year ended December 31, 2022 filed on the date hereof with the Securities and Exchange Commission (the “Report”) fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- b) information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 17, 2023

/s/ Stephen D. Kelley

Stephen D. Kelley
Chief Executive Officer

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version 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.

**WRITTEN STATEMENT OF CHIEF FINANCIAL OFFICER
FURNISHED PURSUANT TO SECTION 906
OF THE SARBANES-OXLEY ACT OF 2002 (18 U.S.C. SECTION 1350)
AND FOR THE PURPOSE OF COMPLYING WITH RULE 13a-14(b)
OF THE SECURITIES EXCHANGE ACT OF 1934**

The undersigned, the Chief Financial Officer of Advanced Energy Industries, Inc. (the “Company”), hereby certifies that to his knowledge on the date hereof:

- a) the Annual Report on Form 10-K of the Company for the year ended December 31, 2022 filed on the date hereof with the Securities and Exchange Commission (the “Report”) fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- b) information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 17, 2023

/s/ Paul Oldham

Paul Oldham

Chief Financial Officer & Executive Vice President

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version 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.
