VICOR CORP
Form 10-K
February 28, 2019
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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, 2018

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 0-18277

VICOR CORPORATION

(Exact name of registrant as specified in its charter)

Delaware	**04-2742817**
(State or other jurisdiction of incorporation or organization)	*(IRS employer identification no.)*
25 Frontage Road, Andover, Massachusetts	**01810**
(Address of principal executive offices)	*(Zip code)*

Registrant s telephone number, including area code:

(978) 470-2900

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

Common Stock, $.01 par value	**The NASDAQ Stock Market LLC**
(Title of Class)	*(Name of Each Exchange on Which Registered)*

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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 is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

The aggregate market value of the voting and non-voting common equity of the registrant held by non-affiliates (for this purpose, persons and entities other than executive officers and directors) of the registrant, as of the registrant s most recently completed second fiscal quarter (June 30, 2018) was approximately $750,683,000.

	Number of Shares of Common Stock
Title of Each Class	*Outstanding as of February 21, 2019*
Class A Common Stock	28,453,729
Class B Common Stock	11,758,218

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Company s definitive proxy statement (the Definitive Proxy Statement) to be filed with the Securities and Exchange Commission pursuant to Regulation 14A and relating to the Company s 2019 annual meeting of stockholders are incorporated by reference into Part III.

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PART I

In this Annual Report on Form 10-K, unless the context indicates otherwise, references to Vicor®, the Company, our company, we, us, our, and similar references, refer to Vicor Corporation and its subsidiaries, unless otherwise specified.

The Company s consolidated operating results are affected by a wide variety of factors that could materially and adversely affect revenues and profitability, including the risk factors described in Item 1A of this Annual Report on Form 10-K. As a result of these and other factors, the Company may experience material fluctuations in future operating results on a quarterly or annual basis, which could materially and adversely affect its business, consolidated financial condition, operating results, and the share price of its listed common stock. This document and other documents filed by the Company with the Securities and Exchange Commission (SEC) include forward-looking statements regarding future events and the Company s future results that are subject to the safe harbor afforded under the Private Securities Litigation Reform Act of 1995 and other safe harbors afforded under the Securities Act of 1933 and the Securities Exchange Act of 1934. All statements other than statements of historical fact are statements that could be deemed forward-looking statements. Forward-looking statements are based on our current beliefs, expectations, estimates, forecasts, and projections for the future performance of the Company. Forward-looking statements are identified by the use of the words denoting uncertain, future events, such as anticipate, assume, believe, continue, could, estimate, expect, future, if, intend, may, plan, potential, project, prospective, or would, as well as similar words and phrases, including the negatives of these terms, or other variations thereof. Forward-looking statements also include statements regarding: our ongoing development of power conversion architectures, switching topologies, materials, packaging, and products; the ongoing transition of our business strategically, organizationally, and operationally from serving a large number of relatively low volume customers across diversified markets and geographies to serving a small number of relatively large volume customers; our intent to enter new market segments; the levels of customer orders overall and, in particular, from large customers and the delivery lead times associated therewith; the financial and operational impact of customer changes to shipping schedules; the derivation of a portion of our sales in each quarter from orders booked in the same quarter; our intent to expand the percentage of revenue associated with licensing our intellectual property to third parties; our plans to invest in expanded manufacturing capacity and the timing, location, and funding thereof; our belief cash generated from operations and the total of our cash and cash equivalents will be sufficient to fund operations for the foreseeable future; our belief that we have limited exposure to currency risks; our intentions regarding the declaration and payment of cash dividends; our intentions regarding protecting our rights under our patents; and our expectation that no current litigation or claims will have a material adverse impact on our financial position or results of operations. These forward-looking statements are based upon our current expectations and estimates associated with prospective events and circumstances that may or may not be within our control and as to which there can be no assurance. Actual results could differ materially from those implied by forward-looking statements as a result of various factors, including but not limited to those described under Part I, Item 1 Business, under Part I, Item 1A Risk Factors, under Part I, Item 3 Legal Proceedings, and under Part II, Item 7 Management s Discussion and Analysis of Financial Condition and Results of Operations. The discussion of our business contained herein, including the identification and assessment of factors that may influence actual results, may not be exhaustive. Therefore, the information presented should be read together with other documents we file with the SEC from time to time, including our Quarterly Reports on Form 10-Q and our Current Reports on Form 8-K, which may supplement, modify, supersede, or update the factors discussed in this Annual Report on Form 10-K. We do not undertake any obligation to update any forward-looking statements as a result of future events or developments, except as required by law.

ITEM 1. *BUSINESS*

Overview

Vicor Corporation designs, develops, manufactures, and markets modular power components and power systems for converting electrical power (expressed as watts, and represented by the symbol W). In

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electrically-powered devices utilizing alternating current (AC) voltage from a primary AC source (for example, a wall outlet), a power system converts AC voltage into the stable direct current (DC) voltage necessary to power subsystems and/or individual applications and devices (known as loads). In many electronic devices, this DC voltage may be further converted to one or more voltages (expressed as volts, and represented by the symbol V) and currents (expressed as amperes, and represented by the symbol I) required by a range of loads. In equipment utilizing DC voltage from a primary DC source (for example, a battery) or a secondary source (such as an AC-DC converter), the initial DC voltage similarly may require further conversion. Because numerous applications requiring different DC voltages, currents, and varied power ratings may exist within an electronically-powered device, and system power architectures themselves vary, we offer an extensive range of products and accessories in numerous application-specific configurations. We believe our product offering is among the most comprehensive in the market segments we serve.

Our website, www.vicorpower.com, sets forth detailed information describing our products, the applications for which they may be used, and our suite of design tools. The information contained on our website is not a part of, nor incorporated by reference into, this Annual Report on Form 10-K and shall not be deemed filed under the Exchange Act.

We are headquartered in Andover, Massachusetts, where our manufacturing facility is located. Our subsidiaries, VI Chip Corporation, VICR Securities Corporation, and VLT, Inc., also are located in Andover, Massachusetts. Our domestic offices are located in Santa Clara, California, Lombard, Illinois, and Lincoln, Rhode Island. Our two Vicor Custom Power subsidiaries, Freedom Power Systems, Inc. and Northwest Power, Inc., are located in Cedar Park, Texas, and Milwaukie, Oregon, respectively.

We have established individual subsidiaries or branch offices outside of the United States, which we call Technical Support Centers (TSCs), to conduct preparatory and auxiliary services in support of the Company. Vicor Japan Company, Ltd. (VJCL), our 92.5%-owned Japanese subsidiary, which is engaged in sales and customer support activities exclusively for the sale of certain products customized by VJCL for the Japanese market, is headquartered in Tokyo, Japan. Vicor B.V., a wholly-owned subsidiary incorporated in the Netherlands, provides logistical and administrative support for a limited volume of orders placed directly with the Company by customers in the European Union.

In 2018, our subsidiary, Picor Corporation, was merged with and into the Company, and its operations and personnel were reassigned. We continue to occupy the former subsidiary s facility in Lincoln, Rhode Island. Also in 2018, we closed Granite Power Technologies, Inc., a Vicor Custom Power subsidiary located in Manchester, New Hampshire, transferring its operations and reassigning certain personnel.

Our subsidiaries and their legal domicile are set forth in Exhibit 21.1 to this Annual Report on Form 10-K. The activities of all of the above named entities are consolidated in the financial statements presented herein.

Although Picor Corporation has been merged with and into the Company, we continue to report our operating segments as the Brick Business Unit, VI Chip, and Picor, reflecting our historical organizational segmentation and management s operational oversight. See Note 17 *Segment Information* to the Consolidated Financial Statements presented herein for certain financial information associated with the operations and manufacturing activities of our reported operating segments.

The Company was incorporated in Delaware in 1981. Shares of our Common Stock were listed on the NASDAQ National Market System in April 1990 under the ticker symbol VICR, and we completed an initial public offering of our shares in May 1991.

Our Strategy

Since the Company was founded, our competitive position has been maintained by innovations in product design and achievements in product performance, largely enabled by our focus on the research and development

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of advanced technologies and processes, often implemented in proprietary semiconductor circuitry, materials, and packaging. Many of our products incorporate patented or proprietary implementations of high-frequency switching topologies, which enable the design of power system solutions more efficient and much smaller than conventional alternatives. Our strategy emphasizes demonstrable product differentiation and a value proposition based on competitively superior solution performance, advantageous design flexibility, and a compelling total cost of ownership (TCO).

Power system performance is primarily based on conversion efficiency (i.e., the ratio of output power (i.e., watts) to input power) and power density (i.e., the amount of output power divided by the volume of the power system). Higher efficiency and density contribute to superior thermal performance, as the by-product of power conversion and distribution is heat, which must be dissipated in order to assure the performance of the power system solution itself and the overall system to which it is delivering power. Power system performance also is based on the electrical characteristics of the power system (and their effect on and compatibility with the customer s application). Important electrical characteristics include transient responsiveness (i.e., the behavior of a power system to a voltage change) and noise profile (i.e., the level of electromagnetic interference created by power conversion). We believe the superior performance of our power systems is the most important element of our differentiation strategy.

Our strategy complements performance superiority with design flexibility (i.e., ease of use), as our products can be utilized individually or combined, given their level of integration, to create power system solutions specific to a customer s precise needs. We articulate this positioning through our Power Component Design Methodology, an element of our differentiation strategy, which is our approach to providing our customers the modular products, design tools, and engineering support to enable the rapid design of advanced power system solutions and, thereby, accelerate their own product development cycles. Our value proposition is supported by a compelling TCO, representing the cost of acquiring and operating a power system over its useful life, driven by competitive product pricing and more efficient use of power.

Our earliest market focus was on telecommunications infrastructure, which uses a standard DC distribution voltage of 48V, the highest nominal distribution voltage that meets Safety Extra-Low Voltage (SELV) standard requirements while leaving sufficient margin for over-voltage protection circuits. While we offer products addressing other voltage standards (e.g., 28V for military applications) and a broad range of customer voltage requirements, we consider our core competencies to be associated with 48V distribution, which offers numerous inherent cost and performance advantages over lower distribution voltages.

Our strategy, competitive positioning, and product offerings, all based on highly differentiated product performance, have anticipated the evolution of system power architectures and customer performance requirements. Reflecting this, we categorize our products as either Advanced or Brick (referred to in prior reports we filed with the SEC as Legacy), generally based on design, performance, and form factor considerations, as well as the range of evolving applications for which the products are appropriate. The Advanced Products category consists of our more recently introduced products, which are used to implement our proprietary Factorized Power Architecture™ (FPA), an innovative power distribution architecture enabling flexible, rapid power system design using individual components optimized to perform a specific conversion stage (i.e., function). The Brick Products category largely consists of integrated power systems (i.e., bricks), incorporating multiple conversion stages, used in conventional distributed power systems architectures (e.g., Centralized Power Architecture (CPA), Distributed Power Architecture (DPA), and Intermediate Bus Architecture (IBA)).

Given the growth profiles and performance requirements of the market segments served with Advanced Products and Brick Products, our strategy involves a transition in organizational focus, emphasizing investment in Advanced Products design and manufacturing, targeting high growth market segments with a low-mix, high-volume operational

model, while maintaining a profitable business in mature market segments we serve with Brick Products with a high-mix, low-volume operational model.

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Our Products

Reflecting our Power Component Design Methodology, we offer a comprehensive range of modular building blocks enabling design of a power system specific to a customer s precise needs. Based on design, performance, and form factor considerations, as well as the range of evolving applications for which the products are appropriate, we categorize our product portfolios as either Advanced Products or Brick Products. We also sell a range of electrical and mechanical accessories for use with our products.

Advanced Products

We continue to invest in the research and development of power system technologies and product concepts addressing two accelerating trends, the first toward higher required conversion efficiencies, and the second toward more and diverse on-board voltages, higher performance demands of complex loads, and, in particular, higher current requirements of those loads. These trends are most visible in the microprocessor-based applications we target with Advanced Products, for which energy consumption, energy efficiency, processor performance, and computing density are critical priorities. Recognizing the performance and scale limitations of conventional power distribution architectures and products, we introduced FPA and a range of enabling products incorporating our latest advances in switching topologies, materials, and packaging.

FPA, which is focused on, but not limited to, 48V distribution solutions, increases power system conversion efficiency, density, and power delivery performance by factorizing (i.e., separating) the power conversion process into individual components, free of the design limitations and performance and scaling trade-offs associated with conventional power distribution architectures requiring additional conversion stages and higher component count. FPA implementation allows for a factorized bus voltage to be distributed efficiently to the point-of-load, at which the voltage is converted to the required lower voltage and higher current. In contrast to the 12V IBA distribution commonly used in computing, for the same power requirements, factorized 48V distribution reduces the number of conversion stages required, thereby reducing component count and conserving space, reduces system distribution losses, and delivers improved thermal performance, thereby reducing system cooling challenges. Such direct conversion also improves system responsiveness. As power requirements increase, the differentiated advantages of FPA increase, as our factorized power system solutions deliver unmatched system conversion efficiencies, power densities, thermal profiles, and application performance.

Our FPA implementations with supercomputer and hyperscale datacenter customers involve our PRM® (Pre-Regulator Module), to create a non-isolated, factorized 48V bus voltage at relatively low current, and our VTM® (Voltage Transformation Module), a current multiplier delivering the required high current to the central processing unit (CPU). A typical 48V server motherboard implementation of FPA, utilizing a PRM-VTM configuration to power a CPU requiring less than 200W, would typically deliver 1.8V and 95A average current, with far fewer components and far less required motherboard space than competitive, multi-stage solutions with lower system conversion efficiency.

In 2017, we introduced our next generation of power system solution, Power-on-Package, which was specifically developed to meet the computational performance requirements of artificial intelligence (AI). The microprocessors typically used in AI, particularly in more computationally demanding machine learning applications, are graphics processing units (GPUs) and custom application-specific integrated circuits (ASICs). Both GPUs and ASICs, in contrast to CPUs, are designed for parallel processing throughput, not execution of complex instruction sets. As such, higher levels of average and peak current are required to achieve this throughput. Our Power-on-Package solution, a re-integration of the functions of our PRM-VTM configuration, consists of one Modular Current Driver© (MCD), providing high-bandwidth, low-noise regulation, and two Modular Current Multipliers© (MCMs), providing high

performance current multiplication. Power-on-Package delivers unprecedented current levels to GPUs and ASICs, in part due to the placement of the MCMs directly on the substrate onto which the processor is mounted, thereby minimizing distribution losses associated with such high current. A typical Power-on-Package configuration powering a GPU requiring 350W

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would deliver 0.7V and 500A average current and up to 1,000A peak current, with unmatched power density, which is a critical requirement for small, area-constrained AI accelerator boards. We are unaware of any competitive solution offering such power system performance, as competitive solutions achieve increased power through additional, multi-phase conversion stages, which do not meet the space and thermal limitations of AI accelerators.

Our patented and proprietary technologies also enable a range of Advanced Products applicable to other market segments and power distribution architectures other than FPA. Within computing, these market segments include voltage distribution in server racks and across datacenter infrastructure. We also offer Advanced Product power system solutions for aerospace and aviation (e.g., for use in satellites and unmanned aerial vehicles); defense electronics (e.g., for use in airborne, seaborne, or field radar); industrial automation, instrumentation, and test equipment (e.g., for use in robotics and semiconductor testing); solid state lighting (e.g., for use large scale signage); telecommunications and networking infrastructure (e.g., for use in pole-mounted small-cell base stations); and vehicles (e.g., in autonomous driving applications, electric vehicles, and hybrid electric vehicles).

Advanced Products are offered in various package formats across functional families.

Annual revenue associated with the sale of Advanced Products, representing the sum of third-party revenue of our VI Chip and Picor operating segments, was approximately 35.9%, 33.4%, and 24.4% of the Company s consolidated revenue for the years ended December 31, 2018, 2017, and 2016, respectively. We anticipate the percentage of periodic revenue associated with the sale of Advanced Products will continue to increase, given our strategic and organizational focus and the relatively higher expected growth of the market segments we serve.

Brick Products

Brick-format converters provide the integrated transformation, regulation, isolation, filtering, and/or input protection necessary to power and protect loads, across a range of conventional power distribution architectures. We offer a wide range of brick-format DC-DC converters, as well as complementary components providing AC line rectification, input filtering, power factor correction, and transient protection. Wide ranges of input voltages, output voltages, and output power are offered, allowing end users to select components appropriate to their individual applications. The products differ in dimensions, temperature grades, maximum power ratings, performance characteristics, pin configuration, and, in certain cases, characteristics specific to the targeted market.

We also integrate these converters and components into complete power systems representing standard or custom AC-DC and DC-DC solutions for our customers power needs. We refer to such standard products as our Configurable product line, while our two Vicor Custom Power subsidiaries design, sell, and service custom power system solutions.

We market our standard Brick Products emphasizing mass customization, using highly automated, efficient, domestic manufacturing to serve customers with product design and performance requirements, across a wide range of worldwide market segments, which could not be met by high-volume oriented competitors. We focus on distributed power implementations, for which our brick-format products are well-suited, in market segments such as aerospace and defense electronics, industrial automation, industrial equipment, instrumentation and test equipment, and transportation (e.g., rail). Our customers range from independent manufacturers of highly specialized electronic devices to larger original equipment manufacturers (OEMs) and their contract manufacturers. Some of our Brick Product lines have been in production for over three decades, reflecting the long-established relationships we have with many customers and the long-standing suitability of our products to demanding applications.

Annual revenue associated with the sale of Brick Products, representing the sum of third-party revenue of the Brick Business Unit operating segment, inclusive of such sales of our Vicor Custom Power and VJCL

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subsidiaries, was approximately 64.1%, 66.6%, and 75.6% of the Company s consolidated revenue for the years ended December 31, 2018, 2017, and 2016, respectively.

Competition

We believe our sustainable competitive advantages are: the differentiation of our Advanced Products superior performance and power densities, enabled by our patented and proprietary technologies; the advantageous design flexibility enabled by our Power Component Design Methodology; and a compelling TCO. We seek to position ourselves with customers across all market segments served in a manner that reduces our vulnerability to commoditization. However, the competitive characteristics of market segments we serve with our transitional strategy may vary. Across all market segments we serve, competition generally is based on product performance, design flexibility (i.e., ease of use), product price, and product availability.

Despite significant consolidation of our competitors in the markets we serve with Brick Products, the growth of large-scale, low-cost foreign competitors in the commoditized segments of those markets, and increased application overlap with vendors of solutions based on semiconductors and discrete components in the markets we serve with Advanced Products, the total global merchant (i.e., non-captive) market for AC-DC and DC-DC power conversion solutions remains fragmented. The markets we serve, among which some overlap exists for our Advanced Product and Brick Product categories, are made up of many large, diversified manufacturers, as well as many smaller manufacturers focused on specialized products or narrowly defined market segments or geographies. The markets we serve with Advanced Products, typically on a direct basis, are generally characterized by relatively extended and highly competitive design cycles, product life cycles of generally less than three years, and many competitors that are far larger vendors of integrated circuits and discrete components, often using price concessions to offset performance limitations. The market segments we serve with Brick Products, typically through sales representatives and distribution partners, are generally characterized by relatively short design cycles, relatively long (i.e., greater than three years) product life cycles, and, given the maturity of many markets and applications, degrees of commoditization and price competition.

Although numerous third party industry studies estimate the total global merchant market for AC-DC and DC-DC switching power supplies to exceed $20 billion of annual revenue, representing approximately two-thirds of the total annual consumption of switching power supplies (i.e., the sum of merchant and captive volumes consumed), the Company competes in smaller, well-defined commercial and military market segments and niches within those segments. We believe, based on these third party estimates, AC-DC power supplies represent more than 85% of the total merchant market, reflecting a wide range of battery charging applications, primarily in the consumer, mobile device, and office computing segments (commodity segments in which we currently do not compete, together representing more than 50% of the total merchant market). These third party industry studies set forth estimates of varying levels of annual, dollar-based, nominal revenue growth across the merchant market segments in which we compete. These studies indicate most of the market segments we serve with Advanced Products have experienced high single-digit and low double-digit growth over the past three years. These studies also indicate most of the market segments we serve with Brick Products have experienced low to middle single-digit growth over the past three years.

Based on our own assessment of the market segments in which we do compete, we estimate the Company s total addressable market opportunity within the AC-DC portion of the merchant market may be approximately $1 billion annually. However, because this market is particularly commoditized and customer applications generally do not require the superior performance of our solutions, we pursue narrowly defined niches for which our highly differentiated front-end products, notably the PFM© and RFM©, are well-suited and competitively superior, thereby reducing our served addressable market opportunity. Should we successfully penetrate these potentially high growth niches, we believe that our served addressable market opportunity in AC-DC should expand. We estimate our total

addressable market opportunity within the DC-DC portion of the merchant market may exceed $3 billion annually. We estimate our served addressable market to exceed $1 billion annually, with a relatively high dollar and unit volume growth forecast for the market segments and niches we are pursuing with Advanced Products.

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Despite our minor share in the overall merchant market and the competitive presence of numerous, far larger vendors in the market segments and niches we serve with both Advanced Products and Brick Products, we believe we maintain an advantageous competitive position in those market segments and niches. Notably, we believe we have the largest share of 48V distribution opportunities within the segments of the computing market we serve. However, numerous competitors across these market segments and niches have significantly greater engineering, financial, manufacturing, and marketing and sales resources, as well as longer operating histories and longer customer relationships than we do.

Customers and Backlog

The applications in which our Advanced Products and Brick Products are used are typically in the higher-performance, higher-power segments of the market segments we serve. With our Advanced Product lines, we serve customers concentrated in voltage distribution in server racks and across datacenter infrastructure of the computing market, although we also target applications in aerospace and aviation, defense electronics, industrial automation, instrumentation, test equipment, solid state lighting, telecommunications and networking infrastructure, and vehicles (notably in the autonomous driving, electric vehicle, and hybrid vehicle niches of the vehicle segment). With our Brick Product lines, we serve customers concentrated in aerospace and defense electronics, industrial automation, industrial equipment, instrumentation and test equipment, and transportation (e.g., rail). With our strategic emphasis on larger, high-volume customers, we expect to experience a greater concentration of sales among relatively fewer customers.

As of December 31, 2018, the Company s order backlog was approximately $102,963,000, compared to $73,054,000 as of December 31, 2017. Backlog, as presented here, consists of orders for products for which shipment is scheduled within the following 12 months, subject to our scheduling and cancellation policies.

The lead times between receipt and acceptance of an order and our shipment of the product remained historically long through 2018, although overall conditions across the global electronics supply chain stabilized, allowing the Company to shorten production lead times for certain products in the second half of 2018. As of December 31, 2018, we were quoting to customers average lead times of 14 weeks, consistent with the lead times quoted as of December 31, 2017, although during 2018 we quoted lead times as high as 20 weeks for certain products. We expect supply availability for certain materials and components to remain uncertain for the foreseeable future, and we may further increase inventory levels for these components and raw materials, as necessary. Accordingly, we may not be able to reduce delivery lead times across all product lines for the foreseeable future.

A portion of our revenue in any quarter is, and will continue to be, derived from orders booked and shipped in the same quarter, referred to as turns volume. However, over the past two years, quarterly turns volume has steadily declined, reflecting lengthening lead times due to industry-wide supply chain uncertainties and a corresponding lengthening of customers planning horizons. An additional influence on turns volume has been our transition to larger OEM customers, which typically schedule large volumes for delivery over up to three coming quarters. While turns volume averaged approximately 41% of quarterly revenue for 2016, this quarterly average fell to 36% for 2017 and to 20% for 2018.

Marketing and Sales

We reach and serve customers through several channels: a direct sales force; a network of independent sales representative organizations in North America and South America; independent, authorized non-stocking distributors in Europe and Asia; and three authorized stocking distributors world-wide, Digi-Key Corporation, Future Electronics Incorporated, and Mouser Electronics, Inc. These channels are supported by regional TSCs, each offering application engineering and sales support for our channel partners. Domestic TSCs are located in: Andover, Massachusetts;

Lombard, Illinois; and Santa Clara, California. International TSCs are located in: Beijing, China; Hong Kong, China; Shanghai, China; Shenzhen, China; Munich, Germany; Bangalore, India;

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Milan, Italy; Tokyo, Japan; Seoul, South Korea; Taipei, Taiwan (Republic of China); and Camberley, United Kingdom. Customers do not place purchase orders with TSCs, but do so directly with the Company or with our distributors. In Japan, customers place purchase orders with authorized distributors or, for certain products, VJCL.

We generally sell our products on the basis of our standard terms and conditions, and we most commonly warrant our products for a period of two years. Effective January 1, 2017, we extended the warranty period to three years for a range of H Grade, M Grade, and MI Family DC-DC products sold after that date. In a limited number of circumstances, we have entered into supply contracts with certain high-volume customers calling for extended warranty terms. With our distribution partners, we also enter into contracts providing for our product warranties to transfer to the end customer upon final sale of our product(s) by the distributor.

Because of the technically complex nature of our products and the applications they address, we maintain an extensive staff of Field Applications Engineers to support our own sales and customer support activities, as well as those of our channel partners. Field Application Engineers, based in our TSCs, provide direct technical support worldwide by reviewing new applications and technical matters with our channel partners in support of existing and potential customers. Product Line Engineers, located in our Andover headquarters, support Field Application Engineers assigned to all of our TSCs.

Our direct sales force focuses on higher-volume opportunities involving Advanced Products with global OEMs (and the Original Design Manufacturers (ODMs) and contract manufacturers serving these OEMs). Because of the high level of product differentiation and the increasing complexity and challenges of customer requirements, we have experienced, and may continue to experience, extended design cycles before production orders are received.

We also reach customers through the electronic commerce capabilities of our website, www.vicorpower.com. Registered, qualified customers in the United States, Canada, and certain European countries are able to purchase selected products online. We expanded these capabilities during 2018 to allow for higher-volume purchases, and we intend in 2019 to expand the geographic regions reached via our website.

Our web-based resources are an important element of our efforts to interact with and support customers. Within our website, *PowerBench*™ is a workspace of tools and references allowing engineers to select, architect, and implement power systems using our products. During 2018, we continued to enhance our highly differentiated *Whiteboard*™ tool, which allows users to configure and analyze their own power system designs or those from an extensive library of designs addressing a wide range of applications. Users can modify the operating condition for each component of their design to match the intended application and perform efficiency and loss analysis of individual components and the full power system. We continue to enhance and expand the range and capabilities of engineering tools we make available online to customers and prospective customers.

As stated, our strategy involves maintaining high levels of customer engagement and support for design and engineering, which has resulted in significant expansion of our sales and application engineering infrastructure over historical levels, notably across Asia. We incurred approximately $42,533,000, $40,438,000, and $37,967,000 in marketing and sales expenses in 2018, 2017, and 2016, respectively, representing approximately 14.6%, 17.7%, and 19.0% of revenues in 2018, 2017, and 2016, respectively.

Manufacturing, Quality Assurance, and Supply Chain Management

Our 230,000 sq. ft. manufacturing facility is located in Andover, Massachusetts, where we are headquartered. In this facility, we manufacture Brick Products, with the exception of custom products produced by our Vicor Custom Power and VJCL subsidiaries, and Advanced Products, with the exception of products designed and sourced by our Picor

operating segment, which, given its fabless model, are manufactured, packaged, and tested by third party wafer foundries and packaging contractors in the United States and Asia.

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Our primary manufacturing processes consist of assembly of electronic components onto printed circuit boards; automatic testing of components; wave, reflow and infrared soldering of assembled components; encapsulation or over-molding of converter subassemblies and assemblies; final environmental stress screening of certain products; and product inspection and testing using automated equipment. These processes are largely automated, but their labor components require relatively high levels of skill and training.

We continue to make investments in automated manufacturing equipment, particularly for expansion of production capacity for Advanced Products. Beginning in the fourth quarter of 2018, we began the installation of equipment that, when fully qualified and operational, currently anticipated in the first quarter of 2019, is expected to increase our Advanced Products capacity by approximately 35%. Also in the fourth quarter of 2018, we began detailed development of plans to expand our existing manufacturing floor space by approximately 85,000 usable square feet. We plan to break ground on this addition to our existing plant in 2019 and take occupancy in 2020. The planned addition of multiple manufacturing lines in this additional space, across 2020 and 2021, is expected to increase our Advanced Products capacity by an additional 100%.

Our plans for the additional capacity do not include certain processes necessary for the manufacture of our SM-ChiP© line of surface-mounted converters. As previously disclosed, in December 2017 we began collaborating with a highly sophisticated contractor capable of meeting our near-term volume expectations with acceptable quality and cost. Through 2018 we expanded our relationship with this contractor, refining process steps and investing in specialized equipment for use by the contractor. As such, we have revised our schedule for taking such processes in-house, and expect to meet our forecast needs for SM-ChiP production with this contractor for the foreseeable future.

Product quality and reliability are critical to our success and, as such, we emphasize quality and reliability in our design and manufacturing activities. We follow industry best practices in manufacturing and are compliant with ISO 9001 certification standards (as set forth by the International Organization for Standardization). Our quality assurance practices include rigorous testing and, as necessary, burn-in and temperature cycling (i.e., extended operation of a product to confirm performance) of our products using automated equipment. Incoming components, assemblies, and other parts are subjected to several levels of inspection procedures, and we maintain robust data on our raw material inventories in order to support our quality assurance procedures.

Components and materials used in our products are purchased from a variety of domestic and international vendors. The global electronics supply chain stabilized in 2018, but lead times for delivery of certain raw materials required for the manufacturing of our products remain extended. Most of these raw materials are available from multiple sources, whether directly from suppliers or indirectly through distributors, and during 2018 we continued to opportunistically expand certain raw material inventories to offset the uncertainties associated with availability and lead times.

Our Picor operating segment, given its fabless model, relies on a limited number of wafer foundries and providers of packaging and test services. Our proprietary switching controllers were designed by and are sourced through Picor, which relies on these wafer foundries and service providers for supply continuity and sufficiency of these critical semiconductor devices. Similarly, many of the proprietary semiconductors we use, for which we have either a manufacturing license or ownership of the designs, are sourced from third parties through Picor.

To date, we have not experienced delays or reduced raw material availability as a result of trade disputes between the United States and China, including the imposition earlier this year of import tariffs under the provisions of Section 301 of the Trade Act of 1974 (19 U.S.C. § 2411) (Section 301 Tariffs) on certain Chinese goods imported into the United States. We have not incurred a material amount of tariff charges, either directly or indirectly, on our purchases of raw materials.

Intellectual Property

Our competitive positioning has been, and will continue to be, supported by our long-standing commitment to research and development of power conversion technologies, advanced packaging and manufacturing, and

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innovative approaches to solving customer problems. Our research and development activities have resulted in important domestic and foreign patents protecting our products and enabling technologies, as well as proprietary trade secrets associated with our use of certain components and materials of our own design and proprietary manufacturing, packaging, and testing processes. We incurred approximately $44,286,000, $44,924,000, and $41,848,000 in research and development expenses in 2018, 2017, and 2016, respectively, representing approximately 15.2%, 19.7%, and 20.9% of revenues in 2018, 2017, and 2016, respectively.

We believe our intellectual property affords advantages by building fundamental and multilayered barriers to competitive encroachment upon key features and performance benefits of our principal product families. Our patents cover the fundamental switching topologies used to achieve the performance attributes of our converter product lines; converter array architectures; product packaging design; product construction; high frequency magnetic structures; and automated equipment and methods for circuit and product assembly.

As of December 31, 2018, in the United States, we have been issued 106 total patents. These patents have expirations scheduled between 2019 and 2037. We also have a number of patent applications pending in the United States and certain countries of Europe and Asia, including applications that would extend the life of current patents. We have vigorously protected our rights under these patents and will continue to do so. Although we believe patents are an effective way of protecting our technology, there can be no assurances our patents will prove to be enforceable in any given jurisdiction.

In addition to generating revenue from product sales, we seek to license our intellectual property. In granting licenses, we generally retain the right to use our patented technologies and manufacture and sell our products in all licensed geographic areas and fields of use. Licenses are granted and administered through our wholly-owned subsidiary, VLT, Inc., which is the assignee for our patents that may be subject to licensing. Revenues from licensing arrangements have not exceeded 10% of our consolidated revenues in any of the last three fiscal years.

Employees

As of December 31, 2018, we had 976 full time employees and 31 part time employees. The number of part time employees varies throughout any year, largely based on the number of production shifts we may require at a particular time, as well as the number of college and graduate students participating in short term co-op programs. None of our employees are subject to a collective bargaining agreement. We believe our continued success depends, in part, on our ability to attract and retain qualified personnel. Although there is strong demand for qualified personnel, we have not to date experienced meaningful difficulty in attracting and retaining sufficient engineering and technical personnel to meet our needs (see Part I, Item 1A Risk Factors).

Available Information

We maintain a website with the address www.vicorpower.com and make available free of charge through this website our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, as soon as reasonably practicable after we electronically file such material with, or furnish such material to, the SEC. We also make available on our website our Code of Business Conduct, as well as the charters for the Audit and Compensation Committees of our Board of Directors.

While our website sets forth extensive information, including information regarding our products and the applications in which they may be used, such information is not a part of, nor incorporated by reference into, this Annual Report on Form 10-K and shall not be deemed filed under the Exchange Act.

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ITEM 1A. ***RISK FACTORS***

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Exchange Act. Actual results could differ materially from those projected in the forward-looking statements as a result of, among other factors, the risk factors set forth below.

Our future operating results are difficult to predict and are subject to fluctuations.

Our operating results, including revenues, gross margins, operating expenses, and net income (loss), have fluctuated on a quarterly and annual basis. Our focus on higher volume opportunities with OEMs, ODMs, and contract manufacturers has caused the impact of a relative few such customers to disproportionately influence our operating results. Unanticipated delays in purchase orders from and shipments to these customers have resulted in lower than expected revenue. Despite our profitability during 2018, we cannot predict if we will maintain sustained profitability. Our future operating results may be materially influenced by a number of factors, many of which are beyond our control, including:

changes in demand for our products and for our customers end-products incorporating our products, as well as our ability to respond efficiently to such changes in demand, including changes in delivery lead times and the volume of product for which orders are accepted and the product shipped within an individual quarter (i.e., turns volume);

our ability to manage our supply chain, inventory levels, and our own manufacturing capacity or that of third-party partners, particularly in the event of delays or cancellation of significant customer orders;

our ability to effectively coordinate changes in the mix of products we manufacture and sell, while managing our ongoing transition in organizational focus to Advanced Products from Brick Products;

our ability to provide and maintain a high level of sales and engineering support to an increasing number of demanding, high volume customers;

the ability of our third party suppliers, service subcontractors, and manufacturers to supply us with sufficient quantities of high quality products, components, and/or services on a timely basis;

the effectiveness of our ongoing efforts to continuously reduce product costs and manage operating expenses;

our ability to utilize our manufacturing facilities and personnel at efficient levels, maintaining sufficient production capacity and necessary manufacturing yields;

our ability to plan, schedule, execute, and fund capacity expansion, including the anticipated addition in 2019 of 85,000 sq. ft. to our Andover manufacturing facility;

the timing of our new product introductions and our ability to meet customer expectations for timely delivery of fully qualified products;

the timing of new product introductions or other competitive actions (e.g., product price reductions) by our competitors;

the ability to hire, retain, and motivate qualified employees to meet the demands of our customers;

intellectual property disputes;

potential significant litigation-related costs;

adverse economic conditions in the United States and those international markets in which we operate, as well as our ability to respond to rapid developments, such as the imposition of tariffs or trade restrictions;

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adverse budgetary conditions within the U.S. government, particularly the Department of Defense, which continue to influence spending on current and anticipated programs into which we sell or anticipate to sell our products;

costs related to compliance with increasing worldwide governance, quality, environmental, and other regulations; and

the effects of events outside of our control, including natural disasters, public health emergencies, terrorist activities, political risks, international conflicts, information security breaches, communication interruptions, and other *force majeure*.

As a result of these and other factors, we cannot assure you we will not experience significant fluctuations in future operating results on a quarterly or annual basis. In addition, if our operating results do not meet the expectations of investors, the market price of our Common Stock may decline.

Our stock price has been volatile and may fluctuate in the future.

Because of the factors set forth below, among others, the trading price of our Common Stock has fluctuated and may continue to fluctuate significantly:

volatility of the financial markets, notably the equity markets in the United States;

uncertainty regarding the prospects of domestic and foreign economies, including the impact of tariffs, trade restrictions, and volatile currency exchange rates;

uncertainty regarding domestic and international political conditions, including tax and tariff policies;

actual or anticipated fluctuations in our operating performance or that of our competitors;

the performance and prospects of our major customers;

announcements by us or our competitors of significant new products, technical innovations, or litigation;

investor perception of the Company and the industry in which we operate;

the absence of earnings estimates and supporting research by investment analysts;

the liquidity of the market for our Common Stock, reflecting a relatively low trading float and relatively low average trading volumes;

the uncertainty of the declaration and payment of future cash dividends on our Common Stock; and

the concentration of ownership of our Common Stock by Dr. Vinciarelli, our Chairman of the Board, Chief Executive Officer, and President.

We do not actively communicate with investment analysts and, as a consequence, we are not aware of earnings estimates or supporting investment research coverage of Vicor and our Common Stock. While we seek to be transparent in our financial reporting, public statements, and related disclosures, the absence of research coverage may limit investor interest in our Common Stock, as our communications with investors is generally limited to our quarterly earnings announcements and accompanying investor conference calls. Because our operating results have fluctuated on a quarterly and annual basis, investors may have difficulty in assessing our current and future performance, particularly in light of our strategic transition, as discussed above.

In the past, we have declared and paid cash dividends on our Common Stock. The payment of dividends is based on the periodic determination by our Board of Directors that we have adequate capital to fund anticipated operating requirements and that excess cash is available for distribution to stockholders via a dividend. We have no formal policy regarding dividends and, as such, investors cannot make assumptions regarding the possibility of future dividend payments nor the amounts and timing thereof. As of December 31, 2018, we have no plans to declare or pay a cash dividend.

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The ownership of our Common Stock is concentrated between Dr. Vinciarelli and a limited number of institutional investors. As of December 31, 2018, Dr. Vinciarelli owned 9,861,605 shares of our Common Stock, as well as 11,023,648 shares of our unregistered Class B Common Stock (which may only be sold or transferred after required conversion, on a one-for-one basis, into registered shares of Common Stock), together representing 52.9% of our total issued and outstanding shares. Accordingly, the market float for our Common Stock and average daily trading volumes are relatively small, which may negatively impact investors ability to buy or sell shares of our Common Stock in a timely manner.

Dr. Vinciarelli owns 93.8% of the issued and outstanding shares of our Class B Common Stock, which possess 10 votes per share. Dr. Estia J. Eichten, a member of our Board of Directors, owns the majority of the balance of the Class B Common Stock issued and outstanding. As such, Dr. Vinciarelli, controlling in aggregate 81.9% of our outstanding voting securities, has effective control of our governance.

Dr. Vinciarelli also holds 5,500,000 non-qualified options for the purchase of the common stock of our subsidiary, VI Chip Corporation. We anticipate merging VI Chip with and into the Company during 2019, in the same manner as our Picor Corporation subsidiary was merged with and into the Company, effective May 30, 2018. Assuming the same merger structure (i.e., a stock-for-stock exchange, compliant with the spread and ratio tests and other requirements of Section 424 of the Internal Revenue Code, as amended, by which both the option plan and outstanding options are assumed by the surviving entity (in this case, the Company)), the merger of VI Chip with and into the Company likely would not result in a meaningful change to the percentage held by Dr. Vinciarelli of our total issued and outstanding shares on a fully diluted basis (i.e., the sum of total shares outstanding and exercisable stock options). As of December 31, 2018, we cannot estimate the share values of either VI Chip or the Company at the time of the anticipated merger.

Global economic uncertainty could materially and adversely affect our business and consolidated operating results.

Global economic conditions during the first half of 2018 reflected confidence and expectations of further expansion. However, with the imposition of the Section 301 Tariffs on certain Chinese goods imported into the United States and the corresponding imposition by China of tariffs on certain U.S. goods imported into China, customer confidence began to be replaced by uncertainty. During the second half of 2018, the Chinese economy slowed markedly, contributing to the cyclical decline of certain markets and geographies around the world. Our new orders and shipments surged into the first half of 2018, but the second half reflected heightened customer uncertainty, and we performed below our expectations. Disruption and further deterioration of global economic conditions, including extended trade disputes, the relative strength of the U.S. Dollar, and rising interest rates, may reduce end-demand for our customers products and, in turn, their purchases of our products, thereby reducing our revenues and earnings. In addition, such adverse conditions may, among other things, result in increased price competition for our products, notably in Brick Product categories, increased risk of excess and obsolete inventories, increased risk in the collectability of our accounts receivable from our customers, increased risk in potential reserves for doubtful accounts and write-offs of accounts receivable, and higher operating costs as a percentage of revenues.

We compete with many companies possessing far greater resources.

Some of our competitors have far greater financial, manufacturing, technical, and sales and marketing resources than we possess or have access to. Our Brick Products compete with those products offered by domestic and foreign manufacturers of integrated power systems and power conversion components. With the growth of our Advanced Product lines, we increasingly are competing with global manufacturers of power management products with far larger organizations and broader semiconductor-based product lines. Competition is generally based on product performance, design flexibility (i.e., ease of use), product price, and product availability, but the relative importance of

these factors varying among products, markets, and customers. Existing or new competitors may develop products or technologies that more effectively address the demands of

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our customers and markets with enhanced performance, features and functionality, or lower cost. Larger competitors frequently seek to maintain market share and protect customer relationships through heavily-discounted pricing, which we may not be able to match. If we fail to develop and commercialize leading-edge technologies and products that are cost effective and maintain high standards of quality, and introduce them to the market on a timely basis, our competitive position and results of operations could be materially adversely affected.

Our future success depends upon our ability to develop and market differentiated, leading-edge power conversion products for larger customers, potentially contributing to lengthy product development and sales cycles that may result in significant expenditures before revenues are generated. Our future operating results are dependent on the growth in such customers businesses and on our ability to profitably develop and deliver products meeting customer requirements.

The power system industry and the industries in which many of our customers operate are characterized by intense competition, rapid technological change, quickened product obsolescence, and price erosion for mature products, each of which could have an adverse effect on our results of operations. We are following a strategy based on the development of differentiated Advanced Products addressing what we believe to be the long-term limitations of traditional power architectures, while at the same time sustaining sales and profitability of our well-established Brick Products. The development of new, innovative products is often a complex, time-consuming, and costly process involving significant investment in research and development, with no assurance of return on investment. Although we have introduced many Advanced Products over the past three years, there can be no assurance we will be able to continue to develop and introduce new and improved products and power system concepts in a timely or efficient manner. Similarly, there can be no assurance recently introduced or to be developed products will achieve customer acceptance.

Our future success depends substantially upon customer acceptance of our innovative Advanced Products, notably our Power-on-Package concept in AI and other high-performance applications. As we have been in the early stages of market penetration for these and other Advanced Products, we have experienced lengthy periods during which we have focused our product development efforts on the specific requirements of a limited number of large customers, followed by further periods of delay before meaningful purchase orders are received. These lengthy development and sales cycle times increase the possibility a customer may decide to cancel or change product plans, which could reduce or eliminate our sales to that customer. As a result, we may incur significant product development expenses, as well as significant sales and marketing expenses, before we generate the related revenues for these products. Furthermore, we may never generate the anticipated revenues from a product after incurring such expenses if our customer cancels or changes its product plans.

We continue to shift our go-to-market strategy to focus on larger opportunities with global OEMs, ODMs, and contract manufacturers. Our growth is therefore dependent on: the pace at which these OEMs and ODMs develop their own new products; the acceptance of our Advanced Products by these OEMs and ODMs; and the success of the customers products incorporating our Advanced Products. If we fail to anticipate changes in our customers businesses and their changing product needs or do not successfully identify and enter new markets, our results of operations and financial position could be negatively impacted.

In 2018, we established a dedicated sales effort to penetrate the automotive market with our Advanced Products, notably in rapidly expanding 48V mild hybrid segment. The automotive market is dominated by relatively few global OEMs and tiers of well-established suppliers. Penetrating this market will be challenging and we may not be successful in doing so. Additionally, our early success with vendors of AI computing solutions may not translate into long-term success with customers participating in the long-term development of autonomous driving solutions.

We cannot offer any assurance the markets we currently serve will grow in the future, our Advanced Products or Brick Products will meet respective market requirements, or we can maintain adequate gross margins or operating profits in these markets.

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Our operating results recently have been influenced by a limited number of customers, and our future results may be similarly influenced.

Since the introduction of our Advanced Products, the Company has derived a substantial portion of its revenue from Advanced Products in any given year from either one customer or a limited number of customers, whether through sales directly to the customer(s) or indirectly to the customers contract manufacturers. This concentration of revenue is a reflection of the relatively early stage of adoption of the Advanced Products and the associated technologies and power system architectures, and our targeting of market leading innovators as initial customers. Our current sales and marketing efforts are focused primarily on accelerating the adoption of Advanced Products by a diversified customer base, across a number of identified market segments. However, we cannot assure you our strategy will be successful and such diversification of customers will be achieved.

We may not be able to procure necessary key components or raw materials, or we may purchase excess raw material inventory or unusable inventory, which increases the risk of reserve charges to reduce the value of any inventory deemed excess or obsolete, thereby reducing our profitability.

The power systems industry, and the electronics industry as a whole, can be subject to pronounced, lengthy business cycles and otherwise subject to sudden and sharp changes in demand. Our success, in part, is dependent on our ability to forecast and procure inventories of components and materials to match production schedules and customer delivery requirements. Many of our products require raw materials supplied by a limited number of vendors and, in some instances, a single vendor. During certain periods, key components or materials required to build our products may become unavailable in the timeframe required for us to meet our customers needs. Our inability to secure sufficient raw materials to manufacture products for our customers has reduced, in the past, our revenue and profitability and could do so again. We may choose, and have chosen, to mitigate this risk by increasing the levels of inventory for certain components and materials. Such increased inventory levels may increase the potential risk for excess or obsolete inventories, should our forecasts fail to materialize or if there are negative factors impacting our customers end markets, leading to order cancellation. If we identify excess inventory or determine certain inventory is obsolete (i.e., unusable), we likely will record additional inventory reserves (i.e., expenses representing the write-off of the excess or obsolete inventory), which could have an adverse effect on our gross margins and on our operating results.

We rely on third-party vendors and subcontractors for supply of components, assemblies, and services and, therefore, cannot control the availability or quality of such components, assemblies, and services.

We depend on third-party vendors and subcontractors to supply components, assemblies, and services used in our products, some of which are supplied by a single vendor, and have experienced shortages of certain semiconductor components, incurred additional and unexpected costs to address the shortages, and experienced delays in production and shipping. If suppliers or subcontractors cannot provide their products or services on time or to our specifications, we may not be able to meet the demand for our products and our delivery times may be negatively affected. In addition, we cannot directly control the quality of the products and services provided by third parties. In order to expand revenue, we likely will need to identify and qualify new suppliers and subcontractors to supplant or replace existing suppliers and subcontractors, which may be a time-consuming and expensive process. In addition, any qualification of new suppliers may require customers of our products utilizing products and services from new suppliers and service providers to undergo a re-qualification process. Such circumstances likely would lead to disruptions in our production, increased manufacturing costs, delays in shipping to our customers, and/or increases in prices paid to third parties for products and services.

We are exposed to foreign economic, political, and other external risks.

For the years ended December 31, 2018, 2017, and 2016, revenues from sales outside the United States were 62.0%, 63.2%, and 59.8%, respectively, of our total revenues. Net revenues from customers in China, our largest international market, accounted for approximately 37.4% of total net revenues in 2018, approximately 35.8% in

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2017, and approximately 32.1% in 2016, respectively. We expect international sales will continue to be a significant component of total sales, since many of the OEMs and ODMs we target as customers are domiciled offshore, and such customers increasingly utilize offshore contract manufacturers, and rely upon those contract manufacturers to place orders directly with us. We also expect international revenue from our distributors to increase.

While our currency risks are limited, as our sales are denominated in U.S. Dollars worldwide, with the exception of sales by VJCL (and a residual volume of sales of Vicor B.V.), our international activities expose us to special risks including, but not limited to, regulatory requirements, economic and political instability, transportation delays, foreign currency controls, trade restrictions and tariffs, and unfavorable shifts in foreign exchange rates. In addition, our international customers business may be negatively affected imposition of tariffs, as was the case in 2018 with the imposition of Section 301 Tariffs on certain Chinese goods imported into the United States and the corresponding imposition of import tariffs by China on certain U.S. goods imported into China, and by economic sanctions, as were imposed in 2014 by the U.S. Department of the Treasury against certain Russian entities to which we had sold products in the past. Sudden or unexpected changes in the foregoing could have a material adverse effect on our operating results.

We may be unable to adequately protect our proprietary rights, which may limit our ability to compete effectively.

We operate in an industry in which the ability to compete depends on the development or acquisition of proprietary technologies that must be protected to preserve the exclusive use of such technologies. We devote substantial resources to establish and protect our patents and proprietary rights, and we rely on patent and intellectual property law to protect such rights. This protection, however, may not prevent competitors from independently developing products similar or superior to our products. We may be unable to protect or enforce current patents, may rely on unpatented technology that competitors could restrict or replicate, or may be unable to acquire patents in the future, all of which may have a material adverse effect on our competitive position. In addition, the intellectual property laws of foreign countries may not protect our rights to the same extent as those of the United States. We have been and may need to continue to defend or challenge patents. We have incurred and expect to incur significant financial costs in the defense of our patented technologies and have devoted and expect to devote significant resources to these efforts which, if unsuccessful, may have a material adverse effect on our operating results and financial position.

We face intellectual property infringement claims that could be disruptive to operations and costly to resolve and may encounter similar infringement claims in the future.

The power supply industry is characterized by vigorous protection and pursuit of intellectual property rights. We have in the past and may in the future receive communications from third parties asserting that our products or manufacturing processes infringe on a third party s patent or other intellectual property rights. Such assertions, if publicly disclosed, have in the past and may in the future inhibit the willingness of potential customers to purchase certain of our products. In the event a third party makes a valid intellectual property claim against us and a license is not available to us on commercially reasonable terms, or at all, we could be forced to either redesign or stop production of products incorporating that technology, and our operating results could be materially and adversely affected. In addition, litigation may be necessary to defend us against claims of infringement, and this litigation could be costly, extend over a lengthy period of time, and divert the attention of key personnel. An adverse outcome in these types of matters could have a material adverse impact on our operating results and financial condition.

Please see Part I, Item 3 Legal Proceedings for information regarding current litigation related to our intellectual property.

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Any expenses or liability resulting from the outcome of litigation could adversely influence our operating results and financial condition.

From time to time, we may be subject to claims or litigation, including intellectual property litigation as described elsewhere in this Annual Report on Form 10-K. Any such claims or litigation may be time-consuming and costly, divert management resources, require us to change our products, or have other adverse effects on our business. Any of the foregoing could have a material adverse effect on our operating results and could require us to pay significant monetary damages.

The outcomes of legal proceedings and claims brought against us are subject to significant uncertainty. An estimated loss from a loss contingency such as a legal proceeding or claim is accrued by a charge to income if it is considered probable an asset has been impaired or a liability has been incurred and the amount of the loss can be reasonably estimated. Disclosure of a contingency is required if there is at least a reasonable possibility that a loss has been incurred. In determining whether a loss should be accrued, we evaluate, among other factors, the degree of probability of an unfavorable outcome and the ability to make a reasonable estimate of the amount of loss. Changes in these factors could materially impact our financial statements. As of December 31, 2018, our evaluation led us to conclude no accrual of a loss contingency was warranted.

We may face legal claims and litigation from product warranty or other claims that could be costly to resolve.

We have in the past and may in the future encounter legal action from customers, vendors, or others concerning product warranty or other claims. We generally offer a two-year warranty from the date title passes from us for all of our standard products. Effective January 1, 2017, we extended the warranty period to three years for a range of H Grade, M Grade and MI Family DC-DC legacy products sold after that date. In a limited number of circumstances, we have entered into supply contracts with certain high-volume customers calling for extended warranty terms. With our distribution partners, we also enter into contracts providing for our product warranties to transfer to the end customer upon final sale of our product(s) by the distributor.

We invest significant resources in the testing of our products; however, if any of our products contain defects, we may be required to incur additional development and remediation costs, pursuant to our warranty policies. These issues may divert our technical and other resources from other product development efforts and could result in claims against us by our customers or others, including liability for costs associated with product returns, which may adversely influence our operating results. If any of our products contain defects, or have reliability, quality, or compatibility problems, the Company s reputation may be damaged, which could make it more difficult for us to sell our products to existing and prospective customers and could adversely affect our operating results. We are currently party to a limited number of supply agreements with certain customers contractually committing us to warranty and indemnification requirements exceeding those to which we have been exposed in the past. While we maintain insurance coverage for such exposure, we could incur significant financial cost beyond the limits of such coverage, as well as operational disruption and damage to our competitive position and image if faced with a significant product warranty or other claim.

Extended interruption of production at our manufacturing facility in Andover, Massachusetts, could materially reduce our revenue and increase costs.

All power components and power systems, whether for direct sale to customers or for sale to our subsidiaries for incorporation into their respective products, are manufactured at our Andover, Massachusetts, facility. Substantial damage to this facility due to fire, natural disaster, power loss, or other events, including events associated with our planned expansion of the facility in 2019, could interrupt manufacturing. While we have never experienced any

meaningful interruption of manufacturing in our history, any prolonged inability to utilize all or a significant portion of our Andover facility could have a material adverse effect on our results of operations.

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Disruption of our information technology infrastructure could adversely affect our business.

We depend heavily on our computing and communications infrastructure to achieve our business objectives, particularly for email communications, financial and operational record keeping, and our computer-integrated manufacturing processes controlling all aspects of our operations in our manufacturing facility in Andover, Massachusetts. If a problem occurs impairing this infrastructure, the resulting disruption could impede our ability to record or process orders, manufacture and ship in a timely manner, or otherwise carry on business in the normal course. Since 2012, we have experienced no interruption of our computing and communications capabilities. While we carry business interruption insurance, to offset financial losses from such an interruption, and cyber-risk insurance to address potential liabilities from such disruption, such insurance may be insufficient to compensate us for the potentially significant costs or liabilities incurred. Any such events, if prolonged, could have a material and adverse effect on our operating results and financial condition.

Our systems are designed to protect us from network security breaches and associated disruptions. However, we remain vulnerable to computer viruses and related software-based challenges to the integrity of our systems, unauthorized or illegal break-ins or malicious network hacking, equipment or software sabotage, acts of vandalism to our systems by third parties, and, in the extreme, forms of cyberterrorism. Our security measures or those of our third-party service providers may not detect or prevent such network security breaches or associated disruptions.

Also, we provide confidential information to third-party business partners and/or receive confidential information from third-party business partners in certain circumstances when doing so is necessary to conduct business. As of December 31, 2018, we were compliant with the comprehensive requirements for the protection of controlled unclassified information (CUI) as set forth in Special Publication 800-171 of the National Institute of Standards and Technology. While we employ confidentiality agreements to protect other sensitive information (i.e., information not considered CUI), our own security measures or those of our third-party service providers may not be sufficient to protect such information in the event the computing infrastructure of these third-party business partners is compromised. Security breaches of our computing and communications infrastructure or that of a third-party business partner could result in the misappropriation or unauthorized release of confidential information belonging to us or to our employees, partners, customers or suppliers, which could result in an interruption to our operations, result in a violation of privacy or other laws, expose us to a risk of litigation, or damage our reputation, any of which could have a material and adverse effect on our operating results and financial condition.

If we fail to maintain an effective system of internal controls over financial reporting or discover material weaknesses in our internal controls over financial reporting, we may not be able to report our financial results accurately or timely or detect fraud, which could have a material adverse effect on our business.

An effective internal control environment is necessary for us to produce reliable financial reports and is an important part of our effort to prevent financial fraud. Section 404 of the Sarbanes-Oxley Act of 2002 (SOX) requires our management to report on, and our independent registered public accounting firm to attest to, the effectiveness of our internal control over financial reporting.

We have an ongoing program to perform the system and process evaluation and testing necessary to comply with the requirements of SOX and to continuously improve and, when necessary, remediate internal controls over financial reporting.

While management evaluates the effectiveness of our internal controls on a regular basis, these controls may not always be effective. There are inherent limitations on the effectiveness of internal controls, including collusion, management override, and failure in human judgment. In addition, control procedures are designed to reduce rather

than eliminate business risks. In the event our Chief Executive Officer or Chief Financial Officer, our certifying officers under SOX, or our independent registered public accounting firm determines our internal

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controls over financial reporting are not effective as defined under Section 404, we may be unable to produce reliable financial reports or prevent fraud, which could materially harm our business. In addition, we may be subject to sanctions or investigation by government authorities or self-regulatory organizations, such as the SEC, the Financial Industry Regulatory Authority, or The NASDAQ Stock Market LLC. Any such actions could affect investor perceptions of the Company and result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of our financial statements, which could cause the market price of our Common Stock to decline or limit our access to capital.

Regulations related to conflict minerals could adversely impact our business.

The Dodd-Frank Wall Street Reform and Consumer Protection Act contains provisions to improve transparency and accountability concerning the supply of certain minerals, known as conflict minerals (including gold, tantalum, tin, and tungsten, and their related ores), originating from the Democratic Republic of Congo (DRC) and adjoining countries. As a result, in August 2012 the SEC released final rules for annual disclosure and reporting for those companies who use conflict minerals mined from the DRC and adjoining countries in their products. We began to implement processes within our supply chain to comply with these rules beginning in 2012 and filed our initial Form SD in May 2014. There have been and will continue to be costs associated with complying with these disclosure requirements, including due diligence to determine the sources of conflict minerals used in our products and other potential changes to products, processes, or sources of supply as a consequence of such verification activities. The implementation of these rules could adversely affect the sourcing, supply, and pricing of materials used in our products. As there may be only a limited number of suppliers offering conflict free conflict minerals, we cannot be certain we will be able to obtain necessary conflict minerals from such suppliers in sufficient quantities or at competitive prices. Also, we may face reputational challenges if we determine that certain of our products contain minerals not determined to be conflict free or if we are unable to sufficiently verify the origins for all conflict minerals used in our products through the procedures we may implement.

Our ability to successfully implement our business strategy may be limited if we do not retain our key personnel and attract and retain skilled and experienced personnel.

Our success depends on our ability to retain the services of our executive officers. The loss of one or more members of senior management could materially adversely influence our business and financial results. In particular, we are dependent on the services of Dr. Vinciarelli, our founder, Chairman of the Board, Chief Executive Officer, and President. The loss of the services of Dr. Vinciarelli could have a material adverse effect on our development of new products and on our results of operations. In addition, our research and development and marketing and sales activities depend on highly skilled engineers and other personnel with technical skills, who are in high demand and are difficult to replace. Our continued operations and growth depend on our ability to attract and retain skilled and experienced personnel in a very competitive employment market. If we are unable to attract and retain such employees, our ability to successfully implement our business strategy may be harmed.

ITEM 1B. *UNRESOLVED STAFF COMMENTS*

None.

ITEM 2. *PROPERTIES*

Our corporate headquarters building in Andover, Massachusetts, which we own, provides approximately 90,000 square feet of office space for our sales, marketing, engineering, and administrative personnel and is used by and supports all business segments. We also own a building of approximately 230,000 square feet in Andover, Massachusetts, which houses all Massachusetts manufacturing activities.

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Current capital investments are focused in the expansion of manufacturing capacity for the production of Advanced Products at our Andover, Massachusetts facility. Based on our long-term forecast of production levels, we anticipate substantial additional capacity will be required to meet requirements beyond 2019. We believe the most appropriate manner of meeting our long-term capacity requirements will be to initially expand the production area of our Andover, Massachusetts facility by approximately 85,000 square feet, through the addition of a two story wing housing ChiP manufacturing equipment. We have entered the design and permitting phase for this project and plan to break ground on this addition to our existing plant in 2019 and take occupancy in 2020. We also are proceeding with the evaluation of alternative projects for the addition of another, larger manufacturing facility, should we anticipate the need based on our forecasts for capacity beyond 2021.

We own and lease a single-story industrial building of approximately 31,000 square feet in Sunnyvale, California, to a corporate tenant, who occupied the building beginning in June 2016.

All other domestic and foreign facilities are leased from third-party lessors on arms length terms. We believe our owned and leased facilities are adequate for our present needs and expect them to remain adequate for the foreseeable future.

ITEM 3. ***LEGAL PROCEEDINGS***

We are the defendant in a patent infringement lawsuit originally filed on January 28, 2011 by SynQor, Inc. (SynQor) in the U.S. District Court for the Eastern District of Texas (the Texas Action). The complaint, as amended in September 2011, alleges that our products, including but not limited to, unregulated bus converters used in intermediate bus architecture power supply systems, infringe SynQor s U.S. patent numbers 7,072,190, 7,272,021, 7,564,702, and 8,023,290 (the 190 patent , the 021 patent , the 702 patent , and the 290 patent , respectively). Sy complaint sought an injunction against further infringement and an award of unspecified compensatory and enhanced damages, interest, costs and attorney fees. We have denied that our products infringe any of the SynQor patents, asserted that the SynQor patents are invalid, and asserted that the 290 patent is unenforceable due to inequitable conduct by SynQor or its agents during the examination of the 290 patent at the United States Patent and Trademark Office (USPTO). We also asserted counterclaims seeking damages against SynQor for deceptive trade practices and tortious interference with prospective economic advantage arising from SynQor s attempted enforcement of its patents against us. On May 23, 2016, after extensive discovery, the Texas Action was stayed by the court pending completion of certain *inter partes* reexamination proceedings at the USPTO (including any appeals from such proceedings to the Federal Circuit (as defined below)) concerning the SynQor patents, which are described below. On November 2, 2018, SynQor filed a motion to lift the stay of the Texas Action. On January 3, 2019, the Court denied the motion and reaffirmed its original decision that the stay should remain at least until the conclusion of all pending *inter partes* reexaminations and related appeals.

In 2011, in response to the filing of the Texas Action, we initiated *inter partes* reexamination proceedings at the USPTO challenging the validity of certain claims of the SynQor patents asserted in the Texas Action, including all claims that were asserted against us by SynQor. The current status of these proceedings is as follows. Regarding the 190 patent, the United States Court of Appeals for the Federal Circuit (the Federal Circuit) issued a decision on March 13, 2015, determining that certain claims were invalid, remanding the matter to the Patent Trial and Appeal Board (PTAB) of the USPTO for further proceedings. On May 2, 2016, the PTAB issued a decision affirming the examiner s original rejection of all but one of the remaining claims of the 190 patent, and identifying a new basis for rejecting the remaining claim (claim 34), which had been added by SynQor during the reexamination. SynQor then requested further examination of claim 34 by the examiner, pursuant to 37 C.F.R. § 41.77(b)(1). On June 22, 2017, the examiner issued a determination under 37 C.F.R. § 41.77(d), finding claim 34 was unpatentable. That decision is

expected to be further reviewed by the PTAB pursuant to 37 C.F.R. § 41.77(f). After the PTAB reviews the examiner s decision with respect to claim 34, it is expected that the PTAB s decisions with respect to all of the challenged and still pending claims of the

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190 patent will be subject to further review by the Federal Circuit. On May 2, 2016, the PTAB also issued decisions finding all challenged claims of SynQor s 021 patent invalid and upholding the validity of all challenged claims of SynQor s 702 and 290 patents. On August 30, 2017, the Federal Circuit issued rulings with regard to those decisions. With respect to the 021 patent, the Federal Circuit affirmed the PTAB s determination that all of the challenged claims of the 021 patent were invalid. The Federal Circuit remanded the case to the PTAB for further consideration of the patentability of certain claims that had been added by amendment during the reexamination. With respect to the 702 patent, the Federal Circuit affirmed the PTAB s determination that all of the challenged claims of the 702 patent were patentable. With respect to the 290 patent, the Federal Circuit vacated the PTAB s decision upholding the patentability of the 290 patent claims, and remanded the case to the PTAB for further consideration. The PTAB has not issued any rulings with respect to the 290 patent after remand.

On October 31, 2017, we filed a request with the USPTO for *ex parte* reexamination of the asserted claims of the 702 patent, based on different prior art references than had been at issue in the previous *inter partes* reexamination of the 702 patent. On December 6, 2017, the USPTO issued a decision initiating *ex parte* reexamination of the 702 patent after finding that our request had raised a substantial new question of patentability of the challenged claims. On March 21, 2018, the examiner issued a non-final office action finding all of the challenged claims of the 702 patent to be unpatentable. On May 14, 2018, SynQor filed a petition requesting the USPTO to vacate its prior decision granting our request for *ex parte* reexamination. No action has been taken on the petition to date. On September 12, 2018, the examiner issued a final office action finding all of the challenged claims of the 702 patent to be unpatentable. On October 26, 2018, SynQor filed a notice of appeal appealing the examiner s final rejection to the PTAB. On December 3, 2018, the USPTO denied SynQor s petition to vacate the decision initiating the *ex parte* reexamination. We continue to monitor the progress of this proceeding.

On August 6, 2018, we filed a request with the USPTO for *ex parte* reexamination of the asserted claims of the 190 patent, based on different prior art references than had been at issue in the previous *inter partes* reexamination of the 190 patent. On September 11, 2018, SynQor filed a petition asking the USPTO to reject our request on the ground that it presented substantially the same prior art or arguments presented to the USPTO in the prior *inter partes* reexamination of the 190 patent. On December 3, 2018, the USPTO denied SynQor s petition to reject our *ex parte* reexamination request. On December 4, 2018, the USPTO instituted *ex parte* reexamination of the 190 patent after finding that our request had raised a substantial new question affecting the patentability of the challenged claims.

On January 23, 2018, the 20-year terms of the 190 patent, the 021 patent and the 702 patent expired. The 20-year term of the 290 patent expired on July 16, 2018. As a consequence of these expirations, we cannot be liable under any of the SynQor patents for allegedly infringing activities occurring after the patents respective expiration dates.

We continue to believe none of our products, including our unregulated bus converters, infringe any valid claim of the asserted SynQor patents, either alone or when used in an intermediate bus architecture implementation. We believe SynQor s claims lack merit and, therefore, we continue to vigorously defend ourself against SynQor s patent infringement allegations. We do not believe a loss is probable for this matter. If a loss were to be incurred, however, we cannot estimate the amount of possible loss or range of possible loss at this time.

In addition to the SynQor matter, we are involved in certain other litigation and claims incidental to the conduct of our business. While the outcome of lawsuits and claims against us cannot be predicted with certainty, management does not expect any current litigation or claims will have a material adverse impact on our financial position or results of operations.

ITEM 4. ***MINE SAFETY DISCLOSURES***

Not Applicable.

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PART II

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

Our Common Stock is listed on The NASDAQ Stock Market LLC, under the trading symbol VICR. Shares of our Class B Common Stock are not registered with the Securities and Exchange Commission, are not listed on any exchange nor traded on any market, and are subject to transfer restrictions under our Restated Certificate of Incorporation, as amended.

As of February 21, 2019, there were 134 holders of record of our Common Stock and 13 holders of record of our Class B Common Stock. These numbers do not reflect persons or entities that hold their shares in nominee or street name through various brokerage firms.

Issuer Purchases of Equity Securities

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Number (or Approximate Dollar Value) of Shares that May Yet Be Purchased Under the Plans or Programs
October 1 31, 2018		$		$ 8,541,000
November 1 30, 2018		$		$ 8,541,000
December 1 31, 2018		$		$ 8,541,000
Total		$		$ 8,541,000

In November 2000, our Board of Directors authorized the repurchase of up to $30,000,000 of our Common Stock (the November 2000 Plan). The November 2000 Plan authorizes us to make such repurchases from time to time in the open market or through privately negotiated transactions. The timing and amounts of Common Stock repurchases are at the discretion of management based on its view of economic and financial market conditions.

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Stockholder Return Performance Graph

The graph set forth below presents the cumulative, five-year stockholder return for each of the Company s Common Stock, the Standard & Poor s 500 Index (S&P 500 Index), a value-weighted index made up of 500 of the largest, by market capitalization, listed companies, and the Standard & Poor s SmallCap 600 Index (S&P SmallCap 600 Index), a value-weighted index of 600 listed companies with market capitalizations between $200,000,000 and $1,000,000,000.

The graph assumes an investment of $100 on December 31, 2013, in each of our Common Stock, the S&P 500 Index, and the S&P SmallCap 600 Index, and assumes reinvestment of all dividends. The historical information set forth below is not necessarily indicative of future performance.

Comparison of Five Year Cumulative Return

Among Vicor Corporation, S&P 500 Index

and S&P SmallCap 600 Index

	2013	2014	2015	2016	2017	2018
Vicor Corporation	$100.00	$ 90.16	$ 67.96	$ 112.52	$ 155.74	$ 281.59
S&P 500 Index	$100.00	$ 113.69	$ 115.26	$ 129.05	$ 157.22	$ 150.33
S&P SmallCap 600 Index	$100.00	$ 105.76	$ 103.67	$ 131.20	$ 148.56	$ 135.96

Our equity plan information required by this item is incorporated by reference to the information in Part III, Item 12 of this Annual Report on Form 10-K.

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ITEM 6. ***SELECTED FINANCIAL DATA***

The following selected consolidated financial data with respect to our statements of operations for the years ended December 31, 2018, 2017, and 2016, and with respect to our balance sheet as of December 31, 2018 and 2017, are derived from our audited Consolidated Financial Statements, which appear elsewhere in this Annual Report on Form 10-K. The following selected consolidated financial data with respect to our statements of operations for the years ended December 31, 2015 and 2014, and with respect to our balance sheets as of December 31, 2016, 2015, and 2014, are derived from our Consolidated Financial Statements, which are not included herein. The data should be read in conjunction with the Consolidated Financial Statements, related notes and other financial information included herein.

	Year Ended December 31,				
Statement of Operations Data	**2018**	**2017**	**2016**	**2015**	**2014**
	(In thousands, except per share data)				
Net revenues	$ 291,220	$ 227,830	$ 200,280	$ 220,194	$ 225,731
Net income (loss) from operations	32,059	(1,360)	(6,314)	(267)	(14,763)
Consolidated net income (loss)	31,846	258	(6,261)	5,159	(14,070)
Net income (loss) attributable to noncontrolling interest	121	91	(14)	232	(183)
Net income (loss) attributable to Vicor Corporation	31,725	167	(6,247)	4,927	(13,887)
Net income (loss) per share basic attributable to Vicor Corporation	0.80	0.00	(0.16)	0.13	(0.36)
Net income (loss) per share diluted attributable to Vicor Corporation	0.78	0.00	(0.16)	0.13	(0.36)
Weighted average shares basic	39,872	39,228	38,842	38,754	38,569
Weighted average shares diluted	40,729	39,933	38,842	39,146	38,569

	As of December 31,				
Balance Sheet Data	**2018**	**2017**	**2016**	**2015**	**2014**
	(In thousands)				
Working capital	$ 129,062	$ 90,796	$ 89,545	$ 94,905	$ 90,321
Total assets	221,068	165,724	154,067	157,545	155,542
Total liabilities	36,978	29,305	23,050	21,460	24,990
Total equity	184,090	136,419	131,017	136,085	130,552

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

Overview

We design, develop, manufacture, and market modular power components and power systems for converting electrical power. We also license certain rights to our technology in return for recurring royalties.

We organize and report our operating segments according to our key product lines. Although our Picor Corporation subsidiary was merged with and into the Company in 2018, we continue to report our operating segments as the Brick Business Unit (BBU) operating segment, the VI Chip operating segment, and the Picor operating segment, reflecting our historical organizational segmentation and management s operational oversight. (See Note 16 *Picor Merger* and Note 17 *Segment Information* to the Consolidated Financial Statements presented herein for certain financial

information associated with the merger of Picor with and into the Company.)

The BBU segment designs, develops, manufactures, and markets our Brick Product lines of DC-DC converters and configurable products, as well as complementary components providing AC line rectification, input filtering, power factor correction, and transient protection. The BBU segment, as reported, also includes

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third-party and intra-segment activities of our Vicor Custom Power and VJCL subsidiaries. The VI Chip segment consists of our subsidiary, VI Chip Corporation, which designs, develops, manufactures, and markets a range of advanced power converters and power systems, emphasizing implementations of our proprietary Factorized Power Architecture™ (FPA), an innovative power distribution architecture enabling flexible, rapid power system design using individual components optimized to perform a specific conversion stage (i.e., function). The VI Chip segment, as reported, also includes third-party and intra-segment activities, including those of VJCL. The Picor segment consists of the operations of our former subsidiary, Picor Corporation, which was legally merged with and into the Company in May 2018. While Picor Corporation s subsidiary status and corporate form ceased to exist upon the closing of the merger, Picor operations remain categorized as an operating segment for financial reporting purposes. The Picor segment designs, develops, and markets integrated circuits for use in a variety of power management and power system applications. The Picor segment is a fabless manufacturer, as its products are manufactured, assembled, packaged, and tested by third parties in Asia and the United States. The Picor segment develops integrated circuits for use in products across the Company, to be sold as complements to those products, or for sale to third parties for separate (i.e., stand-alone) applications, and are often integrated with VI Chip segment products to enable FPA implementation, particularly in the datacenter and supercomputer segments of the computing market. As such, the Picor segment, as reported, includes inter-segment activities.

We categorize our products as either Advanced Products or Brick Products (referred to in prior reports we filed with the SEC as Legacy), generally based on design, performance, and form factor considerations, as well as the range of evolving applications for which the products are appropriate. Revenue from the sale of Advanced Products represents the sum of third party sales of our Picor and VI Chip operating segments. Revenue from the sale of Brick Products represents the sum of third-party revenue of the Brick Business Unit operating segment, inclusive of such sales of our Vicor Custom Power and VJCL subsidiaries. When reporting such revenue, intra-segment and inter-segment revenues are eliminated.

The Advanced Products category consists of our more recently introduced Picor and VI Chip products, which are used to implement FPA designs. The Brick Products category largely consists of the BBU s integrated power converters and power systems, incorporating multiple conversion stages, used in conventional distributed power systems architectures (e.g., Centralized Power Architecture (CPA), Distributed Power Architecture (DPA), and Intermediate Bus Architecture (IBA)). Given the growth profiles of the market segments served with Advanced Products and Brick Products, our strategy involves a transition in organizational focus, emphasizing investment in Advanced Products, targeting high growth market segments with a low-mix, high-volume operational model, while maintaining a profitable business in mature market segments we serve with Brick Products with a high-mix, low-volume operational model.

The applications in which our Advanced Products and Brick Products are used are typically in the higher-performance, higher-power segments of the market segments we serve. With our Advanced Product lines, we generally serve large Original Equipment Manufacturers (OEMs), Original Design Manufacturers (ODMs), and their contract manufacturers concentrated in voltage distribution in server racks and across datacenter infrastructure of the computing market, although we also target applications in aerospace and aviation, defense electronics, industrial automation, instrumentation, test equipment, solid state lighting, telecommunications and networking infrastructure, and vehicles (notably in the autonomous driving applications, electric vehicles, and hybrid electric vehicle niches of the vehicle segment). With our Brick Product lines, we generally serve a fragmented base of large and small customers, concentrated in aerospace and defense electronics, industrial automation, industrial equipment, instrumentation and test equipment, and transportation (e.g., rail). With our strategic emphasis on larger, high-volume customers, we expect to experience a greater concentration of sales among relatively fewer customers.

2018 Results

Our improved operating results for 2018 were driven by an increase in net revenues due to preceding increases in bookings and order backlog, as well as improved gross margins resulting from higher production

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volumes, favorable product mix, and improved pricing. The 28% increase in revenue for 2018 compared to 2017 was primarily a result of double-digit percentage increases in the dollar value of shipments of certain product families across both Advanced Product and Brick Product categories, as well as the start of production shipments in the second half of the year of our Power-on-Package solution, included in the Advanced Products category.

2018 order bookings increased 27% over 2017 bookings, reflecting customer interest in our expanding portfolio of highly-differentiated Advanced Products. Bookings for our factorized 48V to point-of-load solutions for supercomputing and hyperscale datacenter applications accelerated during the first half of the year, stabilized through the third quarter, but declined for the fourth quarter, largely reflecting the timing of certain customer programs. Bookings for our Power-on-Package solutions were robust for the second and third quarters, but declined sharply for the fourth quarter, reflecting a sudden decline in our customers own outlooks for 2019, notably associated with poor visibility for forecasting supercomputing and high performance computing spending, particularly in China. Total bookings for 2018 for Brick Products improved year over year, reflecting the continued recovery of economic conditions during the first half of the year in the geographies and markets we serve, notably in defense electronics and high-value capital goods. However, Brick Product bookings from distributors declined through the second half of the year. Notably, uncertainties regarding the Chinese economy and its influence on other industrial economies and the potential impact of the United Kingdom s pending departure from the European Union were negative influences on fourth quarter order activity.

Revenue associated with product shipments in 2018 reflected the booking trends discussed above, improving year over year. Revenue for the first half of 2018 reflected backlog expansion that began in 2017, with broad improvement across most product lines. The PRMs and VTMs making up our factorized 48V to point-of-load solutions were the highest selling products for the year. We also recorded improved revenue across both Advanced Product and Brick Product categories into the third quarter of the year. However, fourth quarter revenue fell short of expectations, primarily because of a single customer s rescheduling of significant deliveries planned for that quarter.

Gross margins, both in absolute dollars and as a percentage of revenue, increased year over year, reflecting the increase in net revenues and improved mix of products shipped, as well as improved pricing, particularly in Brick Product lines, and higher overhead absorption due to higher unit production volumes. Consolidated gross margin as a percentage of revenue improved to 47.7% for 2018, from 44.6% for 2017. Meaningful improvements of gross margins were realized across Advanced Product lines, as higher volumes led to lower material costs and improved yields, in addition to higher overhead absorption.

Total operating expenses, largely associated with compensation and related personnel costs, grew 3.8% from 2017 to 2018. Marketing and Sales expenses and Administrative expenses both rose consistent with salary and benefit cost increases, although Administrative expenses rose disproportionately due to increased audit, financial reporting fees, and legal fees. Research and Development expenses declined year to year, as higher compensation costs were offset by lower prototyping and related engineering material costs.

We believe the following considerations may influence our financial performance in 2019:

Operational Considerations

We operate a highly automated electronics manufacturing facility in Andover, Massachusetts, and our profitability is closely aligned with production unit volumes. We have invested significantly in state-of-the-art systems, equipment, and robotics, which allow us to generate relatively higher profitability

when operating at or near factory capacity, even with a high mix of products produced. However, periods of low volume production and/or brief, low volume production runs contribute to lower profitability, largely due to lower absorption of relatively high manufacturing overhead costs associated with our manufacturing model. While direct labor and associated variable costs generally correlate with volume, manufacturing overhead costs are inflexible and, therefore, problematic during periods of low volume or brief production runs.

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We continue to invest in the production capacity to meet our internal volume projections, and believe these projections are reasonable and our investment will be adequate. However, if sustained, uniform, high volume production levels are not achieved, notably in Advanced Products, our product-level profitability likely will not reach the levels necessary to cover our fixed spending, consisting of manufacturing overhead costs and operating costs.

Current capital investments are focused in the expansion of manufacturing capacity for the production of Advanced Products at our Andover facility. Based on our long-term forecast of production levels, we anticipate substantial additional capacity will be required to meet requirements beyond 2019. We believe the most appropriate manner of meeting our long-term capacity requirements will be to initially expand the production area of our Andover facility by approximately 85,000 square feet, through the addition of a two story wing. We have entered the design and permitting phase for this project and plan to break ground on this addition to our existing plant in 2019 and take occupancy in 2020. We also are proceeding with the evaluation of alternative projects for the addition of another, larger manufacturing facility, should we anticipate the need based on our forecasts for capacity beyond 2021. Construction activity can be difficult to schedule, and construction sites can present management and operational challenges. As such, given the proximity of the addition to our existing operations, this construction activity has the potential to disrupt our current operations, which could cause production to be delayed and costs to increase.

Our ability to achieve sustained, high volume production levels is tied to our ability to forecast manufacturing requirements for, and the availability of, a range of inputs, notably raw material inventories. Because we utilize a number of components and other materials of proprietary design, our ability to sustain targeted production schedules and meet customer delivery requirements has been vulnerable to delays or shortages of such inventories, which often cause prices of these components and materials to rise. With the implementation earlier this year of Section 301 Tariffs on certain Chinese goods imported into the United States, we are now exposed to potentially higher costs on certain electronic components and devices we import from China for use in the manufacture of our products. To date, such costs have not been material.

To mitigate supply chain risks, we focus on identifying and reducing potential vulnerabilities to stock-outs, vendor shortages, and similar disruptions. We maintain safety-stock programs for certain critical components and materials, and these programs recently have contributed to increased levels of raw material inventory primarily for Advanced Products. We also have established second-source supply relationships, in order to reduce exposure to material shortages. Although the global electronics supply chain has generally stabilized, we continue to experience lengthened lead times for certain product categories, and our product-level profitability and overall performance could be negatively influenced by an unplanned shortage of a particular component or material. We do not expect lead-times to shorten meaningfully in 2019 and anticipate availability of certain commodity components will remain uncertain into 2019.

We import a range of materials from China used in the manufacture of our products. These products are subject to Section 301 Tariffs that went into effect on July 6, 2018 and August 23, 2018. Given the relatively short length of time since the tariffs were put in effect, our results have not been materially influenced by tariffs incurred on Chinese imports. However, we have assessed the potential amount of additional costs such tariffs may represent going forward and have concluded we will absorb the costs, rather than pass them on to our customers, for the foreseeable future. Should the amount of additional costs expand to be

materially higher than our current estimate, we may seek to pass some or all of these costs on to our customers in the form of a surcharge.

As revenue has increased, our operating expenses have declined as a percentage of revenue, although such expenses have not declined meaningfully on an absolute basis. We have expanded and focused our engineering and sales organizations to pursue the promising opportunities afforded by our innovative Advanced Products, and we believe our current level of absolute spending is necessary to

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achieve our strategic goals. However, many of these opportunities are in early phases of development, and near-term revenue growth may not be sufficient to further reduce the percentages of revenue represented by our operating expenses or to levels comparable to our high volume competitors.

Market and Macroeconomic Considerations

Based on current customer activity, an expanding customer list, and an expanding backlog, we believe the 48V to point-of-load opportunity has entered an accelerated, second phase of development, with a broadening of interest, as well as the entry of new vendors offering 48V solutions. Our Power-on-Package solution powering GPUs and ASICs used in AI applications has received strong customer interest, and we have secured significant design wins for the solution. We also believe customer interest in the application of 48V distribution to server racks and datacenter infrastructure is accelerating. As such, we likely will face a more complex competitive landscape, with additional challenges and competitors. We continue to believe our new products will be adopted in volume by multiple leading customers, as the number of OEMs, ODMs, hyperscalers, and cloud services providers with which we are engaged in development activities expanded in 2018. However, we cannot control the actions by, or the timing of, our customers, their contract manufacturers, or the significant vendors also participating in the market. Many of these vendors possess resources far greater than we do and have operational and financial flexibility we do not. Notably, our outlook for 2019 bookings and shipments of Power-on-Package solutions has been influenced by the sudden, fourth quarter shift in the confidence of our customers regarding supercomputing and high performance computing spending, particularly in China. Despite recent and anticipated design wins, as well as the strong momentum of AI computing through the year, recent customer uncertainty may cause orders from new and existing customers to be delayed, with a likely influence on our financial results and capacity expansion plans.

We anticipate aggregate demand for the mature markets we serve with our Brick Products will grow over the long-term only at the rate of the overall industrial economy (i.e., in the United States, for example, at the rate of growth approximating that of the industrial segments of gross domestic product). Given our long-standing customer relationships and the status of our Brick Products in long-standing customer applications, we anticipate maintaining our share in many of these mature markets. While we are pursuing opportunities to replace many Brick Products used in existing customers applications with Advanced Products, when appropriate, and, similarly, to replace competitors products in existing applications, we believe such opportunities may not cumulatively contribute to expanding, in 2019, our share of the mature markets we serve with our Brick Products.

2018 Financial Highlights

Net revenues increased 27.8% to $291,220,000 for 2018, from $227,830,000 for 2017, primarily due to an overall 26.9% increase in bookings in 2018, compared to 2017, with significant increases across all operating segments.

Export sales, as a percentage of total revenues, represented approximately 62.0% in 2018 and 63.2% in 2017.

Gross margin increased to $138,971,000 for 2018, from $101,656,000 for 2017. Gross margin, as a percentage of net revenues increased to 47.7% for 2018 from 44.6% for 2017. The increases were primarily due to the increase in net revenues, driving higher overhead absorption, broadly improved average selling prices, and an improved mix of products shipped.

Backlog, representing the total of orders for products received for which shipment is scheduled within the next 12 months, was approximately $102,963,000 at the end of 2018, as compared to $73,054,000 at the end of 2017. The increase in backlog was due to increased bookings across all operating segments, as noted above.

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Operating expenses for 2018 increased $3,896,000, or 3.8%, to $106,912,000 from $103,016,000 for 2017, due to an increase in selling, general, and administrative expenses of $4,132,000, partially offset by a decrease in research and development expenses of $638,000. We recorded severance and other charges of $402,000 in 2018 in connection with the closure of one of our Vicor Custom Power subsidiaries, Granite Power Technologies, Inc. (GPT), as part of our ongoing initiative to streamline operations and improve our cost structure.

We reported net income for 2018 of $31,725,000, or $0.78 per diluted share, compared to net income of $167,000, or $0.00 per diluted share, for 2017.

In 2018, depreciation and amortization totaled $9,254,000, and capital expenditures were $18,211,000, compared to $8,893,000 and $12,545,000, respectively, for 2017. The increase in capital spending was largely associated with the purchase and installation of production equipment, primarily for Advanced Products.

Inventories increased by approximately $10,871,000, or 29.8%, to $47,370,000 at the end of 2018, as compared to $36,499,000 at the end of 2017. This increase was primarily associated with increases in VI Chip, BBU, and Picor inventories of $7,953,000, $1,539,000, and $1,379,000 respectively, to meet increased bookings and to ensure adequate levels of key components with long lead times are maintained.

The following table sets forth certain items of selected consolidated financial information as a percentage of net revenues for the years shown, ended December 31. This table and the subsequent discussion should be read in conjunction with the selected financial data and the Consolidated Financial Statements and related footnotes contained elsewhere in this report.

	Year Ended December 31,		
	2018	2017	2016
Net revenues	100.0%	100.0%	100.0%
Gross margin	47.7%	44.6%	45.5%
Selling, general and administrative expenses	21.4%	25.5%	27.8%
Research and development expenses	15.2%	19.7%	20.9%
Income (loss) before income taxes	11.3%	(0.0)%	(3.0)%

Critical Accounting Policies and Estimates

Management s Discussion and Analysis of Financial Condition and Results of Operations is based upon our Consolidated Financial Statements, which have been prepared in accordance with accounting principles generally accepted in the United States (U.S. GAAP). The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues, expenses, and related disclosures of contingent assets and liabilities. On an ongoing basis, we evaluate our estimates and assumptions, and our associated judgments, including those related to inventories, income taxes, contingencies, and litigation. We base our estimates, assumptions, and judgments on historical experience, knowledge of current conditions, and on various other factors we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. We also have other policies we

consider key accounting policies, such as our policy for revenue recognition, which was updated in 2018 to reflect the adoption of the new accounting guidance (See Note 2 to the Consolidated Financial Statements *Significant Accounting Policies Recently Adopted Accounting Standards Revenue Recognition*). However, the application of these other policies does not require us to make significant estimates and assumptions difficult to support quantitatively.

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Inventories

We employ a variety of methodologies to estimate allowances for our inventory for estimated obsolescence or unmarketable inventory, based upon our existing backlog, historical consumption, and assumptions about future demand and market conditions. For BBU products produced at our Andover facility, our principal manufacturing location, the methodology used compares on-hand quantities to projected demand and historical consumption, such that amounts of inventory on hand in excess of a three-year projected consumption or three-year historical consumption, whichever is higher, are fully reserved. VI Chip and Picor use two-year projected and historical consumption assumptions. While we have used our best efforts and believe we have used the best available information to estimate future demand, due to uncertainty in the economy and our business and the inherent difficulty in predicting future demand, it is possible actual demand for our products will differ from our estimates. If actual future demand or market conditions are less favorable than those projected by management, additional inventory reserves for existing inventories may need to be recorded in future periods.

Income Taxes

We make certain estimates, assumptions, and judgments in determining income tax expense for financial statement reporting purposes. These estimates, assumptions, and judgments occur in the calculation of tax credits, benefits, and deductions, and in the calculation of certain assets and liabilities that arise from differences in the timing and of the recognition of revenue and expense for tax and financial statement purposes, as well as the interest and penalties relating to uncertain tax positions. Significant changes to these estimates, assumptions, and judgments may result in an increase or decrease to our tax provision in a subsequent period.

Significant management judgment also is required in determining whether deferred tax assets will be realized in full or in part. We assess the need for a valuation allowance on a quarterly basis. We record a valuation allowance to reduce our deferred tax assets to the amount we believe is more likely than not to be realized. In assessing the need for a valuation allowance, we consider all positive and negative evidence, including scheduled reversals of deferred tax liabilities, projected future taxable income, tax planning strategies, and past financial performance. While recent positive operating results caused us to be in a cumulative income position as of December 31, 2018, we have been in such a position for only a limited number of quarters. In addition, some uncertainty in economic conditions, as discussed above under the heading *2018 Results*, above, that could potentially impact us has led management to conclude a full valuation allowance against all domestic net deferred tax assets is still warranted as of December 31, 2018. The valuation allowances against these deferred tax assets may require adjustment in the future based on changes in the mix of temporary differences, changes in tax laws, and operating performance. If the positive quarterly earnings continue, we may release all or a portion of the valuation in the near-term. If and when we determine the valuation allowance should be released (i.e., reduced), the adjustment would result in a tax benefit reported in that period s Consolidated Statements of Operations, the effect of which would be an increase in reported net income. The amount of any such tax benefit associated with release of our valuation allowance in a particular quarter may be material.

We follow a two-step process to determine the amount of tax benefit to recognize in our financial statements for tax positions taken on tax returns. The first step is to evaluate the tax position to determine the likelihood it would be sustained upon examination by a tax authority. If the tax position is deemed more-likely-than-not to be sustained, the second step is to assess the tax position to determine the amount of tax benefit to recognize in the financial statements. The amount of the benefit that may be recognized is the largest amount that has a greater than 50 percent likelihood of being realized upon ultimate settlement. If the tax position does not meet the more-likely-than-not threshold then it is not recognized in the financial statements. We accrue interest and penalties, if any, related to unrecognized tax benefits as a component of income tax expense. If the estimates, assumptions, and judgments made by us change, the

unrecognized tax benefits may have to be adjusted, and such adjustments may be material.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation, referred to as the Tax Cuts and Jobs Act (the Tax Act). The Tax Act makes broad and complex changes to the U.S. tax code,

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including, but not limited to: (1) reducing the U.S. federal corporate tax rate from 35% to 21%; (2) elimination of the corporate alternative minimum tax (AMT) and changing how existing AMT credits can be realized; (3) changing rules related to the usage and limitation of net operating loss carryforwards created in tax years beginning after December 31, 2017; and (4) implementing a territorial tax system, which generally eliminates the U.S. federal income tax on dividends from foreign subsidiaries, and imposes a one-time transition tax on certain earnings of foreign subsidiaries previously untaxed in the United States. We recognized the provisional tax impacts related to deemed repatriated earnings and the revaluation of deferred tax assets and liabilities and included these amounts in its consolidated financial statements for the year ended December 31, 2017. We did not record any adjustments in the year ended December 31, 2018 to these provisional amounts that were material to our financial statements. As of December 31, 2018, our accounting treatment with regards to the Tax Act is complete. Effective for our 2018 tax year, the Tax Act implements certain additional provisions including the Global Intangible Low-Taxes Income (GILTI) inclusion and the Foreign Derived Intangible Income (FDII) deduction. We are electing to account for the GILTI inclusion as a period cost.

New Accounting Pronouncements

From time to time, new accounting pronouncements are issued by the Financial Accounting Standards Board (FASB) that we adopt as of the specified effective date. Unless otherwise discussed, we believe the impact of recently issued accounting standards will not have a material impact on our future financial condition and results of operations. See Note 2 *Impact of recently issued accounting standards*, to the Consolidated Financial Statements for a description of recently issued and adopted accounting pronouncements, including the dates of adoption and expected impact on our financial position and results of operations.

Lease Accounting

In February 2016, the Financial Accounting Standards Board (FASB) issued new guidance for lease accounting, which will require lessees to recognize leases on the balance sheet and disclose key information about leasing arrangements. The new guidance establishes a right-of-use model (ROU) that will require a lessee to recognize a ROU asset and a lease liability on the balance sheet for all leases with a term longer than twelve months. Leases will be classified as finance or operating, with classification affecting the pattern and classification of expense recognition in the income statement. For lessors, the guidance modifies the classification criteria and accounting for sales-type and direct financing leases. The majority of our leases are for certain of its office and manufacturing space, along with several automobiles. We are a party to one arrangement as the lessor, for our former Westcor facility located in Sunnyvale, California.

The new standard is effective for us as of January 1, 2019, with early adoption permitted. We plan to adopt the new guidance on its effective date. The new standard must be adopted using a modified retrospective transition approach, applying the guidance to all leases existing at the date of initial application. An entity may choose to use either (1) its effective date or (2) the beginning of the earliest comparative period presented in the financial statements as its date of application. We plan to adopt the new standard on January 1, 2019 and use the effective date as our date of initial application. As a result, financial information will not be updated and the disclosures required under the new standard will not be provided for dates and periods before January 1, 2019.

The new standard provides a number of optional practical expedients. We expect to elect the package of practical expedients , which permits companies to not reassess under the new standard lease identification, lease classification and initial direct costs. We do not plan to elect the use-of-hindsight or the practical expedient pertaining to land easements, the latter not being applicable.

We estimate the adoption of the standard will result in recognition of ROU assets and lease liabilities of approximately $4,500,000, as of January 1, 2019. The implementation team s remaining tasks are to complete documentation for the systems and controls to support the lease recognition and disclosure requirements under the new standard, and to complete the required disclosures in preparation for filing our Form 10-Q for the quarter ending March 31, 2019.

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Year ended December 31, 2018 compared to Year ended December 31, 2017

Consolidated net revenues for 2018 were $291,220,000, an increase of $63,390,000, or 27.8%, as compared to $227,830,000 for 2017.

Net revenues, by segment, for the years ended December 31 were as follows (dollars in thousands):

			Increase	
	2018	2017	$	%
BBU	$ 186,704	$ 151,702	$ 35,002	23.1%
VI Chip	81,674	59,017	22,657	38.4%
Picor	22,842	17,111	5,731	33.5%
Total	$ 291,220	$ 227,830	$ 63,390	27.8%

The overall increase in consolidated net revenues was primarily due to an overall 26.9% increase in bookings for the year ended December 31, 2018, compared to the year ended December 31, 2017, with significant increases across all operating segments. BBU, VI Chip, and Picor bookings increased by 26.1%, 29.8% and 22.2%, respectively. In fact, total bookings have increased sequentially each quarter since the first quarter of 2016, with the exception of the fourth quarter of 2018. The increase in BBU segment revenues was primarily attributable to an increase in BBU module and configurable product revenues of approximately $32,377,000, VJCL revenues of approximately $1,606,000 and Vicor Custom Power revenues of $1,449,000. Increases in revenues recorded by the VI Chip and Picor operating segments for the year ended December 31, 2018 were associated largely with fulfillment of increased orders for our 48V to point-of-load solutions.

Gross margin for 2018 increased $37,315,000, or 36.7%, to $138,971,000 from $101,656,000 in 2017. Gross margin as a percentage of net revenues increased to 47.7% in 2018 from 44.6% in 2017. Both increases were primarily due to the increase in net revenues, driving higher overhead absorption, broadly improved average selling prices, and an improved mix of products shipped.

Income (loss) from operations by reported operating segments and our Corporate segment for the years ended December 31 were as follows (dollars in thousands):

			Increase (decrease)	
	2018	2017	$	%
BBU	$ 22,544	$ 5,615	$ 16,929	301.5%
VI Chip	3,612	(11,495)	15,107	131.4%
Picor	7,517	5,400	2,117	39.2%
Corporate	(1,614)	(880)	(734)	(83.4)%
Total	$ 32,059	$ (1,360)	$ 33,419	2457.3%

The increase in BBU operating income in 2018 compared to 2017 was due to an increase in revenues and a related increase in gross margin, partially offset by increases in operating expenses. The primary increases in operating

expenses were compensation expenses, audit, tax, and accounting fees, and legal fees. The improvement in VI Chip operating results in 2018 compared to 2017 was due to the increase in revenues and the related increase in gross margin, and decreases in operating expenses. The primary decreases in operating expenses were associated with lower consumption of project and pre-production materials. The increase in Picor operating income in 2018 compared to 2017 was due to the increase in revenues and the related increase in gross margin. The cash needs for each operating segment are primarily for working capital and capital expenditures. Positive cash flow from the BBU operating segment historically has funded, and is expected to continue to fund, operations of the VI Chip and Picor operating segments, as well as the capital expenditures for all operating segments for the foreseeable future.

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Selling, general, and administrative expenses were $62,224,000 for 2018, an increase of $4,132,000, or 7.1%, as compared to $58,092,000 for 2017. As a percentage of net revenues, selling, general, and administrative expenses decreased to 21.4% in 2018 from 25.5% in 2017, primarily due to the increase in net revenues.

The components of the $4,132,000 increase in selling, general, and administrative expenses were as follows (dollars in thousands):

	Increase (decrease)	
Compensation	$ 3,180	8.9%(1)
Audit, tax, and accounting fees	584	33.3%(2)
Legal fees	527	40.7%(3)
Advertising expenses	396	14.8%(4)
Employment recruiting	102	70.7%
Depreciation and amortization	(115)	(4.5)%(5)
Royalty expense	(650)	(100.0)%(6)
Other, net	108	0.8%
	$ 4,132	7.1%

(1) Increase primarily attributable to annual compensation adjustments in May 2018, increased stock-based compensation expense and increases in headcount. The increase in stock-based compensation expense was due to an increase in stock options granted between July 1, 2017 and December 31, 2018 and employee stock purchase plan expense, which was recorded for only part of 2017. See Note 3 to the Consolidated Financial Statements.

(2) Increase primarily attributable to the timing of the 2018 audit process and higher total audit fees for the 2017 audit, a portion of which was expensed in 2018, compared to the 2016 audit.

(3) Increase attributable to an increase in corporate legal matters, including the Picor and GPT mergers.

(4) Increase primarily attributed to increases in sales support expenses, direct mailings, and advertising in trade publications.

(5) Decrease attributable to certain BBU operating segment fixed assets becoming fully depreciated during 2018.

(6) Decrease attributable to an increase in contingent consideration obligations in 2017. See Note 8 to the Consolidated Financial Statements.

Research and development expenses decreased $638,000, or 1.4%, to $44,286,000 in 2018 from $44,924,000 in 2017. As a percentage of net revenues, research and development decreased to 15.2% in 2018 from 19.7% in 2017, primarily due to the increase in net revenues.

The components of the $638,000 decrease in research and development expenses were as follows (in thousands):

	Increase (decrease)	
Project and pre-production materials	$ (1,495)	(21.5)%(1)
Compensation	(72)	(0.0)%(2)
Outside services	98	14.6%
Deferred costs	168	14.6%(3)
Facilities expenses	202	9.0%(4)
Supplies expense	317	42.9%(5)
Other, net	144	3.2%
	$ (638)	(1.4)%

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(1) Decrease primarily attributable to decreased spending for new product development by the VI Chip operating segment.

(2) Increase primarily attributable to annual compensation adjustments in May 2018, increased stock-based compensation expense and increases in headcount, were offset by allocation of certain compensation expenses to cost of goods sold, as a result of increased engineering involvement in the production activities of the Picor operating segment.

(3) Increase primarily attributable to a decrease in deferred costs capitalized for certain non-recurring engineering projects for which the related revenues have been deferred.

(4) Increase primarily attributable to an increase in utilities and building maintenance expenses.

(5) Increase primarily attributable to an increase in circuit development spending by the Picor operating segment.
In May 2018, the Company s management authorized the closure of GPT by the end of 2018. GPT is one of three Vicor Custom Power (VCP) entities, located in Manchester, N.H. Certain of GPT s products will continue to be manufactured and sold by the two remaining VCP entities. As a result, we recorded pre-tax charges of $402,000 in 2018, for the cost of severance and other employee-related costs involving cash payments based on each employee s respective length of service, and for rent and freight costs.

The significant changes in the components of Other income (expense), net for the years ended December 31 were as follows (in thousands):

	2018	2017	Increase (decrease)
Rental income	$ 792	$ 792	$
Foreign currency (losses) gains, net	(260)	323	(583)
Interest income	257	124	133
Gain on disposal of equipment	57	14	43
Credit gains on available-for-sale securities	7	11	(4)
Other	21	(2)	23
	$ 874	$ 1,262	$ (388)

Our exposure to market risk fluctuations in foreign currency exchange rates relates to the operations of VJCL, for which the functional currency is the Japanese Yen, and all other subsidiaries in Europe and Asia, for which the functional currency is the U.S. Dollar. These other subsidiaries in Europe and Asia experienced unfavorable foreign currency exchange rate fluctuations in 2018 compared to 2017. Interest income increased due to an increase in interest rates.

Income (loss) before income taxes was $32,933,000 in 2018, as compared to $(98,000) in 2017.

The provision (benefit) for income taxes and the effective income tax rate for the years ended December 31 were as follows (dollars in thousands):

	2018	2017
Provision (benefit) for income taxes	$ 1,087	$ (356)
Effective income tax rate	3.3%	(363.3)%

The 2018 income tax provision includes estimated state and foreign taxes on the Company s pre-tax income. Federal tax expense was offset by net operating loss carryforwards.

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In 2017, the benefit for income taxes was primarily due to our AMT credit carryforwards of approximately $736,000 becoming fully refundable in future years, due to the repeal of the corporate AMT under the recently enacted Tax Act, discussed below. The 2017 income tax provision included estimated foreign income taxes and estimated state taxes in jurisdictions in which we do not have net operating loss carryforwards. No tax benefit could be recognized for the majority of our losses during the periods as we maintained a full valuation allowance against all net domestic deferred tax assets due to our inability to project sustained net future taxable income.

See Note 14 to the Consolidated Financial Statements for disclosure regarding our current assessment of the full valuation allowance against all domestic net deferred tax assets, and the possible release (i.e., reduction) of the allowance in the future.

On December 22, 2017, the U.S. government enacted comprehensive tax legislation, referred to as the Tax Cuts and Jobs Act (the Tax Act). The Tax Act makes broad and complex changes to the U.S. tax code, including, but not limited to: (1) reducing the U.S. federal corporate tax rate from 35% to 21%; (2) elimination of the corporate AMT and changing how existing AMT credits can be realized; (3) changing rules related to the usage and limitation of net operating loss carryforwards created in tax years beginning after December 31, 2017; and (4) implementing a territorial tax system, which generally eliminates the U.S. federal income tax on dividends from foreign subsidiaries, and imposes a one-time transition tax on certain earnings of foreign subsidiaries previously untaxed in the United States. Effective for our 2018 tax year, the Tax Act implements certain additional provisions including the Global Intangible Low-Taxes Income (GILTI) inclusion and the Foreign Derived Intangible Income (FDII) deduction. We are electing to account for the GILTI inclusion as a period cost.

Net income per diluted share attributable to Vicor Corporation was $0.78 for the year ended December 31, 2018, compared to net income per diluted share of $0.00 for the year ended December 31, 2017.

Year ended December 31, 2017 compared to Year ended December 31, 2016

Consolidated net revenues for 2017 were $227,830,000, an increase of $27,550,000, or 13.8%, as compared to $200,280,000 for 2016.

Net revenues, by segment, for the years ended December 31 were as follows (dollars in thousands):

			Increase	
	2017	**2016**	**$**	**%**
BBU	$ 151,702	$ 151,429	$ 273	0.2%
VI Chip	59,017	38,369	20,648	53.8%
Picor	17,111	10,482	6,629	63.2%
Total	$ 227,830	$ 200,280	$ 27,550	13.8%

The overall increase in consolidated net revenues was primarily due to an overall 20.2% increase in bookings for the year ended December 31, 2017, compared to the year ended December 31, 2016. BBU, VI Chip, and Picor bookings increased by 6.9%, 54.5% and 57.0%, respectively. The increase in BBU revenues was primarily attributable to an increase in Vicor Custom Power revenues of $3,803,000, partially offset by a decrease in BBU module and configurable product revenues of approximately $3,455,000. Increases in revenues recorded by VI Chip and Picor for the year ended December 31, 2017 were associated largely with fulfillment of increased orders for our 48 volt to

point-of-load solutions.

Gross margin for 2017 increased $10,447,000, or 11.5%, to $101,656,000 from $91,209,000 in 2016. Despite the increase in net revenues, gross,margin as a percentage of net revenues decreased to 44.6% in 2017 from 45.5% in 2016, primarily due to a less favorable product mix, most notably the result of a higher proportion of lower margin VI Chip revenues.

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Income (loss) from operations by segment for the years ended December 31 were as follows (dollars in thousands):

			Increase (Decrease)	
	2017	2016	$	%
BBU	$ 5,615	$ 11,750	$ (6,135)	(52.2)%
VI Chip	(11,495)	(16,494)	4,999	30.3%
Picor	5,400	(637)	6,037	947.7%
Corporate	(880)	(933)	53	5.7%
Total	$ (1,360)	$ (6,314)	$ 4,954	78.5%

The decrease in BBU operating profit in 2017 compared to 2016 was primarily due to a decrease in gross margin, despite the increase in revenues, and an increase in operating expenses. The primary increases in operating expenses were compensation expenses and royalty expenses associated with a reassessment of our contingent consideration obligations tied to our acquisitions, in late 2015 and early 2016, of the equity of two Vicor Custom Power subsidiaries that we did not already own. The decrease in VI Chip operating loss in 2017 compared to 2016 was due to the increase in revenues and the related increase in gross margin, partially offset by increases in operating expenses. The primary increases in operating expenses were compensation expenses and project and pre-production materials expenses. The VI Chip segment continued to incur significant operating losses as revenue volume and related gross margins are not sufficient to cover fixed manufacturing costs and operating expenses, particularly research and development expenses. The improvement in Picor operating results in 2017 compared to 2016 was due to the increase in revenues and the related increase in gross margin.

Selling, general, and administrative expenses were $58,092,000 for 2017, an increase of $2,417,000, or 4.3%, as compared to $55,675,000 for 2016. As a percentage of net revenues, selling, general, and administrative expenses decreased to 25.5% in 2017 from 27.8% in 2016, primarily due to the increase in net revenues.

The components of the $2,417,000 increase in selling, general, and administrative expenses were as follows (dollars in thousands):

	Increase (decrease)	
Compensation	$ 1,954	5.8%(1)
Royalty expense	650	100.0%(2)
Advertising expenses	422	18.7%(3)
Audit, tax, and accounting fees	(150)	(7.9)%(4)
Depreciation and amortization	(160)	(5.9)%(5)
Telephone expense	(166)	(14.5)%(6)
Outside services	(172)	(8.6)%(7)
Legal fees	(273)	(17.4)%(8)
Other, net	312	3.0%
	$ 2,417	4.3%

(1) Increase primarily attributable to annual compensation adjustments in May 2017, increases in headcount and the reversal of VI Chip performance-based stock compensation expense in the third quarter of 2016.

(2) Increase attributable to an increase in contingent consideration obligations. See Note 8 to the Consolidated Financial Statements.

(3) Increase primarily attributed to increases in sales support expenses, direct mailings, and advertising in trade publications.

(4) Decrease primarily attributable to the timing of the 2017 audit process.

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(5) Decrease attributable to certain BBU segment fixed assets becoming fully depreciated during 2016.

(6) Decrease attributable to reduced service provider costs.

(7) Decrease primarily attributable to a decrease in the use of outside consultants at certain international locations.

(8) Decrease attributable to reduced activity associated with the patent infringement claims filed against the Company during the first quarter of 2011 by SynQor. See Note 15 to the Consolidated Financial Statements.

Research and development expenses increased $3,076,000, or 7.4%, to $44,924,000 in 2017 from $41,848,000 in 2016. As a percentage of net revenues, research and development decreased to 19.7% in 2017 from 20.9% in 2016, primarily due to the increase in net revenues.

The components of the $3,076,000 increase in research and development expenses were as follows (dollars in thousands):

	Increase (decrease)	
Compensation	$ 2,121	7.3%(1)
Project and pre-production materials	1,151	19.9%(2)
Facilities expenses	316	16.4%(3)
Supplies expense	(167)	(18.4)%(4)
Deferred costs	(213)	(22.7)%(5)
Outside services	(245)	(23.5)%(6)
Other, net	113	2.8%
	$ 3,076	7.4%

(1) Increase primarily attributable to annual compensation adjustments in May 2017, increases in headcount and the reversal of VI Chip performance-based stock compensation expense in the third quarter of 2016.

(2) Increase primarily attributable to increases in spending for new product development by the VI Chip segment.

(3) Increase primarily attributable to an increase in utilities and building maintenance expenses, of which a portion of the increase was due to Picor s occupancy of a larger facility in January 2017.

(4) Decrease primarily attributable to a decrease in spending by the VI Chip segment.

(5)

Decrease primarily attributable to an increase in deferred costs capitalized for certain non-recurring engineering projects for which the related revenues have been deferred.

(6) Decrease primarily attributable to decreased use of outside contractors associated with the pre-production development of certain VI Chip and Picor products.

The significant changes in the components of Other income, net for the years ended December 31 were as follows (in thousands):

	2017	2016	Increase (decrease)
Rental income	$ 792	$ 462	$ 330
Foreign currency gains (losses), net	323	(268)	591
Interest income	124	68	56
Gain (loss) on disposal of equipment	14	(4)	18
Credit gains on available-for-sale securities	11	13	(2)
Other	(2)	13	(15)
	$ 1,262	$ 284	$ 978

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During the second quarter of 2016, we began recognizing rental income under a new leasing agreement with a third party for the former Westcor facility. Our exposure to market risk fluctuations in foreign currency exchange rates relate primarily to the operations of VJCL, for which the functional currency is the Japanese Yen. The functional currency of all other subsidiaries in Europe and Asia is the U.S. Dollar. While our Vicor B.V. operation also potentially exposes us to exchange rate risk, as that subsidiary s sales are denominated in Euros and Pounds Sterling, any periodic gains or losses associated with exchange rate fluctuations are small, given the small U.S. Dollar value of shipments we make to Vicor B.V.

Loss before income taxes was $(98,000) in 2017, as compared to $(6,030,000) in 2016.

The (benefit) provision for income taxes and the effective income tax rate for the years ended December 31 were as follows (dollars in thousands):

	2017	2016
(Benefit) provision for income taxes	$ (356)	$ 231
Effective income tax rate	(363.3)%	3.8%

In 2017, the benefit for income taxes was primarily due to our AMT credit carryforwards of approximately $736,000 becoming fully refundable in future years, due to the repeal of the corporate AMT under the recently enacted Tax Act, discussed above. The provisions for income taxes in each 2017 and 2016 period included estimated foreign income taxes and estimated state taxes in jurisdictions in which we do not have net operating loss carryforwards. No tax benefit could be recognized for the majority of our losses during the periods as we maintain a full valuation allowance against all net domestic deferred tax assets due to our inability to project net future taxable income. In addition, in connection with our acquisition of 100% ownership of certain operating assets and cash of our consolidated subsidiary, Converpower Corporation, the related deferred tax liability for unremitted earnings of $55,000 was reversed and recorded as a discrete benefit in the first quarter of 2016 (see Note 8 to the Consolidated Financial Statements).

We adopted new guidance for employee stock-based payment accounting during the first quarter of 2017. The new guidance, among other considerations, requires excess tax benefits and tax deficiencies related to employee stock-based compensation to now be recorded in earnings when the awards vest or are settled, rather than in stockholders equity under previous guidance. In addition, it eliminates the requirement that excess tax benefits be realized with the taxing authority before they can be recognized. In connection with the adoption of this new guidance, we recorded a cumulative-effect adjustment as of January 1, 2017 to increase gross deferred tax assets and the related valuation allowance against deferred tax assets by $3,485,000. This amount was allocated and added to deferred tax assets for research and development tax credit carryforwards, net operating loss carryforwards and the alternative minimum tax credit carryforward but, as noted above, was fully offset by a corresponding increase in the valuation allowance against deferred tax assets, resulting in no net effect on our Consolidated Financial Statements.

Net income per diluted share attributable to Vicor Corporation was $0.00 for the year ended December 31, 2017, compared to a net loss per share of $(0.16) for the year ended December 31, 2016.

LIQUIDITY AND CAPITAL RESOURCES

At December 31, 2018, we had $70,557,000 in cash and cash equivalents. The ratio of current assets to current liabilities was 4.6:1 at December 31, 2018, as compared to 4.2:1 at December 31, 2017. Net working capital increased $38,266,000 to $129,062,000 at December 31, 2018 from $90,796,000 at December 31, 2017.

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The primary working capital changes were due to the following (in thousands):

	Increase (decrease)
Cash and cash equivalents	$ 26,327
Accounts receivable	9,186
Inventories	10,871
Other current assets	(156)
Accounts payable	(7,084)
Accrued compensation and benefits	(766)
Accrued expenses	358
Sales allowances	(548)
Accrued severance charges	(234)
Income taxes payable	(410)
Deferred revenue	722
	$ 38,266

The primary sources of cash for the year ended December 31, 2018 were from operating activities, $36,171,000, and proceeds from the issuance of Common Stock upon the exercise of options under our stock option plans and our 2017 Employee Stock Purchase Plan, $8,656,000.The primary uses of cash for the year ended December 31, 2018 was the purchase of equipment of $18,211,000.

In November 2000, our Board of Directors authorized the repurchase of up to $30,000,000 of Common Stock (the November 2000 Plan). The November 2000 Plan authorizes us to make such repurchases from time to time in the open market or through privately negotiated transactions. The timing of such repurchases and the number of shares purchased in each transaction are at the discretion of management based on its view of economic and financial market conditions. We did not repurchase shares of Common Stock under the November 2000 Plan during the year ended December 31, 2018. As of December 31, 2018, we had approximately $8,541,000 remaining for share purchases under the November 2000 Plan.

As of December 31, 2018, we had no off-balance sheet arrangements.

The table below summarizes our contractual obligations for operating leases as of December 31, 2018 (in thousands):

		Payments Due by Period			
Contractual Obligations	**Total**	**Less than 1 Year**	**Years 2 & 3**	**Years 4 & 5**	**More Than 5 Years**
Operating lease obligations	$ 5,429	$ 1,962	$ 2,190	$ 815	$ 462

We have approximately $8,862,000 of capital expenditure commitments, principally for manufacturing equipment, as of December 31, 2018, which we intend to fund with existing cash. Our primary liquidity needs are for making continuing investments in manufacturing equipment and, if we proceed with the planned construction of 85,000 square feet of additional manufacturing space adjoining our existing Andover manufacturing facility, for funding architectural and construction costs. We believe cash generated from operations and the total of our cash and cash

equivalents will be sufficient to fund planned operational needs, capital equipment purchases, and the planned construction, for the foreseeable future.

We do not consider the impact of inflation and changing prices on our business activities or fluctuations in the exchange rates for foreign currency transactions to have been significant during the last three fiscal years.

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

We are exposed to a variety of market risks, including changes in interest rates affecting the return on our cash and cash equivalents and fluctuations in foreign currency exchange rates. As our cash and cash equivalents consist principally of cash accounts and money market securities, which are short-term in nature, we believe our exposure to market risk on interest rate fluctuations for these investments is not significant. As of December 31, 2018, our long-term investment portfolio, recorded on our Consolidated Balance Sheet as Long-term investment, net , consisted of a single auction rate security with a par value of $3,000,000, purchased through and held in custody by a broker-dealer affiliate of Bank of America, N.A., that has experienced failed auctions (the Failed Auction Security) since February 2008. While the Failed Auction Security is Aaa/AA+ rated by major credit rating agencies, collateralized by student loans and guaranteed by the U.S. Department of Education under the Federal Family Education Loan Program, continued failure to sell at its periodic auction dates (i.e., reset dates) could negatively impact the carrying value of the investment, in turn leading to impairment charges in future periods. Periodic changes in the fair value of the Failed Auction Security attributable to credit loss (i.e., risk of the issuer s default) are recorded through earnings as a component of Other income (expense), net , with the remainder of any periodic change in fair value not related to credit loss (i.e., temporary mark-to-market carrying value adjustments) recorded in Accumulated other comprehensive income (loss) , a component of Vicor Corporation Stockholders Equity. Should we conclude a decline in the fair value of the Failed Auction Security is other than temporary, such losses would be recorded through earnings as a component of Other income (expense), net . We do not believe there was an other-than-temporary decline in value in this security as of December 31, 2018.

We estimate our annual interest income would change by approximately $30,000 in 2018 for each 100 basis point increase or decrease in interest rates.

Our exposure to market risk for fluctuations in foreign currency exchange rates relates primarily to the operations of VJCL, for which the functional currency is the Japanese Yen, and changes in the relative value of the Yen to the U.S. Dollar. Relative to our Yen exposure as of December 31, 2018, we estimate a 10% unfavorable movement in the value of the Yen relative to the U.S. Dollar would increase our foreign currency loss by approximately $7,000. The functional currency of all other subsidiaries in Europe and other subsidiaries in Asia is the U.S. Dollar. While we believe risk to fluctuations in foreign currency rates for these subsidiaries is generally not significant, they can be subject to substantial currency changes, and therefore foreign exchange exposures.

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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 Board of Directors

Vicor Corporation:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Vicor Corporation and subsidiaries (the Company) as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income (loss), cash flows, and equity for each of the years in the three-year period ended December 31, 2018, and the related notes, and the financial statement schedule listed in Item 15(a)(2) (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2018, 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, 2018, based on criteria established in Internal Control Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 28, 2019 expressed an unqualified opinion on the effectiveness of the Company s internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company s management. Our responsibility is to express an opinion on these consolidated 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 consolidated 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 consolidated 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 consolidated 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 consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company s auditor since 2013.

Boston, Massachusetts

February 28, 2019

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VICOR CORPORATION

CONSOLIDATED BALANCE SHEETS

December 31, 2018 and 2017

(In thousands, except per share data)

	2018	2017
ASSETS		
Current assets:		
Cash and cash equivalents	$ 70,557	$ 44,230
Accounts receivable, less allowance of $224 in 2018 and $159 in 2017	43,673	34,487
Inventories, net	47,370	36,499
Other current assets	3,460	3,616
Total current assets	165,060	118,832
Long-term deferred tax assets	265	210
Long-term investment, net	2,526	2,525
Property, plant and equipment, net	50,432	41,356
Other assets	2,785	2,801
Total assets	$ 221,068	$ 165,724
LIABILITIES AND EQUITY		
Current liabilities:		
Accounts payable	$ 16,149	$ 9,065
Accrued compensation and benefits	10,657	9,891
Accrued expenses	2,631	2,989
Sales allowances	548	
Accrued severance and other charges	234	
Income taxes payable	710	300
Deferred revenue	5,069	5,791
Total current liabilities	35,998	28,036
Long-term deferred revenue	232	303
Contingent consideration obligations	408	678
Long-term income taxes payable	238	195
Other long-term liabilities	102	93
Total liabilities	36,978	29,305
Commitments and contingencies (Note 15)		
Equity:		
Vicor Corporation stockholders equity:		
Class B Common Stock: 10 votes per share, $.01 par value, 14,000,000 shares authorized, 11,758,218 shares issued and outstanding in 2018 and 2017	118	118

Common Stock: 1 vote per share, $.01 par value, 62,000,000 shares authorized 40,066,710 shares issued and 28,430,971 shares outstanding in 2018; 39,324,029 shares issued and 27,652,543 shares outstanding in 2017	402	401
Additional paid-in capital	193,457	181,395
Retained earnings	129,000	93,605
Accumulated other comprehensive loss	(394)	(478)
Treasury stock at cost: 11,635,739 shares in 2018 and 11,671,486 shares in 2017	(138,927)	(138,927)
Total Vicor Corporation stockholders equity	183,656	136,114
Noncontrolling interest	434	305
Total equity	184,090	136,419
Total liabilities and equity	$ 221,068	$ 165,724

See accompanying notes.

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VICOR CORPORATION

CONSOLIDATED STATEMENTS OF OPERATIONS

Years Ended December 31, 2018, 2017 and 2016

(In thousands, except per share amounts)

	2018	2017	2016
Net revenues	$ 291,220	$ 227,830	$ 200,280
Cost of revenues	152,249	126,174	109,071
Gross margin	138,971	101,656	91,209
Operating expenses:			
Selling, general and administrative	62,224	58,092	55,675
Research and development	44,286	44,924	41,848
Severance and other charges	402		
Total operating expenses	106,912	103,016	97,523
Income (loss) from operations	32,059	(1,360)	(6,314)
Other income (expense), net:			
Total unrealized gains (losses) on available-for-sale securities, net	1	17	(18)
Portion of losses (gains) recognized in other comprehensive income (loss)	6	(6)	31
Net credit gains recognized in earnings	7	11	13
Other income (expense), net	867	1,251	271
Total other income (expense), net	874	1,262	284
Income (loss) before income taxes	32,933	(98)	(6,030)
Less: Provision (benefit) for income taxes	1,087	(356)	231
Consolidated net income (loss)	31,846	258	(6,261)
Less: Net income (loss) attributable to noncontrolling interest	121	91	(14)
Net income (loss) attributable to Vicor Corporation	$ 31,725	$ 167	$ (6,247)
Net income (loss) per common share attributable to Vicor Corporation:			
Basic	$ 0.80	$ 0.00	$ (0.16)
Diluted	$ 0.78	$ 0.00	$ (0.16)
Shares used to compute net income (loss) per common share attributable to Vicor Corporation:			
Basic	39,872	39,228	38,842
Diluted	40,729	39,933	38,842

See accompanying notes.

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VICOR CORPORATION

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

Years Ended December 31, 2018, 2017 and 2016

(In thousands)

	2018	2017	2016
Consolidated net income (loss)	$ 31,846	$ 258	$ (6,261)
Foreign currency translation gains, net of tax benefit (1)	98	83	52
Unrealized (losses) gains on available-for-sale securities, net of tax (1)	(6)	6	(31)
Other comprehensive income	92	89	21
Consolidated comprehensive income (loss)	31,938	347	(6,240)
Less: Comprehensive income (loss) attributable to noncontrolling interest	129	97	(9)
Comprehensive income (loss) attributable to Vicor Corporation	$ 31,809	$ 250	$ (6,231)

(1) The deferred tax assets associated with cumulative foreign currency translation gains and cumulative unrealized gains (losses) on available for sale securities are completely offset by a tax valuation allowance as of December 31, 2018, 2017, and 2016. Therefore, there is no income tax benefit (provision) recognized in any of the three years ended December 31, 2018.

See accompanying notes.

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VICOR CORPORATION

CONSOLIDATED STATEMENTS OF CASH FLOWS

Years Ended December 31, 2018, 2017 and 2016

(In thousands)

	2018	2017	2016
Operating activities:			
Consolidated net income (loss)	$ 31,846	$ 258	$ (6,261)
Adjustments to reconcile consolidated net income (loss) to net cash provided by (used for) operating activities:			
Depreciation and amortization	9,254	8,893	8,438
Stock-based compensation expense	3,396	1,735	506
Increase (decrease) in long-term income taxes payable	43	(1)	4
Deferred income taxes	(55)	(172)	(78)
Decrease in long-term deferred revenue	(71)	(71)	(94)
Increase in other long-term liabilities	9	93	
(Gain) loss on disposal of equipment	(57)	(14)	4
Provision (benefit) for doubtful accounts	65	6	(22)
Credit gain on available-for-sale securities	(7)	(11)	(13)
Increase in refundable income taxes		(736)	
Increase in contingent consideration obligations		650	
Increase in other assets			(505)
Change in current assets and liabilities, net	(8,252)	(13,094)	(1,435)
Net cash provided by (used for) operating activities	36,171	(2,464)	544
Investing activities:			
Additions to property, plant and equipment	(18,211)	(12,545)	(8,428)
Proceeds from sale of equipment	57	14	2
(Decrease) increase in other assets	(85)	5	(93)
Net cash used for investing activities	(18,239)	(12,526)	(8,519)
Financing activities:			
Proceeds from issuance of Common Stock	8,656	3,300	1,584
Payment of contingent consideration obligations	(270)	(225)	(99)
Deconsolidation of subsidiary			(372)
Net cash provided by financing activities	8,386	3,075	1,113
Effect of foreign exchange rates on cash	9	(25)	52
Net increase (decrease) in cash and cash equivalents	26,327	(11,940)	(6,810)
Cash and cash equivalents at beginning of year	44,230	56,170	62,980
Cash and cash equivalents at end of year	$ 70,557	$ 44,230	$ 56,170

Change in current assets and liabilities, excluding effects of deconsolidation of subsidiary:			
Accounts receivable	$ (8,834)	$ (9,210)	$ 780
Inventories, net	(10,827)	(9,309)	(3,677)
Other current assets	176	(357)	(158)
Accounts payable and accrued liabilities	7,450	3,186	339
Accrued severance and other charges	234		(195)
Income taxes payable	410	208	61
Deferred revenue	3,139	2,388	1,415
Change in current assets and liabilities, net	$ (8,252)	$ (13,094)	$ (1,435)
Supplemental disclosures:			
Cash paid during the year for income taxes, net of refunds	$ 743	$ 373	$ 230

See accompanying notes.

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VICOR CORPORATION

CONSOLIDATED STATEMENTS OF EQUITY

Years Ended December 31, 2018, 2017 and 2016

(In thousands)

	Class B Common Stock	Common Stock	Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Treasury Stock	Total Vicor Corporation Stockholders' Equity	Noncontrolling Interest	Total Equity
Balance on December 31, 2015	$ 118	$ 395	$ 174,337	$ 99,685	$ (577)	$ (138,927)	$ 135,031	$ 1,054	$ 136,085
Sales of Common Stock		2	1,587				1,589		1,589
Acquisition of noncontrolling interest			(81)				(81)	(837)	(918)
Stock-based compensation expense			506				506		506
Net settlement stock option exercises			(5)				(5)		(5)
Components of comprehensive income, net of tax									
Net (loss)				(6,247)			(6,247)	(14)	(6,261)
Other comprehensive income					16		16	5	21
Total comprehensive (loss)							(6,231)	(9)	(6,240)
Balance on December 31, 2016	118	397	176,344	93,438	(561)	(138,927)	130,809	208	131,017
Sales of Common Stock		4	3,296				3,300		3,300
			1,735				1,735		1,735

Stock-based compensation expense									
Other			20				20		20
Components of comprehensive income, net of tax									
Net income				167			167	91	258
Other comprehensive income					83		83	6	89
Total comprehensive income							250	97	347
Balance on December 31, 2017	118	401	181,395	93,605	(478)	(138,927)	136,114	305	136,419
Sales of Common Stock		6	6,776				6,782		6,782
Stock-based compensation expense			3,396				3,396		3,396
Issuances of stock through employee stock purchase plan		1	1,873				1,874		1,874
Cumulative effect of adoption of new accounting principle (Topic 606)				3,670			3,670		3,670
Other		(6)	17				11		11
Components of comprehensive income, net of tax									
Net income				31,725			31,725	121	31,846
Other comprehensive income					84		84	8	92
Total comprehensive income							31,809	129	31,938
Balance on December 31,	$ 118	$ 402	$ 193,457	$ 129,000	$ (394)	$ (138,927)	$ 183,656	$ 434	$ 184,090

2018

See accompanying notes.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. DESCRIPTION OF BUSINESS

Vicor Corporation (the Company or Vicor) designs, develops, manufactures, and markets modular power components and power systems for converting electrical power. The Company also licenses certain rights to its technology in return for recurring royalties. The principal markets for the Company s power converters and systems are large original equipment manufacturers (OEMs) and their contract manufacturers, and smaller, lower volume users, which are broadly distributed across several major market areas.

2. SIGNIFICANT ACCOUNTING POLICIES

Principles of consolidation

The Consolidated Financial Statements include the accounts of the Company and its subsidiaries. All intercompany transactions and balances have been eliminated upon consolidation. One of the Company s subsidiaries was not majority owned by the Company prior to 2016, and a second was not majority owned prior to March 31, 2016. Prior to the transactions described in Note 8, these entities were consolidated by the Company as management believed that the Company had the ability to exercise control over their activities and operations.

Use of estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States (U.S. GAAP) requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingencies at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Such estimates and assumptions relate to the useful lives of fixed assets and identified intangible assets, recoverability of long-lived assets, fair value of long-term investments, allowances for doubtful accounts, the net realizable value of inventory, potential reserves relating to litigation matters, accrued liabilities, accrued taxes, deferred tax valuation allowances, assumptions pertaining to share-based payments, and other reserves. Actual results could differ from those based on these estimates and assumptions, and such differences may be material to the financial statements.

Recently Adopted Accounting Standards

Revenue Recognition

In May 2014, the Financial Accounting Standards Board (FASB) issued new guidance for revenue recognition (Topic 606), which requires an entity to recognize the amount of revenue to which it expects to be entitled for the transfer of promised goods or services to customers. The new guidance, which includes several amendments, replaces most of the prior revenue recognition guidance under U.S. GAAP. The Company adopted the new guidance as of January 1, 2018 using the modified retrospective method, as applied to all contracts. As a result, the Company has changed its accounting policy for revenue recognition, as detailed below. The most significant impact of the adoption was on the timing of recognition of sales to the Company s stocking distributors and including the additional required disclosures under the new standard. Through December 31, 2017, the Company deferred revenue and the related cost of sales on shipments to stocking distributors until the distributors resold the products to their customers. Upon adoption, the Company is no longer permitted to defer revenue until sale by the stocking distributor to the end customer, but rather,

is required to estimate the effects of returns and allowances provided to stocking distributors and record revenue at the time of sale to the stocking distributor. In addition, the Company modified the accounting for a contractual arrangement due to a reassessment of the number of performance obligations in the arrangement, and adjusted for the timing of certain royalty revenue. The cumulative effect of adopting this guidance, recorded as an increase to the balance of retained earnings as of January 1, 2018, was approximately $3,670,000. The comparative information for the

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

years ended December 31, 2017 and 2016, including disclosures, has not been restated and continues to be reported under the accounting standards in effect for those periods.

The following tables summarize the impacts of adopting the new revenue recognition guidance on certain components of the Company s consolidated financial statements (in thousands):

a) Consolidated Balance Sheet Items

	As of December 31, 2018		
	As reported	Adjustments	Balances without adoption of Topic 606
Accounts receivable, net	$ 43,673	$ (72)	$ 43,601
Inventories, net	47,370	(110)	47,260
Total assets	221,068	(182)	220,886
Income taxes payable	710	(59)	651
Deferred revenue	5,069	5,768	10,837
Sales allowances	548	(483)	65
Total liabilities	36,978	5,226	42,204
Retained earnings	129,000	(5,408)	123,592
Total equity	184,090	(5,408)	178,682
Total liabilities and equity	221,068	(182)	220,886

b) Consolidated Statement of Operations Items

	Year Ended December 31, 2018		
	As reported	Adjustments	Balances without adoption of Topic 606
Net revenues	$ 291,220	$ (3,946)	$ 287,274
Cost of revenues	152,249	(2,149)	150,100
Gross margin	138,971	(1,797)	137,174
Income before income taxes	32,933	(1,797)	31,136
Provision for income taxes	1,087	(59)	1,028
Consolidated net income	31,846	(1,738)	30,108
Net income attributable to Vicor Corporation	31,725	(1,738)	29,987

The impact of the adoption of the new revenue recognition standard on the consolidated statements of comprehensive income (loss) and cash flows for the year ended December 31, 2018 was not material.

Prior to January 1, 2018

Product revenue was recognized in the period when persuasive evidence of an arrangement with a customer existed, the products were shipped and title was transferred to the customer, the price was fixed or determinable, and collection was considered probable.

The Company deferred revenue and the related cost of sales on shipments to stocking distributors until the distributors resold the products to their customers. The agreements with these stocking distributors allowed them

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

to receive price adjustment credits or to return qualifying products for credit, as determined by the Company, in order to reduce the amounts of slow-moving, discontinued, or obsolete product from their inventory. These stocking distributors were also granted price adjustment credits in the event of a price decrease subsequent to the date the product was shipped and invoiced to the stocking distributor. Given the uncertainties associated with the levels of price adjustment credits to be granted to stocking distributors, the sales price to the stocking distributor was not fixed or determinable until the stocking distributor resold the products to its customers. Therefore, the Company deferred revenue and the related cost of sales on shipments to stocking distributors until the stocking distributors resold the products to their customers. Accordingly, the Company s revenue fully reflected end-customer purchases and was not impacted by stocking distributor inventory levels. Agreements with stocking distributors limited returns of qualifying product to the Company to a certain percentage of the value of the Company s shipments to that stocking distributor during the prior quarter. In addition, stocking distributors were allowed to return unsold products if the Company terminated the relationship with the stocking distributor. Title to the inventory transferred to the stocking distributor at the time of shipment or delivery to the stocking distributor. Payments from the stocking distributors were due in accordance with the Company s standard payment terms. These payment terms were not contingent upon the stocking distributors sale of the products to their end-customers. Upon title transfer to stocking distributors, the Company reduced inventory for the cost of goods shipped, the margin (i.e., revenues less cost of revenues) was recorded as deferred revenue, and an account receivable was recorded. As of December 31, 2017, the Company had gross deferred revenue of approximately $4,659,000 and gross deferred cost of revenues of approximately $2,135,000 under agreements with stocking distributors.

The Company evaluated revenue arrangements with potential multi-element deliverables to determine if there were more than one unit of accounting. A deliverable constituted a separate unit of accounting when it had standalone value and there were no customer-negotiated refund or return rights for the undelivered elements. The Company entered into arrangements containing multiple elements that could include a combination of non-recurring engineering services (NRE), prototype units, and production units. The Company determined NRE and prototype units represented one unit of accounting and production units represented a separate unit of accounting, based on an assessment of the respective standalone value. The Company deferred revenue recognition for NRE and prototype units until completion of the final milestone under the NRE arrangement, which was generally the delivery of the prototype. Recognition generally took place within six to twelve months of the initiation of the arrangement. Revenue for the production units was recognized upon shipment, consistent with other product revenue summarized above.

License fees were recognized as earned. The Company recognized revenue on such arrangements only when the contract was signed, the license term had begun, all obligations had been delivered to the customer, and collection was probable.

Subsequent to January 1, 2018

Revenue is recognized when control of the promised goods or services is transferred to a customer, in an amount that reflects the consideration the Company expects to be entitled to in exchange for those goods or services. Sales, value add, and other taxes collected concurrent with revenue-producing activities are excluded from revenue. The expected costs associated with product warranties continue to be recognized at the time product revenue is recognized. Shipping and handling costs associated with outbound freight after control over a product has transferred to a customer are

accounted for as a fulfillment cost and are included in cost of revenues.

The Company s primary source of net revenue comes from the sale of products, which are modular power components and power systems for converting, regulating and controlling electric current. The principal

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

customers for the Company s power converters and systems are large original equipment manufacturers and the original design manufacturers and contract manufacturers serving them, and smaller, lower volume users, which are broadly distributed across several major market areas. The Company recognizes revenue for product sales at a point in time following the transfer of control of such products to the customer, which typically occurs upon shipment or delivery, depending on the terms of the underlying contract. As noted above, the Company previously deferred revenue and the related cost of revenues on shipments to stocking distributors until the distributors resold the products to their customers. The Company now records revenue for such transactions at the time of sale to the stocking distributor. The Company establishes sales allowances for estimated future product returns including distributor returns and price adjustment credits, primarily based upon historical and anticipated rates of product returns and allowances.

Certain contracts with customers contain multiple performance obligations, which typically may include a combination of NRE, prototype units, and production units. For these contracts, the individual performance obligations are accounted for separately if they are distinct. Generally, the Company has determined the NRE and prototype units represent one distinct performance obligation and the production units represent a separate distinct performance obligation. For such arrangements, revenue is allocated to each performance obligation based on its relative standalone selling price, based on prices charged to customers or using the expected cost plus a margin approach. The Company defers revenue recognition for NRE and prototype units until the point in time at which the final milestone under the NRE arrangement is completed and control is transferred to the customer, which is generally the shipment or delivery of the prototype. Revenue for production units is recognized upon shipment or delivery, consistent with product revenue summarized above.

The Company licenses its intellectual property under right to use licenses, in which royalties due to the Company are based upon a percentage of the licensee s sales. The Company utilizes the exception under the revenue recognition guidance for the recognition of sales- or usage-based royalties, in which the royalties are not recognized until the later of when 1) the customer s subsequent sales or usages occur, or 2) the performance obligation to which some or all of the sales- or usage-based royalty has been allocated is satisfied or partially satisfied.

Accounts receivable includes amounts billed and currently due from customers. The amounts due are stated at their estimated realizable value. The Company s payment terms vary by the type and location of its customers and the products or services offered, although terms generally include a requirement of payment within 30 to 60 days. The Company maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments, based on assessments of customers credit-risk profiles and payment histories. If the financial condition of the Company s customers were to deteriorate, resulting in an impairment of their ability to make payments, additional allowances may be required. The Company does not require collateral from its customers, although there have been circumstances when the Company has required cash in advance (i.e., a partial down-payment) to facilitate orders in excess of a customer s established credit limit. To date, such amounts have not been material.

The Company records deferred revenue, which represents a contract liability, when cash payments are received or due in advance of performance under a contract with a customer. During the year ended December 31, 2018, under Topic 606, the Company recognized revenue of approximately $991,000 that was included in deferred revenue at the

beginning of the respective period.

The Company applies the practical expedient allowed under the new guidance for the incremental costs of obtaining a contract for sales commissions, which are expensed when incurred because the amortization period is generally less than one year. These costs are included in selling, general and administrative expenses.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The Company also applies another practical expedient allowed under the new guidance and does not disclose the value of unsatisfied performance obligations for contracts with an original expected length of one year or less.

The following table presents the Company s net revenues disaggregated by geography based on the location of the customer, by reportable segment, (in thousands):

	Year Ended December 31, 2018			
	BBU	VI Chip	Picor	Total
United States	$ 77,995	$ 30,118	$ 2,666	$ 110,779
Europe	23,484	3,883	322	27,689
Asia Pacific	80,097	47,174	19,807	147,078
All other	5,128	499	47	5,674
	$ 186,704	$ 81,674	$ 22,842	$ 291,220

The following table presents the Company s net revenues disaggregated by the category of revenue, by reportable segment, (in thousands):

	Year Ended December 31, 2018			
	BBU	VI Chip	Picor	Total
Direct customers, contract manufacturers and non-stocking distributors	$ 163,206	$ 70,919	$ 20,660	$ 254,785
Stocking distributors, net of sales allowances	22,362	7,653	1,717	31,732
Non-recurring engineering	1,066	2,996	360	4,422
Royalties	70	70	70	210
Other		36	35	71
	$ 186,704	$ 81,674	$ 22,842	$ 291,220

The following table presents the changes in certain contract assets and (liabilities) (in thousands):

	December 31, 2018	December 31, 2017	Increase (decrease)
Accounts receivable	$ 43,673	$ 34,487	$ 9,186

Deferred revenue	(3,820)	(5,015)	1,195
Deferred expenses	501	859	(358)
Customer prepayments	(1,250)	(776)	(474)
Sales allowances	(548)		(548)

The increase in accounts receivable was primarily due to an increase in net revenues of approximately $14,949 in the fourth quarter of 2018 compared to the fourth quarter of 2017. The decrease in deferred revenue was primarily due to the adoption of the new revenue recognition guidance, as the balances related to stocking distributors were reversed as part of the transition adjustment recorded as of January 1, 2018 (see *Recently Adopted Accounting Standards*, above). The increase in sales allowances was due to the establishment of new allowances, in connection with the new revenue recognition guidance, for potential returns and price adjustment credits on sales to stocking distributors.

Deferred expenses are included in Other current assets, and customer prepayments are included in Deferred revenue, in the accompanying Consolidated Balance Sheets, respectively.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Other Recently Adopted Accounting Standards

In June 2018, the FASB issued new guidance, Improvements to Nonemployee Share-Based Payment Accounting, which more closely aligns the accounting for share-based payments to non-employees with the accounting for share-based payments to employees. This new guidance is effective for public business entities for annual and interim periods in fiscal years beginning after December 15, 2018, with early adoption permitted. The Company early-adopted the new standard on July 1, 2018. The adoption of this new guidance did not have a material impact on its consolidated financial statements and related disclosures.

In May 2017, the FASB issued guidance about which changes to the terms or conditions of a share-based payment award require an entity to apply modification accounting in Topic 718, Compensation Stock Compensation. The new guidance is effective for annual and interim periods beginning after December 15, 2017, with early adoption permitted. The Company adopted the new standard on January 1, 2018. The adoption of this new guidance did not have a material impact on its consolidated financial statements and related disclosures.

In August 2016, the FASB issued guidance to clarify how certain cash receipts and cash payments should be presented in the statement of cash flows. These include debt prepayment, settlement of zero-coupon debt instruments, contingent consideration payments made after a business combination, proceeds from the settlement of insurance claims, proceeds from the settlement of corporate-owned life insurance policies, distributions received from equity method investees and beneficial interests in securitization transactions. The new guidance is effective for interim and annual reporting periods beginning after December 15, 2017, with early adoption permitted. The Company adopted the new standard on January 1, 2018. The adoption of this new guidance did not have a material impact on its consolidated financial statements and related disclosures.

Foreign currency translation

The financial statements of Vicor Japan Company, Ltd. (VJCL), a majority-owned subsidiary, for which the functional currency is the Japanese Yen, have been translated into U.S. Dollars using the exchange rate in effect at the balance sheet date for balance sheet amounts and the average exchange rates in effect during the year for income statement amounts. The gains and losses resulting from the changes in exchange rates from year to year have been reported in other comprehensive income.

Transaction gains and losses resulting from the remeasurement of foreign currency denominated assets and liabilities of the Company s foreign subsidiaries where the functional currency is the U.S. Dollar are included in other income (expense), net. Foreign currency gains (losses) included in other income (expense), net, were approximately $(260,000), $323,000, and $(268,000) in 2018, 2017, and 2016, respectively.

Cash and cash equivalents

Cash and cash equivalents include funds held in disbursement (i.e., checking) and money market accounts, certificates of deposit, and debt securities with maturities of less than three months at the time of purchase. Cash and cash equivalents are valued at cost, approximating market value. The Company s money market securities, which are

classified as cash equivalents on the balance sheet, are purchased and redeemed at par value. Their estimated fair value is equal to their cost, and, due to the nature of the securities and their classification as cash equivalents, there are no unrealized gains or losses recorded at the balance sheet dates.

Long-term investment

The Company s principal sources of liquidity are its existing balances of cash and cash equivalents, as well as cash generated from operations. Consistent with the guidelines of the Company s investment policy, the

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Company can invest, and has historically invested, its cash balances in demand deposit accounts, money market funds, and auction rate securities meeting certain quality criteria. The Company s long-term investment is subject to credit, liquidity, market, and interest rate risk.

The Company s long-term investment, which is a debt security, is classified as an available-for-sale security. The available-for-sale security is recorded at fair value, with unrealized gains and losses, net of tax, attributable to credit loss recorded through the Consolidated Statement of Operations and unrealized gains and losses, net of tax, attributable to other non-credit factors recorded in Accumulated other comprehensive loss, a component of Total Equity. In determining the amount of credit loss, the Company compares the present value of cash flows expected to be collected to the amortized cost basis of the security, considering credit default risk probabilities and changes in credit ratings, among other factors.

The amortized cost of the debt security is adjusted for amortization of premiums and accretion of discounts to maturity, the net amount of which, along with interest and realized gains and losses, is included in Other income (expense), net in the Consolidated Statements of Operations. The Company periodically evaluates the investment to determine if impairment is required, whether an impairment is other than temporary, and the measurement of an impairment loss. The Company considers a variety of impairment indicators such as, but not limited to, a significant deterioration in the earnings performance, credit rating, or asset quality of the investment.

Fair value measurements

The Company accounts for certain financial assets at fair value, defined as the price that would be received to sell an asset or paid to transfer a liability (i.e., an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. A three-level hierarchy is used to show the extent and level of judgment used to estimate fair value measurements:

Level 1	Inputs used to measure fair value are unadjusted quoted prices available in active markets for the identical assets or liabilities as of the reporting date.
Level 2	Inputs used to measure fair value, other than quoted prices included in Level 1, are either directly or indirectly observable as of the reporting date through correlation with market data, including quoted prices for similar assets and liabilities in active markets and quoted prices in inactive markets. Level 2 also includes assets and liabilities valued using models or other pricing methodologies that do not require significant judgment since the input assumptions used in the models, such as interest rates and volatility factors, are corroborated by readily observable data from actively quoted markets for substantially the full term of the financial instrument.
Level 3	Inputs used to measure fair value are unobservable inputs supported by little or no market activity and reflect the use of significant management judgment. These values are generally determined

using pricing models for which the assumptions utilize management s estimates of market participant assumptions.

The carrying amounts of cash and cash equivalents, accounts receivable and accounts payable approximate fair value because of the short maturity of these financial instruments.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Inventories

Inventories are valued at the lower of cost (determined using the first-in, first-out method) or net realizable value. Fixed production overhead is allocated to the inventory cost per unit based on the normal capacity of the production facilities. Abnormal production costs, including fixed cost variances from normal production capacity, if any, are charged to cost of revenues in the period incurred. All shipping and handling costs incurred in connection with the sale of products are included in cost of revenues.

The Company provides reserves for inventories estimated to be excess, obsolete, or unmarketable. The Company s estimation process for assessing net realizable value is based upon its known backlog, projected future demand, historical consumption and expected market conditions. If the Company s estimated demand and/or market expectations were to change or if product sales were to decline, the Company s estimation process may cause larger inventory reserves to be recorded, resulting in larger charges to cost of revenues.

Concentrations of risk

Financial instruments potentially subjecting the Company to significant concentrations of credit risk consist principally of cash and cash equivalents, of which a significant portion is held by one financial institution, its long-term investment, and trade accounts receivable. The Company maintains cash and cash equivalents and certain other financial instruments with various large financial institutions. Generally, amounts invested with these financial institutions are in excess of federal deposit insurance limits. The Company has not experienced any losses in such accounts, and management believes the Company is not exposed to significant credit risk. The Company s long-term investment as of December 31, 2018 consists of a single auction rate security with a par value of $3,000,000, which is collateralized by student loans. It is a highly rated (Aaa/AA+) municipal and corporate debt security. Through December 31, 2018, auctions held for the Company s auction rate security have failed. The funds associated with an auction rate security that has failed auction may not be accessible until a successful auction occurs, a buyer is found outside of the auction process, the security is called, or the underlying securities have matured. If the credit rating of the issuer of the auction rate security held deteriorates, the Company may be required to adjust the carrying value of the investment for an other-than-temporary decline in value through an impairment charge. The Company s investment policy, approved by the Board of Directors, limits the amount the Company may invest in any issuer, thereby reducing credit risk concentrations.

The Company s products are sold worldwide to customers ranging from smaller, independent manufacturers of highly specialized electronic devices, to larger OEMs and their contract manufacturers. The Company s Brick Business Unit (BBU) segment has customers concentrated in aerospace and defense electronics, industrial automation, industrial equipment, instrumentation and test equipment, and transportation (e.g., rail). The Company s other segments, the VI Chip subsidiary and Picor (see Note 17) have customers concentrated in computing (voltage distribution in server racks and across datacenter infrastructure), although they also target applications in aerospace and aviation, defense electronics, industrial automation, instrumentation, test equipment, solid state lighting, telecommunications and networking infrastructure and vehicles (e.g., in autonomous driving applications, electric vehicles, and hybrid electric vehicles). While, overall, the Company has a broad customer base and sells into a variety of industries, VI Chip and Picor have derived a substantial portion of their revenue from a limited number of customers. This concentration of

revenue is a reflection of the relatively early stage of adoption of the technologies, architectures and products offered by these subsidiaries, and their targeting of market leading innovators as initial customers. Concentrations of credit risk with respect to trade accounts receivable are limited due to the number of entities comprising the Company s customer base. As of December 31, 2018 and 2017, one customer accounted for approximately 14.3% and 17.5%, respectively, of trade account receivables.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Components and materials used in the Company s products are purchased from a variety of vendors. While most of the components are available from multiple sources, some key components for certain VI Chip and Picor products, in particular, are supplied by single vendors. In instances of single source items, the Company maintains levels of inventories management considers appropriate to enable meeting the delivery requirements of customers. If suppliers or subcontractors cannot provide their products or services on time or to the required specifications, the Company may not be able to meet the demand for its products and its delivery times may be negatively affected.

Long-lived assets

The Company reviews property, plant and equipment and finite-lived intangible assets for impairment whenever events or changes in circumstances indicate the carrying value of such assets may not be recoverable. Management determines whether the carrying value of an asset or asset group is recoverable based on comparison to the undiscounted expected future cash flows the assets are expected to generate over their remaining economic lives. If an asset value is not recoverable, the impairment loss is equal to the amount by which the carrying value of the asset exceeds its fair value, which is determined by either a quoted market price, if any, or a value determined by utilizing a discounted cash flow technique. Evaluation of impairment of long-lived assets requires estimates of future operating results that are used in the preparation of the expected future undiscounted cash flows. Actual future operating results and the remaining economic lives of our long-lived assets could differ from the estimates used in assessing the recoverability of these assets. These differences could result in impairment charges, which could be material.

Intangible assets

Values assigned to patents are amortized using the straight-line method over periods ranging from three to 20 years. Patents and other intangible assets are included in Other assets in the accompanying Consolidated Balance Sheets.

Advertising expense

The cost of advertising is expensed as incurred. The Company incurred approximately $2,610,000, $2,150,000, and $1,818,000 in advertising costs during 2018, 2017 and 2016, respectively.

Product warranties

The Company generally offers a two-year warranty for all of its products, though it has extended the warranty period to three years for certain military grade products sold after January 1, 2017. The Company is party to a limited number of supply agreements with certain customers contractually committing the Company to warranty and indemnification requirements exceeding those to which the Company has been exposed in the past. The Company provides for the estimated cost of product warranties at the time product revenue is recognized. Factors influencing the Company s warranty reserves include the number of units sold, historical and anticipated rates of warranty returns, and the cost per return. The Company periodically assesses the adequacy of warranty reserves and adjusts the amounts as necessary. Warranty obligations are included in Accrued expenses in the accompanying Consolidated Balance Sheets.

Legal Costs

Legal costs in connection with litigation are expensed as incurred.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Net income (loss) per common share

The Company computes basic net income (loss) per share using the weighted average number of common shares outstanding and diluted net income (loss) per share using the weighted average number of common shares outstanding plus the effect of outstanding dilutive stock options, if any. The following table sets forth the computation of basic and diluted net income (loss) per share for the years ended December 31 (in thousands, except per share amounts):

	2018	2017	2016
Numerator:			
Net income (loss) attributable to Vicor Corporation	$ 31,725	$ 167	$ (6,247)
Denominator:			
Denominator for basic net income (loss) per share-weighted average shares (1)	39,872	39,228	38,842
Effect of dilutive securities:			
Employee stock options (2)	857	705	
Denominator for diluted net income (loss) per share-adjusted weighted-average shares and assumed conversions (3)	40,729	39,933	38,842
Basic net income (loss) per share	$ 0.80	$ 0.00	$ (0.16)
Diluted net income (loss) per share	$ 0.78	$ 0.00	$ (0.16)

(1) Denominator represents weighted average number of Common Shares and Class B Common Shares outstanding.

(2) Options to purchase 67,247, 53,913 and 1,696,222 shares of Common Stock in 2018, 2017, and 2016, respectively, were not included in the calculation of net income (loss) per share as the effect would have been antidilutive.

(3) Denominator represents weighted average number of Common Shares and Class B Common Shares outstanding for the year, adjusted to include the dilutive effect, if any, of outstanding options.

Income taxes

Deferred tax assets and liabilities are determined based on the differences between financial reporting and tax bases of assets and liabilities and are measured using the enacted income tax rates and laws expected to be in effect when the

temporary differences are expected to reverse. Deferred tax assets are reduced by a valuation allowance if management determines it is more likely than not that some portion or all of the deferred tax assets will not be realized. All deferred tax assets and liabilities are classified as noncurrent.

The Company follows a two-step process to determine the amount of tax benefit to recognize. The first step is to evaluate the tax position to determine the likelihood it would be sustained upon examination by a tax authority. If the tax position is deemed more-likely-than-not to be sustained, the second step is to assess the tax position to determine the amount of tax benefit to be recognized in the financial statements. The amount of the benefit that may be recognized is the largest amount that possesses greater than 50 percent likelihood of being realized upon ultimate settlement. If the tax position does not meet the more-likely-than-not threshold, then it is not recognized in the financial statements. Additionally, the Company accrues interest and penalties, if any, related to unrecognized tax benefits as a component of income tax expense. The unrecognized tax benefits, including accrued interest and penalties, if any, are included in Long-term income taxes payable in the accompanying Consolidated Balance Sheets.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Stock-based compensation

The Company uses the Black-Scholes option-pricing model to calculate the fair value of stock option awards, whether they possess time-based vesting provisions or performance-based vesting provisions, and awards granted under the Vicor Corporation 2017 Employee Stock Purchase Plan (ESPP), as of their grant date. For stock options with time-based vesting provisions, the calculated compensation expense, net of expected forfeitures, is recognized on a straight-line basis over the service period of the award, which is generally five years for stock options. For stock options with performance-based vesting provisions, recognition of compensation expense, net of expected forfeitures, commences if and when the achievement of the performance criteria is deemed probable. For stock options with performance-based vesting provisions, compensation expense, net of expected forfeitures, when recognized, is recognized over the relevant performance period.

Comprehensive income (loss)

The components of comprehensive income (loss) include, in addition to net income (loss), unrealized gains and losses on investments, net of tax and foreign currency translation adjustments related to VJCL, net of tax.

Impact of recently issued accounting standards

In August 2018, the Financial Accounting Standards Board (FASB) issued guidance which modifies the disclosure requirements on fair value measurements under Topic 820, Fair Value Measurements (Topic 820). Certain disclosure requirements under Topic 820 were removed, others modified, and certain disclosures have been added. The changes that will impact the Company primarily pertain to those affecting Level 3 fair value measurements. The new guidance is effective for all entities for annual and interim periods in fiscal years beginning after December 15, 2019, with early adoption permitted. It is required to be applied on a retrospective approach with certain elements being adopted prospectively for only the most recent interim or annual period presented in the initial fiscal year of adoption. The Company has not yet determined the impact this new guidance will have on its consolidated financial statements and related disclosures.

In June 2016, the FASB issued new guidance which will require measurement and recognition of expected credit losses on certain types of financial instruments. It also modifies the impairment model for available -for-sale debt securities and provides for a simplified accounting model for purchased financial assets with credit deterioration since their origination. The new guidance is effective for interim and annual reporting periods beginning after December 15, 2019, with early adoption permitted. It is required to be applied on a modified-retrospective approach with certain elements being adopted prospectively. The Company does not expect the adoption of the new guidance will have a material impact on its consolidated financial statements and related disclosures.

Lease Accounting

In February 2016, the FASB issued new guidance for lease accounting, which will require lessees to recognize leases on the balance sheet and disclose key information about leasing arrangements. The new guidance establishes a right-of-use model (ROU) that will require a lessee to recognize a ROU asset and a lease liability on the balance sheet

for all leases with a term longer than twelve months. Leases will be classified as finance or operating, with classification affecting the pattern and classification of expense recognition in the income statement. For lessors, the guidance modifies the classification criteria and accounting for sales-type and direct financing leases. The majority of the Company s leases are for certain of its office and manufacturing space, along with several automobiles. The Company is a party to one arrangement as the lessor, for its former Westcor facility located in Sunnyvale, California.

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The new standard is effective for the Company of January 1, 2019, with early adoption permitted. The Company plans to adopt the new guidance on its effective date. The new standard must be adopted using a modified retrospective transition approach, applying the guidance to all leases existing at the date of initial application. An entity may choose to use either (1) its effective date or (2) the beginning of the earliest comparative period presented in the financial statements as its date of application. The Company plans to adopt the new standard on January 1, 2019 and use the effective date as our date of initial application. As a result, financial information will not be updated and the disclosures required under the new standard will not be provided for dates and periods before January 1, 2019.

The new standard provides a number of optional practical expedients. The Company expects to elect the package of practical expedients , which permits companies to not reassess under the new standard lease identification, lease classification and initial direct costs. The Company does not plan to elect the use-of-hindsight or the practical expedient pertaining to land easements, the latter not being applicable.

The Company estimates the adoption of the standard will result in recognition of ROU assets and lease liabilities of approximately $4,500,000, as of January 1, 2019. The implementation team s remaining tasks are to complete documentation for the systems and controls to support the lease recognition and disclosure requirements under the new standard, and to complete the required disclosures in preparation for filing the Company s Form 10-Q for the quarter ending March 31, 2019.

Other new pronouncements issued but not effective until after December 31, 2018 are not expected to have a material impact on the Company s consolidated financial statements.

3. STOCK-BASED COMPENSATION AND EMPLOYEE BENEFIT PLANS

Vicor currently grants options for the purchase of Common Stock (i.e., stock options) under the following equity compensation plan that is stockholder-approved:

Amended and Restated 2000 Stock Option and Incentive Plan, as amended and restated (the 2000 Plan) Under the 2000 Plan, the Board of Directors or the Compensation Committee of the Board of Directors may grant stock incentive awards based on the Company s Common Stock, including stock options, stock appreciation rights, restricted stock, performance shares, unrestricted stock, deferred stock, and dividend equivalent rights. Awards may be granted to employees and other key persons, including non-employee directors. Incentive stock options may be granted to employees at a price at least equal to the fair market value per share of the Common Stock on the date of grant, and non-qualified options may be granted to non-employee directors at a price at least equal to 85% of the fair market value of the Common Stock on the date of grant. A total of 10,000,000 shares of Common Stock have been reserved for issuance under the 2000 Plan. The period of time during which an option may be exercised and the vesting periods are determined by the Compensation Committee. The term of each option may not exceed 10 years from the date of grant.

Picor Corporation (Picor) was a privately held, majority-owned subsidiary of Vicor until May 30, 2018, at which date it was merged with and into Vicor, and its separate corporate existence ceased (see Note 16). Until that time, Picor could grant stock options under the *Picor Corporation Amended and Restated 2001 Stock Option and Incentive Plan*

(the 2001 Picor Plan), that had been approved by its Board of Directors. All awards thereunder were approved by the Compensation Committee of the Company s Board of Directors. To effect the merger, holders of Picor Common Stock and Picor stock options received an equivalent value of Vicor Common Stock and Vicor stock options, respectively, pursuant to the assumption of the 2001 Picor Plan, and options outstanding thereunder, by Vicor. No additional awards will be granted under the assumed and restated 2001 Picor Plan.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

VI Chip Corporation (VI Chip), a privately held, majority-owned subsidiary of Vicor, currently grants stock options under the following equity compensation plan that has been approved by its Board of Directors:

VI Chip Corporation Amended and Restated 2007 Stock Option and Incentive Plan (the 2007 VI Chip Plan) Under the 2007 VI Chip Plan, the Board of Directors of VI Chip may grant equity-based awards associated with VI Chip Common Stock, including stock options, restricted stock, or unrestricted stock. Awards may be granted to employees and other key persons, including non-employee directors and full or part-time officers. No incentive stock options have been granted since November 11, 2011, and no such options were outstanding as of December 31, 2017. Non-qualified stock options may be granted to employees at a price at least equal to the estimated fair market value per share of the VI Chip Common Stock, based on judgments made by VI Chip s Board of Directors on the date of grant. All stock option awards must be approved by both the VI Chip Board of Directors and the Compensation Committee of the Company s Board of Directors. A total of 14,000,000 shares of VI Chip Common Stock have been reserved for issuance under the 2007 VI Chip Plan. The period of time during which an option may be exercised and the vesting periods are determined by the VI Chip Board of Directors. The term of each option may not exceed 10 years from the date of grant.

All time-based (i.e., non-performance-based) options for the purchase of Vicor common stock are granted at an exercise price equal to or greater than the market price for Vicor Common Stock at the date of the grant. All time-based (i.e., non-performance-based) options for the purchase of VI Chip, and, prior to the merger and assumption of the 2001 Picor Plan, Picor Common Stock have been granted at an exercise price equal to or greater than the estimated fair market value of the respective share price, based on valuation methodologies consistent with U.S. GAAP and the requirements of Section 409A of the Internal Revenue Code, as amended (the Code).

On December 31, 2010, the Company granted 2,984,250 non-qualified stock options under the 2007 VI Chip Plan with performance-based vesting provisions tied to achievement of certain margin targets by VI Chip. As of December 31, 2010, the Company determined it was probable the margin targets would be achieved and, accordingly, began recording stock-based compensation expense relating to these options beginning January 1, 2011. During the third quarter of 2016, the Company determined the margin targets would not be met prior to the expiration date of the corresponding options, as VI Chip s revenue growth had been below levels necessary to achieve the targets. As a result, the Company reversed approximately $768,000 of previously recorded stock-based compensation expense in the third quarter of 2016, representing all expense taken for these performance-based options through June 30, 2016. This resulted in decreases in cost of revenues of $86,000, selling, general and administrative expense of $516,000, and research and development expense of $166,000 in the third quarter of 2016. On April 30, 2018, after approval by the Boards of Directors of the Company and VI Chip, all such options were cancelled.

On April 26, 2017, the Company s Board of Directors approved the Vicor Corporation 2017 Employee Stock Purchase Plan (the Plan or the ESPP). The ESPP became effective on June 16, 2017, the date the Company s stockholders approved the Plan at the 2017 Annual Meeting of Stockholders. The Company has reserved 2,000,000 shares of Common Stock under the Plan for issuance to eligible employees who elect to participate. The ESPP is intended to qualify as an employee stock purchase plan under Section 423 of the Internal Revenue Code. The ESPP operates in successive periods of approximately six months, each referred to as an offering period. Generally, offering periods commence on or around September 1 and March 1 and end on or around the following February 28 or August 31,

respectively. Under the ESPP, an option is granted to participating employees on the first day of an offering period to purchase shares of the Company s Common Stock at the end of that offering period at a purchase price equal to 85% of the lesser of the fair market value of a share of Common Stock on either the first day or the last day of that offering period. The purchase of shares is

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

funded by means of periodic payroll deductions, which may not exceed 15.0% of the employee s eligible compensation, as defined in the Plan. Among other provisions, the Plan limits the number of shares that can be purchased by a participant during any offering period and cumulatively for any calendar year.

Stock-based compensation expense for the years ended December 31 was as follows (in thousands):

	2018	2017	2016
Cost of revenues	$ 237	$ 187	$ 95
Selling, general and administrative	2,517	1,125	412
Research and development	642	423	(1)
Total stock-based compensation	$ 3,396	$ 1,735	$ 506

The increase in stock-based compensation in 2018 compared to 2017 was due to an increase in stock options granted between July 1, 2017 and December 31, 2018, an increase in the fair value of those stock option awards due to an increase in the market price of Vicor Common Stock during that period and ESPP expense, which was recorded for only part of 2017. The increase in stock-based compensation expense in 2017 compared to 2016 was primarily due to the reversal of previously recorded stock-based compensation for VI Chip performance-based options in 2016, as described above.

Compensation expense by type of award for the years ended December 31 was as follows (in thousands):

	2018	2017	2016
Stock options	$ 2,649	$ 1,546	$ 506
ESPP	747	189	
Total stock-based compensation	$ 3,396	$ 1,735	$ 506

The fair value for non performance-based stock options awarded for the years shown below was estimated at the date of grant using the Black-Scholes option pricing model with the following weighted-average assumptions:

Vicor:	2018	2017	2016
Risk-free interest rate	2.9%	2.1%	1.5%
Expected dividend yield			
Expected volatility	44%	43%	45%
Expected lives (years)	6.4	7.1	7.2

VI Chip:	2018	2017	2016
Risk-free interest rate	N/A	1.9%	1.7%
Expected dividend yield			
Expected volatility	N/A	32%	34%
Expected lives (years)	N/A	6.5	6.5

No stock options were granted in 2018 under the 2007 VI Chip Plan.

Risk-free interest rate:

Vicor The Company uses the yield on zero-coupon U.S. Treasury Strip securities for a period that is commensurate with the expected term assumption for each vesting period.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

VI Chip VI Chip uses the yield to maturity of a seven-year U.S. Treasury bond, as it most closely aligns to the expected exercise period.

Expected dividend yield:

Vicor The Company determines the expected dividend yield by annualizing the most recent prior cash dividends declared by the Company s Board of Directors, if any, and dividing that result by the closing stock price on the date of that dividend declaration. Dividends are not paid on options.

VI Chip VI Chip has not and does not expect to declare and pay dividends in the foreseeable future. Therefore, the expected dividend yield is not applicable.

Expected volatility:

Vicor Vicor uses historical volatility to estimate the grant-date fair value of the options, using the expected term for the period over which to calculate the volatility (see below). The Company does not expect its future volatility to differ from its historical volatility. The computation of the Company s volatility is based on a simple average calculation of monthly volatilities over the expected term.

VI Chip As VI Chip is a nonpublic entity, historical volatility information is not available. An industry sector index of 11 publicly traded fabless semiconductor firms was developed for calculating historical volatility for VI Chip. Historical prices for each of the companies in the index based on the market price of the shares on each day of trading over the expected term were used to determine the historical volatility.

Expected term:

Vicor The Company uses historical employee exercise and option expiration data to estimate the expected term assumption for the Black-Scholes grant-date valuation. The Company believes this historical data is currently the best estimate of the expected term of options, and all groups of the Company s employees exhibit similar exercise behavior.

VI Chip Due to the lack of historical information, the simplified method as prescribed by the Securities and Exchange Commission is used to determine the expected term.

Forfeiture rate:

The amount of stock-based compensation recognized during a period is based on the value of the portion of the awards that are ultimately expected to vest. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates. The term forfeitures is distinct from cancellations or expirations and represents only the unvested portion of the surrendered option. The forfeiture analysis is re-evaluated annually and the forfeiture rate is adjusted as necessary. Ultimately, the actual expense recognized over the vesting period will only be for those shares that vest.

Vicor The Company currently expects, for Vicor options, based on an analysis of historical forfeitures, approximately 85% of its options will actually vest. An annual forfeiture rate of 5.25% has been applied to all unvested options as of December 31, 2018. For 2017 and 2016, the Company expected 85% and 86%, respectively, of its options would actually vest and applied an annual forfeiture rate of 5.25% and 5.00%, respectively.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

VI Chip The Company currently expects, for VI Chip options, based on an analysis of historical forfeitures, approximately 89% of its options will actually vest. An annual forfeiture rate of 4.25% has been applied to all unvested options as of December 31, 2018. For 2017 and 2016, the Company expected 76% of its options would actually vest and applied an annual forfeiture rate of 9.00% for both years.

Vicor Stock Options

A summary of the activity under the 2000 Plan as of December 31, 2018 and changes during the year then ended, is presented below (in thousands except for share and weighted-average data):

	Options Outstanding	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life in Years	Aggregate Intrinsic Value
Outstanding on December 31, 2017	1,365,917	$ 9.63		
Granted	684,077	$ 18.40		
Forfeited and expired	(25,923)	$ 16.08		
Exercised	(641,090)	$ 10.58		
Outstanding on December 31, 2018	1,382,981	$ 13.41	5.40	$ 34,329
Exercisable on December 31, 2018	888,257	$ 8.93	4.46	$ 25,635
Vested or expected to vest as of December 31, 2018 (1)	1,345,938	$ 13.07	5.34	$ 33,820

(1) In addition to the vested options, the Company expects a portion of the unvested options to vest at some point in the future. The number of options expected to vest is calculated by applying an estimated forfeiture rate to the unvested options.

As of December 31, 2017 and 2016 the Company had options exercisable for 707,244 and 730,388 shares respectively, for which the weighted average exercise prices were $8.01 and $7.74, respectively.

During the years ended December 31, 2018, 2017, and 2016 under all plans, the total intrinsic value of Vicor options exercised (i.e., the difference between the market price at exercise and the price paid by the employee to exercise the options) was approximately $22,938,000, $4,395,000, and $1,392,000, respectively. The total amount of cash received by the Company from options exercised in 2018, 2017, and 2016, was $6,782,000, $3,295,000, and $1,572,000, respectively. The total grant-date fair value of stock options that vested during the years ended December 31, 2018,

2017, and 2016 was approximately $2,921,000, $774,000, and $365,000, respectively.

As of December 31, 2018, there was approximately $2,487,000 of total unrecognized compensation cost related to unvested non-performance based awards for Vicor. That cost is expected to be recognized over a weighted-average period of 1.9 years for those awards. The expense will be recognized as follows: $1,183,000 in 2019, $689,000 in 2020, $395,000 in 2021, $180,000 in 2022, and $40,000 in 2023.

The weighted-average fair value of Vicor options granted was $17.46, $8.71, and $4.94, in 2018, 2017, and 2016, respectively.

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Picor Stock Options

A summary of the activity under the 2001 Picor Plan as of May 30, 2018, the date of the merger with and into Vicor, and changes during the period then ended, is presented below:

	Options Outstanding	Weighted-Average Exercise Price
Outstanding on December 31, 2017	10,065,987	$ 0.62
Granted		
Forfeited and expired		
Exercised		
Options transferred in merger with Vicor	(10,065,987)	$ 1.91
Outstanding on May 30, 2018		

VI Chip Stock Options

A summary of the activity under the 2007 VI Chip Plan as of December 31, 2018 and changes during the year then ended, is presented below (in thousands except for share and weighted-average data):

	Options Outstanding	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life in Years	Aggregate Intrinsic Value
Outstanding on December 31, 2017	13,092,250	$ 0.97		
Granted		$		
Forfeited and expired	(2,678,250)	$ 1.00		
Exercised		$		
Outstanding on December 31, 2018 (1)	10,414,000	$ 0.96	5.39	$
Exercisable on December 31, 2018	2,743,400	$ 0.97	5.04	$
	9,853,685	$ 0.96	5.38	$

Vested or expected to vest as of December 31, 2018 (2)	

(1) Of the total VI Chip options outstanding on December 31, 2018, 5,500,000 options had been granted to Dr. Vinciarelli, the Company s Chief Executive Officer.

(2) In addition to the vested options, the Company expects a portion of the unvested options to vest at some point in the future. Options expected to vest is calculated by applying an estimated forfeiture rate to the unvested options.

As of December 31, 2017 and 2016, VI Chip had options exercisable for 810,700 and 7,074,650 shares, respectively, for which the weighted average exercise price was $1.00.

There were no VI Chip options exercised in 2018, 2017 and 2016. The total grant-date fair value of stock options that vested during the years ended December 31, 2018, 2017, and 2016 was approximately $0, $2,900,000, and $0, respectively.

As of December 31, 2018, there was $1,792,000 of total unrecognized compensation cost related to unvested share-based awards for VI Chip. That cost is expected to be recognized over a weighted-average period

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of 3.40 years for all VI Chip awards. The expense will be recognized as follows: $544,000 in 2019, $503,000 in 2020, $483,000 in 2021, and $262,000 in 2022.

There were no VI Chip options granted in 2018. The weighted-average fair value of VI Chip options granted in 2017 and 2016 was $0.29, and $0.01, respectively.

401(k) Plan

The Company sponsors a savings plan available to all domestic employees, which qualifies under Section 401(k) of the Internal Revenue Code. Employees may contribute to the plan in amounts representing from 1% to 80% of their pre-tax salary, subject to statutory limitations. The Company matches employee contributions to the plan at a rate of 50%, up to the first 3% of an employee s compensation. The Company s matching contributions currently vest at a rate of 20% per year, based upon years of service. The Company s contributions to the plan were approximately $976,000, $937,000, and $882,000 in 2018, 2017, and 2016, respectively.

Stock Bonus Plan

Under the Company s 1985 Stock Bonus Plan, as amended, shares of Common Stock may be awarded to employees from time to time as determined by the Board of Directors. On December 31, 2018, 109,964 shares were available for further award. All shares awarded to employees under this plan have vested. No further awards are contemplated under this plan at the present time.

4. LONG-TERM INVESTMENT

As of December 31, 2018 and 2017, the Company held one auction rate security with a par value of $3,000,000, purchased through and held in custody by a broker-dealer affiliate of Bank of America, N.A., that has experienced failed auctions (the Failed Auction Security) since February 2008. The Failed Auction Security held by the Company is Aaa/AA+ rated by major credit rating agencies, is collateralized by student loans, and is guaranteed by the U.S. Department of Education under the Federal Family Education Loan Program. Management is not aware of any reason to believe the issuer of the Failed Auction Security is presently at risk of default. Through December 31, 2018, the Company has continued to receive interest payments on the Failed Auction Security in accordance with the terms of its indenture. Management believes the Company ultimately should be able to liquidate the Failed Auction Security without significant loss primarily due to the overall quality of the issue held and the collateral securing the substantial majority of the underlying obligation. However, current conditions in the auction rate securities market have led management to conclude the recovery period for the Failed Auction Security exceeds 12 months. As a result, the Company continued to classify the Failed Auction Security as long-term as of December 31, 2018.

The following is a summary of the available-for-sale security (in thousands):

December 31, 2018	**Cost**

		Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
Failed Auction Security	$ 3,000	$	$ 474	$ 2,526
December 31, 2017				
Failed Auction Security	$ 3,000	$	$ 475	$ 2,525

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

As of December 31, 2018 and 2017, the Failed Auction Security had been in an unrealized loss position for greater than 12 months.

The amortized cost and estimated fair value of the available-for-sale security on December 31, 2018, by contractual maturities, are shown below (in thousands):

	Cost	Estimated Fair Value
Due in twenty to forty years	$ 3,000	$ 2,526

Based on the fair value measurements described in Note 5, the fair value of the Failed Auction Security on December 31, 2018, with a par value of $3,000,000, was estimated by the Company to be approximately $2,526,000. The gross unrealized loss of $474,000 on the Failed Auction Security consists of two types of estimated loss: an aggregate credit loss of $41,000 and an aggregate temporary impairment of $433,000. In determining the amount of credit loss, the Company compared the present value of cash flows expected to be collected to the amortized cost basis of the security, considering credit default risk probabilities and changes in credit ratings as significant inputs, among other factors (see Note 5).

The following table represents a rollforward of the activity related to the credit loss recognized in earnings on the available-for-sale auction rate security held by the Company for the years ended December 31 (in thousands):

	2018	2017	2016
Balance at the beginning of the period	$ 48	$ 59	$ 72
Reductions in the amount related to credit gain for which other-than-temporary impairment was not previously recognized	(7)	(11)	(13)
Balance at the end of the period	$ 41	$ 48	$ 59

At this time, the Company has no intent to sell the Failed Auction Security and does not believe it is more likely than not the Company will be required to sell the security. If current market conditions deteriorate further, the Company may be required to record additional unrealized losses. If the credit rating of the security deteriorates, the Company may be required to adjust the carrying value of the investment through impairment charges recorded in the Consolidated Statement of Operations, and any such impairment adjustments may be material.

Based on the Company s ability to access cash and cash equivalents and its expected operating cash flows, management does not anticipate the current lack of liquidity associated with the Failed Auction Security held will affect the Company s ability to execute its current operating plan.

5. FAIR VALUE MEASUREMENTS

The Company accounts for certain financial assets at fair value, defined as the price that would be received to sell an asset or paid to transfer a liability (i.e., an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. As such, fair value is a market-based measurement that should be determined based on assumptions market participants would use in pricing an asset or liability. A three-level hierarchy is used to show the extent and level of judgment used to estimate fair value measurements.

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Assets and liabilities measured at fair value on a recurring basis included the following as of December 31, 2018 (in thousands):

	Quoted Prices in Active Markets (Level 1)	Using Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total Fair Value as of December 31, 2018
Cash equivalents:				
Money market funds	$ 9,433	$	$	$ 9,433
Long-term investments:				
Failed Auction Security			2,526	2,526
Liabilities:				
Contingent consideration obligations			(408)	(408)

Assets measured at fair value on a recurring basis included the following as of December 31, 2017 (in thousands):

	Quoted Prices in Active Markets (Level 1)	Using Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total Fair Value as of December 31, 2017
Cash equivalents:				
Money market funds	$ 9,279	$	$	$ 9,279
Long-term investments:				
Failed Auction Security			2,525	2,525
Liabilities:				
Contingent consideration obligation			(678)	(678)

As of December 31, 2018, there was insufficient observable auction rate security market information available to determine the fair value of the Failed Auction Security using Level 1 or Level 2 inputs. As such, the Company s investment in the Failed Auction Security was deemed to require valuation using Level 3 inputs. Management, after consulting with advisors, valued the Failed Auction Security using analyses and pricing models similar to those used by market participants (i.e., buyers, sellers, and the broker-dealers responsible for execution of the Dutch auction pricing mechanism by which each issue s interest rate was set). Management utilized a probability weighted discounted cash flow (DCF) model to determine the estimated fair value of this security as of December 31, 2018. The

major assumptions used in preparing the DCF model included: estimates for the amount and timing of future interest and principal payments based on default probability assumptions used to measure the credit loss of 1.0%; the rate of return required by investors to own this type of security in the current environment, which we estimate to be 5.0% above the risk free rate of return; and an estimated time frame of three to five years for successful auctions for this type of security to occur. In making these assumptions, management considered relevant factors including: the formula applicable to each security defining the interest rate paid to investors in the event of a failed auction (the Penalty Rate); forward projections of the interest rate benchmarks specified in such formulas; the likely timing of principal repayments; the probability of full repayment considering the guarantees by the U.S. Department of Education of the underlying student loans, guarantees by other third parties, and additional credit enhancements provided through other means; and publicly available pricing data for recently issued student loan asset-backed securities not subject to auctions. In developing its estimate of the rate of return required by investors to own these securities, management compared

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the Penalty Rate of the Failed Auction Security with yields of actively traded long-term bonds with similar characteristics and, reflecting the limited liquidity for auction rate securities and the discounts to par value seen in recent tender offers by issuers and arm s length market transactions between informed buyers and sellers, estimated the implied yield (i.e., the discount to par value) necessary to complete a sale of the Failed Auction Security. Management has calculated an increase or decrease in the liquidity risk premium of 5.0% referenced above of 1.0% (i.e., 100 basis points) as used in the model, would decrease or increase, respectively, the fair value of the Failed Auction Security by approximately $100,000.

The significant unobservable inputs used in the fair value measurement of the Company s Failed Auction Security are the cumulative probability of earning the maximum rate until maturity, the cumulative probability of principal return prior to maturity, the cumulative probability of default, the liquidity risk premium, and the recovery rate in default. Significant increases (decreases) in any of those inputs in isolation would result in changes in fair value measurement. Significant increases (decreases) in the cumulative probability of earning the maximum rate until maturity, the cumulative probability of principal return prior to maturity, and the recovery rate in default would result in a higher (lower) fair value measurement, while increases (decreases) in the cumulative probability of default and the liquidity risk premium would result in a (lower) higher fair value measurement.

Generally, the interrelationships are such that a change in the assumption used for the cumulative probability of principal return prior to maturity is accompanied by a directionally similar change in the assumption used for the cumulative probability of earning the maximum rate until maturity and a directionally opposite change in the assumptions used for the cumulative probability of default and the liquidity risk premium. The recovery rate in default is somewhat independent and based upon the securities specific underlying assets and published recovery rate indices.

Quantitative information about Level 3 fair value measurements as of December 31, 2018 are as follows (dollars in thousands):

	Fair Value	Valuation Technique	Unobservable Input	Weighted Average
Failed Auction Security	$ 2,526	Discounted cash flow	Cumulative probability of earning the maximum rate until maturity	0.08%
			Cumulative probability of principal return prior to maturity	93.69%
			Cumulative probability of default	6.24%
			Liquidity risk premium	5.00%
			Recovery rate in default	40.00%

The change in the estimated fair value calculated for the investment valued on a recurring basis utilizing Level 3 inputs (i.e., the Failed Auction Security) for the year ended December 31, 2018 was as follows (in thousands):

Balance at the beginning of the period	$ 2,525
Credit gain on available-for-sale security included in Other income (expense), net	7
Gain included in Other comprehensive income (loss)	(6)
Balance at the end of the period	$ 2,526

The Company has classified its contingent consideration obligations as Level 3 because the fair value for this liability was determined using unobservable inputs. The liability was based on estimated sales of legacy

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products over the period of royalty payments at the royalty rate (see Note 8), discounted using the Company s estimated cost of capital.

The change in the estimated fair value calculated for the liabilities valued on a recurring basis utilizing Level 3 inputs (i.e., the Contingent consideration obligations) for the year ended December 31, 2018 was as follows (in thousands):

Balance at the beginning of the period	$ 678
Payments	(270)
Balance at the end of the period	$ 408

There were no transfers between Level 1 and Level 2 of the fair value hierarchy during the year ended December 31, 2018.

6. INVENTORIES

Inventories as of December 31 were as follows (in thousands):

	2018	2017
Raw materials	$ 37,696	$ 27,400
Work-in-process	4,740	3,596
Finished goods	4,934	5,503
Net balance	$ 47,370	$ 36,499

7. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are stated at cost and are depreciated and amortized over a period of three to 39 years generally under the straight-line method for financial reporting purposes and accelerated methods for income tax purposes.

Property, plant and equipment as of December 31 were as follows (in thousands):

	2018	2017
Land	$ 2,089	$ 2,089
Buildings and improvements	45,170	45,147

Machinery and equipment	208,135	243,392
Furniture and fixtures	7,239	6,320
Construction in-progress and deposits	9,251	4,120
	271,884	301,068
Accumulated depreciation and amortization	(221,452)	(259,712)
Net balance	$ 50,432	$ 41,356

Depreciation expense for the years ended December 31, 2018, 2017 and 2016 was approximately $9,135,000, $8,763,000, and $8,304,000 respectively. As of December 31, 2018, the Company had approximately $8,862,000 of capital expenditure commitments.

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8. NONCONTROLLING INTEREST TRANSACTIONS

On March 30, 2016, the Company acquired 100% ownership of certain operating assets and cash of its consolidated Vicor Custom Power subsidiary, Converpower Corporation (Converpower), in which it held a 49% ownership interest. The operating assets and cash were acquired in exchange for the Company s common shares representing that 49% interest and the aggregate dollar amount of royalty payments to be made by the Company to Converpower. The transaction was executed through a newly-formed, wholly-owned Vicor Custom Power subsidiary, Granite Power Technologies, Inc. (GPT), the business operations of which had formerly existed as a division of the Company. The shares of Converpower common stock held by the Company were contributed to GPT prior to the transaction. At the same time that it entered into the Asset Purchase Agreement associated with this transaction, the Company and Converpower entered into a license agreement providing the Company the right to continue manufacturing certain Converpower products in exchange for payment of royalties, quarterly through June 30, 2021, equal to a percentage of the revenue generated by the manufacture and sale of these products by GPT. The estimated present value of total future royalties, included in Contingent consideration obligations in the accompanying Consolidated Balance Sheet as of December 31, 2018, is $282,000 (initially $208,000, as of March 31, 2016). The Company increased the liability by approximately $448,000 in 2017 based on a reassessment of the total obligation through the end of license agreement. The amount was included in selling, general, and administrative expenses. GPT was merged into Vicor Development Corporation, a wholly-owned subsidiary of Vicor, effective December 31, 2018, at which time the separate corporate existence of GPT ceased. The manufacture of those certain Converpower products going forward will be performed by the two remaining Vicor Custom Power subsidiaries and the payment of royalties will continue as under the license agreement.

On December 28, 2015, the Company acquired the noncontrolling interest holder s 18% ownership interest in Mission Power Solutions, Inc. (MPS) for approximately $216,000, which equaled the noncontrolling interest holder s share of the net equity of MPS. This transaction was achieved through a statutory merger of MPS with and into an existing Vicor Custom Power wholly-owned subsidiary, Northwest Power, Inc. (NPI). In addition to the payment noted above, the selling principal will be eligible to receive quarterly royalty payments through June 30, 2021 equal to a percentage of the revenue generated by the sale of certain MPS legacy products to be manufactured by NPI going forward. The estimated obligation for total future royalties, recorded as Contingent consideration obligation in the accompanying Consolidated Balance Sheets as of December 31, 2018 is $126,000 (initially $144,000 as of December 31, 2015). The Company increased the liability by approximately $202,000 in 2017, based on a reassessment of the total obligation under the royalty arrangement. The amount was included in selling, general, and administrative expenses.

The respective noncontrolling interest holders of Converpower and MPS served as key employees of each company prior to the transactions described above.

9. INTANGIBLE ASSETS

Patent costs, which are included in other assets in the accompanying Consolidated Balance Sheets, as of December 31 were as follows (in thousands):

	2018	2017
Patent costs	$ 1,979	$ 2,093
Accumulated amortization	(1,380)	(1,386)
	$ 599	$ 707

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Definite lived intangible assets, such as patent rights, are amortized and tested for impairment if a triggering event occurs.

Amortization expense was approximately $119,000, $130,000 and $134,000 in 2018, 2017 and 2016, respectively. The estimated future amortization expense from patent assets held as of December 31, 2018, is projected to be $108,000, $103,000, $93,000, $62,000 and $51,000, in fiscal years 2019, 2020, 2021, 2022, and 2023, respectively.

10. SEVERANCE AND OTHER CHARGES

In May 2018, the Company s management authorized the closure of its GPT subsidiary, which was part of the BBU segment, by the end of 2018. The closure was completed in December 2018. GPT, located in Manchester, N.H., was one of three Vicor Custom Power (VCP) entities. Certain of GPT s products will continue to be manufactured and sold by the two remaining VCP entities. As a result, the Company recorded a pre-tax charge of $350,000 in the second quarter of 2018, for the cost of severance and other employee-related costs involving cash payments based on each employee s respective length of service. This was recorded as Severance and other charges in the Consolidated Statement of Operations. The related liability is presented as Accrued severance and other charges in the Consolidated Balance Sheets. Adjustments to reduce the liability were due to certain GPT employees accepting positions with Vicor, and for severance payments made to employees who have left GPT after the authorization of the closure. Adjustments to increase the liability, and the expense, were due to an early termination fee under GPT s lease and for freight costs to transport GPT inventory and fixed assets to the two remaining VCP entities. The adjustments were recorded in the third and fourth quarters of 2018 for a total expense of $402,000 in 2018, as reported in the Consolidated Statement of Operations.

11. PRODUCT WARRANTIES

Product warranty activity for the years ended December 31 was as follows (in thousands):

	2018	2017	2016
Balance at the beginning of the period	$ 290	$ 214	$ 585
Accruals for warranties for products sold in the period	173	346	358
Fulfillment of warranty obligations	(117)	(194)	(527)
Revisions of estimated obligations	(78)	(76)	(202)
Balance at the end of the period	$ 268	$ 290	$ 214

12. STOCKHOLDERS EQUITY

Each share of Common Stock entitles the holder thereof to one vote on all matters submitted to the stockholders.

Each share of Class B Common Stock entitles the holder thereof to ten votes on all such matters.

Shares of Class B Common Stock are not transferable by a stockholder except to or among the stockholder s spouse, certain of the stockholder s relatives, and certain other defined transferees. Class B Common Stock is not listed or traded on any exchange or in any market. Class B Common Stock is convertible at the option of the holder thereof at any time and without cost to the stockholder into shares of Common Stock on a one-for-one basis.

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In November 2000, the Board of Directors of the Company authorized the repurchase of up to $30,000,000 of the Company s Common Stock (the November 2000 Plan). The plan authorizes the Company to make repurchases from time to time in the open market or through privately negotiated transactions. The timing of this program and the amount of the stock that may be repurchased is at the discretion of management based on its view of economic and financial market conditions. There were no repurchases under the November 2000 Plan in 2018, 2017, and 2016. On December 31, 2018, the Company had approximately $8,541,000 available for share repurchases under the November 2000 Plan.

Dividends are declared at the discretion of the Company s Board of Directors and depend on actual cash from operations, the Company s financial condition and capital requirements and any other factors the Company s Board of Directors may consider relevant at the time. Common Stock and Class B Common Stock participate in dividends and earnings equally.

During the year ended December 31, 2018 and December 31, 2016, one subsidiary paid a total of $632,000 and $750,000, respectively, in cash dividends, all of which was paid to the Company.

On December 31, 2018, 2017, and 2016, there were 21,233,659, 21,976,340, and 14,377,880, respectively, shares of Vicor Common Stock reserved for issuance upon exercise of Vicor stock options, upon conversion of Class B Common Stock and under the ESPP.

13. OTHER INCOME (EXPENSE), NET

The major changes in the components of Other income (expense), net for the years ended December 31 were as follows (in thousands):

	2018	2017	2016
Rental income	$ 792	$ 792	$ 462
Foreign currency (losses) gains, net	(260)	323	(268)
Interest income	257	124	68
Gain (loss) on disposal of equipment	57	14	(4)
Credit gains on available-for-sale securities	7	11	13
Other	21	(2)	13
	$ 874	$ 1,262	$ 284

During the second quarter of 2016, the Company began recognizing rental income under a leasing agreement with a third party for its facility in Sunnyvale, California.

14. INCOME TAXES

The tax provision includes estimated federal, state and foreign income taxes on the Company s pre-tax income. The tax provisions also may include discrete items, principally related to increases or decreases in tax reserves, tax provision vs. tax return differences and accrued interest for potential liabilities.

On December 22, 2017, H.R.1., known as the Tax Cuts and Jobs Act (the Tax Act), was signed into law. The Tax Act did not have a significant impact on the Company s consolidated financial statements for the year ended December 31, 2017. However, the reduction of the U.S. federal corporate tax rate from 35% to 21% resulted in increases to the amounts reflected in the Company s tax rate reconciliation table for the year ended December 31, 2017 compared to the year ended December 31, 2016. The change in the U.S. federal corporate tax

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rate, which was effective January 1, 2018, is also reflected in the Company s deferred tax table below. Effective for the 2018 tax year, the Tax Act implements certain additional provisions including the Global Intangible Low-Taxes Income (GILTI) inclusion and the Foreign Derived Intangible Income (FDII) deduction. The Company is electing to account for the GILTI inclusion as a period cost.

Also, on December 22, 2017, the Securities and Exchange Commission staff issued Staff Accounting Bulletin No. 118 to address the application of U.S. GAAP in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Act. The Company recognized the provisional tax impacts related to deemed repatriated earnings and the revaluation of deferred tax assets and liabilities and included these amounts in its consolidated financial statements for the year ended December 31, 2017. The Company did not record any adjustments in the year ended December 31, 2018 to these provisional amounts that were material to its financial statements. As of December 31, 2018, the Company s accounting treatment with regards to the Tax Act is complete.

The reconciliation of the federal statutory rate on the income (loss) before income taxes to the effective income tax rate for the years ended December 31 is as follows:

	2018	2017	2016
Statutory federal tax rate	21.0%	(34.0)%	(34.0)%
State income taxes, net of federal income tax benefit	3.6	97.2	1.9
Increase (decrease) in valuation allowance	(9.1)	(936.1)	46.5
Permanent items	(5.9)	(861.2)	0.9
Tax credits	(5.5)	(1,222.3)	(13.6)
Provision vs. tax return differences	(1.7)		
Foreign rate differential and deferred items	0.7	(91.8)	(0.8)
Decrease in tax reserves	0.1	(5.1)	
Rate change due to tax reform		3,441.1	
Refundable income taxes AMT credit		(751.0)	
Capital gain on sale to noncontrolling interest			3.9
Decrease in unremitted Vicor Custom Power earnings			(0.9)
Book income attributable to noncontrolling interest			0.1
Other	0.1	(0.1)	(0.2)
	3.3%	(363.3)%	3.8%

In 2018, the Company utilized net operating loss carryforwards to offset federal income tax expense.

In 2017 and 2016, the Company did not recognize a tax benefit for the majority of its losses as it maintained a full valuation allowance against all net domestic deferred tax assets due to the inability to project net future taxable income, as described below.

In 2017, the benefit for income taxes was primarily due to the Company s AMT credit carryforwards of approximately $736,000 becoming fully refundable in future years, due to the repeal of the corporate AMT under the Tax Act.

In 2016, in connection with the Company s acquisition of 100% ownership of certain operating assets and cash of Converpower, the related deferred tax liability for unremitted earnings of $55,000 was reversed and recorded as a discrete benefit in the first quarter of 2016 (see Note 8).

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

For financial reporting purposes, income (loss) before income taxes for the years ended December 31 include the following components (in thousands):

	2018	2017	2016
Domestic	$ 31,455	$ (1,591)	$ (6,034)
Foreign	1,478	1,493	4
	$ 32,933	$ (98)	$ (6,030)

Significant components of the provision (benefit) for income taxes for the years ended December 31 are as follows (in thousands):

	2018	2017	2016
Current:			
Federal	$	$ (736)	$
State	231	156	172
Foreign	911	396	137
	1,142	(184)	309
Deferred:			
Federal			(55)
Foreign	(55)	(172)	(23)
	(55)	(172)	(78)
	$ 1,087	$ (356)	$ 231

The Tax Act eliminates the deferral of U.S. income tax on accumulated foreign earnings by imposing a one-time mandatory transition tax on such earnings. As a result, a provisional amount of approximately $122,000 was recorded in 2017 as additional tax expense related to approximately $813,000 of untaxed accumulated unremitted foreign earnings. As noted above, the additional tax of $122,000 was fully offset by existing net operating losses in the U.S. Effective for the Company s 2018 tax year, foreign earnings will be taxed currently in the U.S. under new GILTI and FDII provisions of the Act. As of December 31, 2018, unremitted foreign earnings, which were not significant, are permanently re-invested in the Company s foreign subsidiaries. Upon repatriation of those earnings, in the form of dividends or otherwise, the Company could be subject to immaterial withholding taxes payable to the various foreign countries.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

As noted above, the change in the U.S. federal corporate tax rate, which was effective January 1, 2018, is reflected in the Company s deferred tax table below. Significant components of the Company s deferred tax assets and liabilities as of December 31 were as follows (in thousands):

	2018	2017
Deferred tax assets:		
Research and development tax credit carryforwards	$ 23,244	$ 20,019
Stock-based compensation	3,133	2,793
Inventory reserves	2,109	2,059
Investment tax credit carryforwards	1,976	2,181
Vacation accrual	1,218	1,255
Net operating loss carryforwards	1,091	4,918
UNICAP	275	3
International deferred tax assets	265	210
Unrealized loss on investments	132	135
Sales allowances	128	25
Contingent consideration liabilities	88	148
Deferred revenue	66	79
Bad debt reserves	52	36
Warranty reserves	35	45
Other	233	35
Total deferred tax assets	34,045	33,941
Less: Valuation allowance for deferred tax assets	(30,031)	(33,024)
Net deferred tax assets	4,014	917
Deferred tax liabilities:		
Depreciation	(3,144)	(76)
Prepaid expenses	(473)	(470)
Patent amortization	(107)	(161)
Other	(25)	
Total deferred tax liabilities	(3,749)	(707)
Net deferred tax assets (liabilities)	$ 265	$ 210

As of December 31, 2018, the Company has a valuation allowance of approximately $30,031,000 against all domestic net deferred tax assets, for which realization cannot be considered more likely than not at this time. Management assesses the need for the valuation allowance on a quarterly basis. In assessing the need for a valuation allowance, the Company considers all positive and negative evidence, including scheduled reversals of deferred tax liabilities,

projected future taxable income, tax planning strategies, and past financial performance. While recent positive operating results caused the Company to be in a cumulative income position as of December 31, 2018, it has been in such a position for only a limited number of quarters. In addition, some uncertainty in economic conditions that could potentially impact the Company has led management to conclude a full valuation allowance against all domestic net deferred tax assets is still warranted as of December 31, 2018. The valuation allowance against these deferred tax assets may require adjustment in the future based on changes in the mix of temporary differences, changes in tax laws, and operating performance. If the positive quarterly earnings continue, the Company may release all or a portion of the valuation in the near-term. If and when the Company determines the valuation allowance should be released (i.e., reduced), the adjustment would result in a tax benefit reported in that period s Consolidated Statements of Operations, the effect of which would be an increase in reported net income.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The state and federal research and development tax credit carryforwards of approximately $12,139,000 and $14,920,000, respectively, expire beginning in 2019 for state purposes and in 2025 for federal purposes. The Company has federal net operating loss carryforwards of approximately $2,584,000, which expire beginning in 2033, as well as net operating loss carryforwards in certain states of approximately $8,249,000, which expire beginning in 2019 through 2037.

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows (in thousands):

	2018	2017	2016
Balance on January 1	$ 1,104	$ 946	$ 830
Additions based on tax positions related to the current year	245	138	125
Additions for tax positions of prior years	120	29	
Settlements		(1)	
Lapse of statute	(7)	(8)	(9)
Balance on December 31	$ 1,462	$ 1,104	$ 946

The Company has reviewed the tax positions taken, or to be taken, in its tax returns for all tax years currently open to examination by a taxing authority. The total amount of unrecognized tax benefits, that is the aggregate tax effect of differences between tax return positions and the benefits recognized in the Company s financial statements, as of December 31, 2018, 2017, and 2016 of $1,462,000, $1,104,000, and $946,000, respectively, if recognized, may decrease the Company s income tax provision and effective tax rate. None of the unrecognized tax benefits as of December 31, 2018, are expected to significantly change during the next twelve months.

The Company recognizes accrued interest and penalties, if any, related to unrecognized tax benefits as a component of income tax expense. During the years ended December 31, 2018, 2017, and 2016, the Company recognized approximately $7,000, $6,000, and $6,000, respectively, in net interest expense. As of December 31, 2018 and 2017, the Company had accrued approximately $35,000 and $29,000, respectively, for the potential payment of interest.

The Company files income tax returns in the United States and various foreign tax jurisdictions. These tax returns are generally open to examination by the relevant tax authorities from three to seven years from the date they are filed. The tax filings relating to the Company s federal and state taxes are currently open to examination for tax years 2016 and 2017 and 2009 through 2017, respectively. In addition, 2012 and 2014 tax years resulted in losses and the Company generated federal research and development credits in tax years 2005 through 2015. These years may also be subject to examination when the losses or credits are carried forward and utilized in future years.

The Company s subsidiary in Italy, Vicor Italy S.r.l. (Vicor Italy), underwent a tax inspection during 2014 for tax years 2009 through 2013, covering corporation, regional and value added taxes. Vicor Italy received a preliminary tax audit report dated June 30, 2014. The Company filed a response to the preliminary tax audit report in the third quarter of 2014. The statute of limitations for the tax authorities in Italy to file an assessment, if any, expired on December 31,

2015 for tax year 2009, on December 31, 2016 for tax year 2010 on December 31, 2017 for tax year 2011, and on December 31, 2018 for tax year 2012. Due to the non-response by Italian authorities after nearly five years, and the lapse of the first four out of the five years under examination, the Company does not believe the ultimate impact will be material to the Company s financial statements.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

In May 2017, the Company received notice from the Internal Revenue Service that its federal corporate tax return for tax year 2015 had been selected for examination. The examination was completed in May 2018 resulting in no tax liability to the Company. In January 2018, the Company received notice from the New York State Department of Taxation and Finance that its New York State tax returns for tax years 2014 through 2016 were selected for audit. The audit was completed in the third quarter of 2018, resulting in an immaterial assessment.

There are no other income tax examinations or audits currently in process.

15. COMMITMENTS AND CONTINGENCIES

The Company leases certain of its offices, manufacturing space, and several automobiles. The future minimum rental commitments under non-cancelable operating leases with remaining terms in excess of one year are as follows (in thousands):

Year	
2019	$ 1,962
2020	1,502
2021	688
2022	447
2023 and thereafter	830

Rent expense for the Company s leases was approximately $2,102,000, $1,889,000 and $1,866,000 in 2018, 2017 and 2016, respectively. The Company also pays tenant-related executory costs such as taxes, maintenance, and insurance.

The Company is the defendant in a patent infringement lawsuit originally filed on January 28, 2011 by SynQor, Inc. (SynQor) in the U.S. District Court for the Eastern District of Texas (the Texas Action). The complaint, as amended in September 2011, alleges that the Company s products, including but not limited to, unregulated bus converters used in intermediate bus architecture power supply systems, infringe SynQor s U.S. patent numbers 7,072,190, 7,272,021, 7,564,702, and 8,023,290 (the 190 patent , the 021 patent , the 702 patent , and the 290 patent , respectively). Sy complaint sought an injunction against further infringement and an award of unspecified compensatory and enhanced damages, interest, costs and attorney fees. The Company has denied that its products infringe any of the SynQor patents, asserted that the SynQor patents are invalid, and asserted that the 290 patent is unenforceable due to inequitable conduct by SynQor or its agents during the examination of the 290 patent at the United States Patent and Trademark Office (USPTO). The Company also asserted counterclaims seeking damages against SynQor for deceptive trade practices and tortious interference with prospective economic advantage arising from SynQor s attempted enforcement of its patents against the Company. On May 23, 2016, after extensive discovery, the Texas Action was stayed by the court pending completion of certain *inter partes* reexamination proceedings at the USPTO (including any appeals from such proceedings to the Federal Circuit (as defined below)) concerning the SynQor patents, which are described below. On November 2, 2018, SynQor filed a motion to lift the stay of the Texas Action. On January 3, 2019, the Court denied the motion and reaffirmed its original decision that the stay should remain at least until the conclusion of all pending *inter partes* reexaminations and related appeals.

In 2011, in response to the filing of the Texas Action, the Company initiated *inter partes* reexamination proceedings at the USPTO challenging the validity of certain claims of the SynQor patents asserted in the Texas Action, including all claims that were asserted against the Company by SynQor. The current status of these

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

proceedings is as follows. Regarding the 190 patent, the United States Court of Appeals for the Federal Circuit (the Federal Circuit) issued a decision on March 13, 2015, determining that certain claims were invalid, remanding the matter to the Patent Trial and Appeal Board (PTAB) of the USPTO for further proceedings. On May 2, 2016, the PTAB issued a decision affirming the examiner s original rejection of all but one of the remaining claims of the 190 patent, and identifying a new basis for rejecting the remaining claim (claim 34), which had been added by SynQor during the reexamination. SynQor then requested further examination of claim 34 by the examiner, pursuant to 37 C.F.R. § 41.77(b)(1). On June 22, 2017, the examiner issued a determination under 37 C.F.R. § 41.77(d), finding claim 34 was unpatentable. That decision is expected to be further reviewed by the PTAB pursuant to 37 C.F.R. § 41.77(f). After the PTAB reviews the examiner s decision with respect to claim 34, it is expected that the PTAB s decisions with respect to all of the challenged and still pending claims of the 190 patent will be subject to further review by the Federal Circuit. On May 2, 2016, the PTAB also issued decisions finding all challenged claims of SynQor s 021 patent invalid and upholding the validity of all challenged claims of SynQor s 702 and 290 patents. On August 30, 2017, the Federal Circuit issued rulings with regard to those decisions. With respect to the 021 patent, the Federal Circuit affirmed the PTAB s determination that all of the challenged claims of the 021 patent were invalid. The Federal Circuit remanded the case to the PTAB for further consideration of the patentability of certain claims that had been added by amendment during the reexamination. With respect to the 702 patent, the Federal Circuit affirmed the PTAB s determination that all of the challenged claims of the 702 patent were patentable. With respect to the 290 patent, the Federal Circuit vacated the PTAB s decision upholding the patentability of the 290 patent claims, and remanded the case to the PTAB for further consideration. The PTAB has not issued any rulings with respect to the 290 patent after remand.

On October 31, 2017, the Company filed a request with the USPTO for *ex parte* reexamination of the asserted claims of the 702 patent, based on different prior art references than had been at issue in the previous *inter partes* reexamination of the 702 patent. On December 6, 2017, the USPTO issued a decision initiating *ex parte* reexamination of the 702 patent after finding that the Company s request had raised a substantial new question of patentability of the challenged claims. On March 21, 2018, the examiner issued a non-final office action finding all of the challenged claims of the 702 patent to be unpatentable. On May 14, 2018, SynQor filed a petition requesting the USPTO to vacate its prior decision granting the Company s request for *ex parte* reexamination. No action has been taken on the petition to date. On September 12, 2018, the examiner issued a final office action finding all of the challenged claims of the 702 patent to be unpatentable. On October 26, 2018, SynQor filed a notice of appeal appealing the examiner s final rejection to the PTAB. On December 3, 2018, the USPTO denied SynQor s petition to vacate the decision initiating the *ex parte* reexamination. The Company continues to monitor the progress of this proceeding.

On August 6, 2018, the Company filed a request with the USPTO for *ex parte* reexamination of the asserted claims of the 190 patent, based on different prior art references than had been at issue in the previous *inter partes* reexamination of the 190 patent. On September 11, 2018, SynQor filed a petition asking the USPTO to reject the Company s request on the ground that it presented substantially the same prior art or arguments presented to the USPTO in the prior *inter partes* reexamination of the 190 patent. On December 3, 2018, the USPTO denied SynQor s petition to reject the Company s *ex parte* reexamination request. On December 4, 2018, the USPTO instituted *ex parte* reexamination of the 190 patent after finding that the Company s request had raised a substantial new question affecting the patentability of the challenged claims.

On January 23, 2018, the 20-year terms of the 190 patent, the 021 patent and the 702 patent expired. The 20-year term of the 290 patent expired on July 16, 2018. As a consequence of these expirations, the Company cannot be liable under any of the SynQor patents for allegedly infringing activities occurring after the patents respective expiration dates.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

The Company continues to believe none of its products, including its unregulated bus converters, infringe any valid claim of the asserted SynQor patents, either alone or when used in an intermediate bus architecture implementation. The Company believes SynQor s claims lack merit and, therefore, it continues to vigorously defend itself against SynQor s patent infringement allegations. The Company does not believe a loss is probable for this matter. If a loss were to be incurred, however, the Company cannot estimate the amount of possible loss or range of possible loss at this time.

In addition to the SynQor matter, the Company is involved in certain other litigation and claims incidental to the conduct of its business. While the outcome of lawsuits and claims against the Company cannot be predicted with certainty, management does not expect any current litigation or claims will have a material adverse impact on the Company s financial position or results of operations.

16. PICOR MERGER

On May 25, 2018, the Company s Board of Directors unanimously approved the merger of Picor Corporation (Picor), a subsidiary of Vicor, fully consolidated for financial reporting purposes, with and into the Company. The merger was completed as of May 30, 2018, at which time the separate corporate existence of Picor ceased. To effect the merger, holders of Picor Common Stock and Picor stock options received an equivalent value of Vicor Common Stock and Vicor stock options, respectively, pursuant to the assumption of the Picor Corporation Amended and Restated 2001 Stock Option and Incentive Plan, and options outstanding thereunder, by the Company. While Picor s subsidiary status and corporate form ceased to exist upon the closing of the merger, the operations previously conducted by Picor, which are now conducted by Vicor, continue to be managed and remain categorized as an operating segment for financial reporting purposes. There was no net impact on the Company s consolidated financial statements nor any impact on the Company s segment reporting for the year ended December 31, 2018 as a result of the merger.

17. SEGMENT INFORMATION

The Company has organized its operating business segments according to its key product lines. The BBU segment designs, develops, manufactures, and markets the Company s modular DC-DC converters and configurable products, and also includes the entities comprising Vicor Custom Power and the BBU operations of VJCL. The VI Chip segment includes VI Chip Corporation, which designs, develops, manufactures, and markets many of the Company s advanced power component products. The VI Chip segment also includes the VI Chip business conducted through VJCL. The Picor segment, which consists of the operations of the Company s former subsidiary Picor Corporation (see Note 16 above) designs, develops, manufactures, and markets integrated circuits for use in a variety of power management and power system applications. The Picor segment develops integrated circuits for use in the Company s BBU and VI Chip modules, to be sold as complements to the Company s BBU and VI Chip products, or for sale to third parties for separate (i.e., stand-alone) applications.

The Company s Chief Executive Officer (i.e., identified as the chief operating decision maker,) (CODM), pursuant to U.S. GAAP, evaluates performance and allocates resources based on segment revenues and segment operating income (loss). The operating income (loss) for each segment includes selling, general, and administrative and research and development expenses directly attributable to the segment. Certain of the Company s indirect overhead costs, which

include corporate selling, general, and administrative expenses, are allocated among the segments based upon an estimate of costs associated with each segment. Assets allocated to each segment are based upon specific identification of such assets, which include accounts receivable, inventories, fixed assets, and certain other assets. The Corporate segment consists of those operations and assets shared by all operating segments. The costs of certain centralized executive and administrative functions are

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

recorded in this segment, as are certain shared assets, most notably cash and cash equivalents, deferred tax assets, long-term investments, the Company s facilities in Massachusetts, real estate, and other assets. The Company s accounting policies and method of presentation for segments are consistent with that used throughout the Consolidated Financial Statements.

The following table provides significant segment financial data as of and for the years ended December 31 (in thousands):

	BBU	VI Chip	Picor	Corporate	Eliminations (1)	Total
2018:						
Net revenues	$ 186,715	$ 84,728	$ 34,552	$	$ (14,775)	$ 291,220
Income (loss) from operations	22,544	3,612	7,517	(1,614)		32,059
Total assets	279,671	56,619	14,869	85,851	(215,942)	221,068
Depreciation and amortization	3,621	3,504	792	1,337		9,254
Capital expenditures	2,954	13,386	621	1,250		18,211
2017:						
Net revenues	$ 151,789	$ 61,330	$ 26,297	$	$ (11,586)	$ 227,830
Income (loss) from operations	5,615	(11,495)	5,400	(880)		(1,360)
Total assets	232,255	34,809	13,509	59,550	(174,399)	165,724
Depreciation and amortization	3,907	2,782	747	1,457		8,893
Capital expenditures	3,188	7,505	1,249	603		12,545
2016:						
Net revenues	$ 151,428	$ 39,947	$ 16,684	$	$ (7,779)	$ 200,280
Income (loss) from operations	11,750	(16,494)	(637)	(933)		(6,314)
Total assets	196,987	21,389	8,583	73,253	(146,145)	154,067
Depreciation and amortization	4,258	2,235	545	1,400		8,438
Capital expenditures	2,325	4,041	1,178	884		8,428

(1) The elimination for net revenues is principally related to inter-segment revenues of Picor to BBU and VI Chip and for inter-segment revenues of VI Chip to BBU. The elimination for total assets is principally related to inter-segment accounts receivable due to BBU for the funding of VI Chip and Picor operations.

Substantially all long-lived assets are located in the United States.

During 2018, 2017, and 2016, one customer accounted for approximately 13.4%, 13.0%, and 16.4% of net revenues, respectively, which were included in all three business segments in each of the three years.

Net revenues from unaffiliated customers by country, based on the location of the customer, for the years ended December 31 were as follows (in thousands):

	2018	2017	2016
United States	$ 110,779	$ 83,871	$ 80,603
Europe	27,689	24,078	22,495
Asia Pacific	147,078	114,365	91,848
All other	5,674	5,516	5,334
	$ 291,220	$ 227,830	$ 200,280

Net revenues from customers in China (including Hong Kong), our largest international market, accounted for approximately 37.4% of total net revenues in 2018, 35.8% in 2017 and 32.1% in 2016, respectively.

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VICOR CORPORATION

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

18. QUARTERLY RESULTS OF OPERATIONS (Unaudited)

The following table sets forth certain unaudited quarterly financial data for the years ended December 31 (in thousands, except per share amounts):

	First	Second	Third	Fourth	Total
2018:					
Net revenues	$ 65,269	$ 74,196	$ 78,035	$ 73,720	$ 291,220
Gross margin	30,211	35,883	39,004	33,873	138,971
Consolidated net income	3,982	7,909	13,048	6,907	31,846
Net income (loss) attributable to noncontrolling interest	39	49	36	(3)	121
Net income attributable to Vicor Corporation	3,943	7,860	13,012	6,910	31,725
Net income per share attributable to Vicor Corporation:					
Basic	0.10	0.20	0.32	0.17	0.80
Diluted	0.10	0.19	0.32	0.17	0.78

	First	Second	Third	Fourth	Total
2017:					
Net revenues	$ 54,462	$ 57,709	$ 56,888	$ 58,771	$ 227,830
Gross margin	23,652	25,930	25,143	26,931	101,656
Consolidated net income (loss)	(954)	(445)	38	1,619	258
Net income attributable to noncontrolling interest	20	14	49	8	91
Net income (loss) attributable to Vicor Corporation	(974)	(459)	(11)	1,611	167
Net income (loss) per share attributable to Vicor Corporation:					
Basic and diluted	(0.02)	(0.01)	(0.00)	0.04	0.00

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

None.

ITEM 9A. ***CONTROLS AND PROCEDURES***

Attached as exhibits to this Annual Report on Form 10-K are certifications of our CEO and Chief Financial Officer (CFO), which are required in accordance with Rule 13a-14 of the Exchange Act. This Controls and Procedures section includes information concerning the controls and controls evaluation referred to in the certifications.

(a) Evaluation of disclosure controls and procedures

As required by Rule 13a-15 under the Exchange Act, management, with the participation of our CEO and CFO, conducted an evaluation regarding the effectiveness of our disclosure controls and procedures, as of the end of the last fiscal year. The term disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Securities and Exchange Commission s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the Company s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. We recognize any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and we necessarily apply our judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of the Company s disclosure controls and procedures as of December 31, 2018, the CEO and CFO concluded, as of such date, the Company s disclosure controls and procedures were effective at the reasonable assurance level.

(b) Management s Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Internal control over financial reporting includes those policies and procedures; (a) pertaining to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of our assets; (b) providing 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 are being made only in accordance with authorizations of our management and Board of Directors; and (c) providing reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on our financial statements.

Management assessed our internal control over financial reporting as of December 31, 2018, the end of our fiscal year. Management based its assessment on criteria established in *Internal Control Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Management s assessment included evaluation of such elements as the design and operating effectiveness of key financial reporting controls, process documentation, accounting policies, and our overall control environment.

Based on our assessment, management has concluded that our internal control over financial reporting was effective as of December 31, 2018.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by KPMG LLP, our independent registered public accounting firm, as stated in their report which is included immediately below.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors

Vicor Corporation:

Opinion on Internal Control Over Financial Reporting

We have audited Vicor Corporation and subsidiaries (the Company) internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

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, 2018 and 2017, the related consolidated statements of operations, comprehensive income (loss), cash flows, and equity for each of the years in the three-year period ended December 31, 2018, and the related notes, and the financial statement schedule listed in Item 15(a)(2) (collectively, the consolidated financial statements), and our report dated February 28, 2019 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management s 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 of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included 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/ KPMG LLP

Boston, Massachusetts

February 28, 2019

(c) Inherent Limitations on Effectiveness of Controls

The Company s management, including the CEO and CFO, does not expect that our disclosure controls or our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system s objectives will be met. The design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Further, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, within the Company have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns can occur because of simple error or mistake. Controls can also be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the controls. The design of any system of controls is based in part on certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Projections of any evaluation of controls effectiveness to future periods are subject to risks. Over time, controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with policies or procedures.

(d) Changes in Internal Control Over Financial Reporting

There was no change in our internal control over financial reporting that occurred during the fiscal quarter ended December 31, 2018, that has materially affected, or is reasonably likely to materially affect, the Company s internal control over financial reporting.

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ITEM 9B. ***OTHER INFORMATION***

None.

PART III

ITEM 10. ***DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE***

Incorporated by reference from the Company s Definitive Proxy Statement for its 2019 annual meeting of stockholders.

ITEM 11. ***EXECUTIVE COMPENSATION***

Incorporated by reference from the Company s Definitive Proxy Statement for its 2019 annual meeting of stockholders.

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

Incorporated by reference from the Company s Definitive Proxy Statement for its 2019 annual meeting of stockholders.

ITEM 13. ***CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE***

Incorporated by reference from the Company s Definitive Proxy Statement for its 2019 annual meeting of stockholders.

ITEM 14. ***PRINCIPAL ACCOUNTANT FEES AND SERVICES***

Incorporated by reference from the Company s Definitive Proxy Statement for its 2019 annual meeting of stockholders.

PART IV

ITEM 15. ***EXHIBITS AND FINANCIAL STATEMENT SCHEDULES***

(a) (1) *Financial Statements*

See index in Item 8.

(a) (2) *Schedules*

Schedule II Valuation and Qualifying Accounts

All other schedules for which provision is made in the applicable accounting regulation of the Securities and Exchange Commission are not required under the related instructions or are inapplicable, and therefore have been omitted.

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(b) *Exhibits*

Exhibits	Description of Document
3.1	Restated Certificate of Incorporation, dated February 28, 1990 (1)
3.2	Certificate of Ownership and Merger Merging Westcor Corporation, a Delaware Corporation, into Vicor Corporation, a Delaware Corporation, dated December 3, 1990 (1)
3.3	Certificate of Amendment of Restated Certificate of Incorporation, dated May 10, 1991 (1)
3.4	Certificate of Amendment of Restated Certificate of Incorporation, dated June 23, 1992 (1)
3.5	Bylaws, as amended (8)
4.1	Specimen Common Stock Certificate (2)
10.1*	1998 Stock Option and Incentive Plan (3)
10.2*	Vicor Corporation Amended and Restated 2000 Stock Option and Incentive Plan, as amended and restated (4)
10.3*	Form of Non-Qualified Stock Option under the Vicor Corporation Amended and Restated 2000 Stock Option and Incentive Plan (5)
10.4*	Sales Incentive Plan (6)
10.5*	Picor Corporation Amended and Restated 2001 Stock Option and Incentive Plan, dated May 30, 2018 (14)
10.6*	Form of Non-Qualified Stock Option under the Picor Corporation 2001 Stock Option and Incentive Plan (7)
10.7*	VI Chip Corporation Amended and Restated 2007 Stock Option and Incentive Plan (11)
10.8*	Form of Non-Qualified Stock Option Agreement under the VI Chip Corporation Amended 2007 Stock Option and Incentive Plan (9)
10.9*	Form of Incentive Stock Option Agreement under the VI Chip Corporation Amended 2007 Stock Option and Incentive Plan (10)
10.10*	Form of Stock Restriction Agreement under the VI Chip Corporation Amended 2007 Stock Option and Incentive Plan (10)
10.11*	Vicor Corporation 2017 Employee Stock Purchase Plan (13)
21.1	Subsidiaries of the Company (15)
23.1	Consent of KPMG LLP (15)
31.1	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) of the Exchange Act (15)
31.2	Certification of Chief Financial Officer pursuant to Rule 13a-14(a) of the Exchange Act (15)
32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (15)
32.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (15)
101	The following material from the Company s Annual Report on Form 10-K, for the year ended December 31, 2018, formatted in XBRL (Extensible Business Reporting Language): (i) the Consolidated Balance Sheets; (ii) the Consolidated Statements of Operations; (iii) the Consolidated Statements of Comprehensive Income (Loss); (iv) the Consolidated Statements of Cash Flows; (v) the Consolidated Statements of Equity; and (vi) the Notes to Consolidated Financial Statements.

* Indicates a management contract or compensatory plan or arrangement required to be filled pursuant to Item 15(b) of Form 10-K.

(1)

Filed as an exhibit to the Company s Annual Report on Form 10-K filed on March 29, 2001 and incorporated herein by reference.

(2) Filed as an exhibit to the Company s Registration Statement on Form 10, as amended, under the Securities Exchange Act of 1934 (File No. 0-18277), and incorporated herein by reference. (P)

(3) Filed as an exhibit to the Company s Registration Statement on Form S-8, as amended, under the Securities Act of 1933 (No. 333-61177), and incorporated herein by reference.

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(4) Filed as Appendix A to the Company s Definitive Proxy Statement on Schedule 14A filed with the SEC on May 1, 2017 (File No. 000-18277), and incorporated herein by reference.
(5) Filed as an exhibit to the Company s Quarterly Report on Form 10-Q filed on November 4, 2004 (File No. 0-18277) and incorporated herein by reference.
(6) Filed as an exhibit to the Company s Annual Report on Form 10-K filed on March 16, 2005 (File No. 0-18277) and incorporated herein by reference.
(7) Filed as an exhibit to the Company s Annual Report on Form 10-K filed on March 14, 2006 (File No. 0-18277) and incorporated herein by reference.
(8) Filed as an exhibit to the Company s Quarterly Report on Form 10-Q filed on November 8, 2006 (File No. 0-18277) and incorporated herein by reference.
(9) Filed as an exhibit to the Company s Current Report on Form 8-K, dated June 6, 2007 (File No. 0-18277) and incorporated herein by reference.
(10) Filed as an exhibit to the Company s Current Report and Form 8-K, dated March 6, 2008 (File No. 0-18277) incorporated herein by reference.
(11) Filed as Appendix B to the Company s Definitive Proxy Statement on Schedule 14A filed with the SEC on May 1, 2017 (File No. 000-18277), and incorporated herein by reference.
(12) Filed as Appendix C to the Company s Definitive Proxy Statement on Schedule 14A filed with the SEC on May 1, 2017 (File No. 000-18277), and incorporated herein by reference.
(13) Filed as Appendix D to the Company s Definitive Proxy Statement on Schedule 14A filed with the SEC on May 1, 2017 (File No. 000-18277), and incorporated herein by reference.
(14) Filed as Exhibit 10.1 to the Company s Current Report on Form 8-K filed with the SEC on June 5, 2018 (File No. 000-18277), and incorporated herein by reference.
(15) Filed herewith.

ITEM 16. FORM 10-K SUMMARY

None.

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VICOR CORPORATION

SCHEDULE II

VALUATION AND QUALIFYING ACCOUNTS

Years ended December 31, 2018, 2017 and 2016

Description	Balance at Beginning of Period	Charge (Recovery) to Costs and Expenses	Other Charges, Deductions (1)	Balance at End of Period
Allowance for doubtful accounts:				
Year ended:				
December 31, 2018	$ 159,000	$ 65,000	$	$ 224,000
December 31, 2017	153,000	6,000		159,000
December 31, 2016	171,000	(22,000)	4,000	153,000

(1) Reflects uncollectible accounts written off, net of recoveries.

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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 report to be signed on its behalf by the undersigned, thereunto duly authorized.

Vicor Corporation

By: /s/ James A. Simms
James A. Simms
Vice President, Chief Financial Officer

Date: February 28, 2019

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

Signature	Title	Date
/s/ Patrizio Vinciarelli Patrizio Vinciarelli	President, Chief Executive Officer and Chairman of the Board (Principal Executive Officer)	February 28, 2019
/s/ James A. Simms James A. Simms	Chief Financial Officer and Vice President (Principal Financial Officer and Principal Accounting Officer)	February 28, 2019
/s/ Estia J. Eichten Estia J. Eichten	Director	February 28, 2019
/s/ Barry Kelleher Barry Kelleher	Director	February 28, 2019
/s/ Samuel J. Anderson Samuel J. Anderson	Director	February 28, 2019
/s/ Claudio Tuozzolo Claudio Tuozzolo	Director	February 28, 2019
/s/ Jason L. Carlson	Director	February 28, 2019

Jason L. Carlson		
/s/ Liam K. Griffin	Director	February 28, 2019
Liam K. Griffin		
/s/ H. Allen Henderson	Director	February 28, 2019
H. Allen Henderson		