Chattahoochee Valley Home Health, LLC
Form 424B3
September 29, 2015
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Filed Pursuant to Rule 424(b)(3)
Registration No. 333-206995

PROSPECTUS

Kindred Healthcare, Inc.

Offer to Exchange any and all of our outstanding unregistered 8.00% Senior Notes due 2020

for $750,000,000 aggregate principal amount of our new 8.00% Senior Notes due 2020

that have been registered under the Securities Act of 1933, as amended (the Securities Act)

Offer to Exchange any and all of our outstanding unregistered 8.75% Senior Notes due 2023

for $600,000,000 aggregate principal amount of our new 8.75% Senior Notes due 2023

that have been registered under the Securities Act

Terms of the Exchange Offer

We are offering to exchange (i) any and all of our outstanding unregistered 8.00% Senior Notes due 2020 that were issued on December 18, 2014 (the Old 2020 Notes) for an equal amount of new 8.00% Senior Notes due 2020 (the New 2020 Notes and, together with the Old 2020 Notes, the 2020 notes) and (ii) any and all of our outstanding unregistered 8.75% Senior Notes due 2023 that were issued on December 18, 2014 (the Old 2023 Notes and, together with the Old 2020 Notes, the Old Notes) for an equal amount of new 8.75% Senior Notes due 2023 (the New 2023 Notes and, together with the Old 2023 Notes, the 2023 notes). The 2023 notes and the 2020 notes are collectively referred to herein as the notes. The New 2023 Notes and the New 2020 Notes are collectively referred to herein as the New Notes.

The exchange offer expires at 5:00 p.m., New York City time, on October 28, 2015 (such date and time, the Expiration Date, unless we extend or terminate the exchange offer, in which case the Expiration Date will mean the latest date and time to which we extend the exchange offer).

Tenders of the Old Notes may be withdrawn at any time prior to the Expiration Date.

The Old Notes may be exchanged only in minimum denominations of $2,000 and integral multiples of $1,000 in excess thereof.

All Old Notes that are validly tendered and not validly withdrawn will be exchanged.

The exchange of the Old Notes for the New Notes will not be a taxable event for U.S. federal income tax purposes.

We will not receive any proceeds from the exchange offer.

The terms of the New Notes to be issued in the exchange offer are substantially the same as the terms of the Old Notes, except that the offer of the New Notes is registered under the Securities Act, and the New Notes have no transfer restrictions, registration rights or rights to additional interest.

The New Notes will not be listed on any securities exchange. A public market for the New Notes may not develop, which could make selling the New Notes difficult.

Each broker-dealer that receives the New Notes for its own account pursuant to the exchange offer must acknowledge that it will deliver a prospectus in connection with any resale of such New Notes. The letter of transmittal accompanying this prospectus states that by so acknowledging and by delivering a prospectus, a broker-dealer will not be deemed to admit that it is an underwriter within the meaning of the Securities Act. This prospectus, as it may be amended or supplemented from time to time, may be used by a broker-dealer in connection with resales of the New Notes received in exchange for the Old Notes where such Old Notes were acquired by such broker-dealer as a result of market-making activities or other trading activities. For a period of 120 days after the Expiration Date, we will make this prospectus, as amended or supplemented, available to any broker-dealer for use in connection with any such resale. See Plan of Distribution.

Investing in the New Notes to be issued in the exchange offer involves certain risks. See Risk Factors beginning on page 11.

We are not making an offer to exchange the Old Notes in any jurisdiction where the offer is not permitted.

Neither the SEC nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is September 29, 2015.

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We are responsible for the information contained and incorporated by reference in this prospectus. We have not authorized anyone to give you any other information, and we take no responsibility for any other information that others may give you. If you are in a jurisdiction where offers to sell, or solicitations of offers to purchase, the securities offered by this document are unlawful, or if you are a person to whom it is unlawful to direct these types of activities, then the offer presented in this document does not extend to you. The information contained in this document speaks only as of the date of this document unless the information specifically indicates that another date applies.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-4 to register this exchange offer of the New Notes, which you can access on the SEC s website at *www.sec.gov*. This prospectus, which forms part of the registration statement, does not contain all of the information included in that registration statement. For further information about us and about the New Notes offered in this prospectus, you should refer to the registration statement and its exhibits. You may read and copy any materials we file with the SEC at the Public Reference Room maintained by the SEC at 100 F Street, N.E., Washington, D.C. 20549. You may obtain further information about the operation of the SEC s Public Reference Room by calling the SEC at 1-800-SEC-0330. These materials are also available to the public from the SEC s website at *www.sec.gov*. Please note that the SEC s website is included in this prospectus as an inactive textual reference only.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

We incorporate by reference into this prospectus certain information we file with the SEC, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus. Certain information that we subsequently file with the SEC will automatically update and supersede information in this prospectus and in our other filings with the SEC.

We incorporate by reference the documents listed below, which we have already filed with the SEC, and any future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of

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1934, as amended (the Exchange Act), after the date of the initial registration statement and prior to the termination of the exchange offer, except that we are not incorporating any information included in a Current Report on Form 8-K that has been or will be furnished (and not filed) with the SEC, unless such information is expressly incorporated herein by a reference in a furnished Current Report on Form 8-K or other furnished document:

our Annual Report on Form 10-K for the year ended December 31, 2014 filed with the SEC on March 2, 2015 (the Kindred 2014 10-K) (the description of business, financial statements and related audit report and management s discussion and analysis have been superseded by our Current Report on Form 8-K filed with the SEC on September 17, 2015);

our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2015 filed with the SEC on May 8, 2015 and June 30, 2015 filed with the SEC on August 7, 2015.

portions of our Definitive Proxy Statement on Schedule 14A filed with the SEC on April 6, 2015 that are incorporated by reference into Part III of the Kindred 2014 10-K;

our Current Reports on Form 8-K filed with the SEC on January 2, 2015; January 15, 2015 (SEC Accession No. 0001193125-15-011974); January 15, 2015 (SEC Accession No. 0001193125-15-011984); January 27, 2015; January 28, 2015; January 29, 2015; February 3, 2015 (excluding Item 7.01 and Exhibit 99.1); February 27, 2015 (Item 8.01 and Exhibit 99.2 only); March 6, 2015 (SEC Accession No. 0001193125-15-081193); March 6, 2015 (SEC Accession No. 0001193125-15-081194); March 10, 2015; March 27, 2015; April 1, 2015; April 14, 2015; May 4, 2015; May 7, 2015 (Item 8.01 and Exhibit 99.2 only); May 28, 2015; and August 6, 2015 (Item 8.01 and Exhibit 99.2 only);

our Current Report on Form 8-K filed with the SEC on September 17, 2015 (including a recast presentation of certain sections of the Kindred 2014 10-K) (the Recast 8-K);

our Current Report on Form 8-K filed with the SEC on September 17, 2015 (including audited financial statements of Centerre Healthcare Corporation and Gentiva Health Services, Inc. for the year ended December 31, 2014 and unaudited pro forma condensed combined financial data of Kindred Healthcare, Inc. as of and for the six months ended June 30, 2015 and for the year ended December 31, 2014);

Copies of these filings may be obtained at no cost by writing or calling us at the following address and telephone number:

Corporate Secretary

Kindred Healthcare, Inc.

680 South Fourth Street

Louisville, Kentucky 40202

Telephone: (502) 596-7300

To obtain timely delivery of any copies of filings requested, please write or call us no later than five business days before the Expiration Date of the exchange offer. This means that you must request this information no later than October 21, 2015.

Kindred s filings above are also available to the public on our website *http://www.kindredhealthcare.com.* (We have included our website address as an inactive textual reference and do not intend it to be an active link to our website. Information on our website is not part of this prospectus.)

SUMMARY

The following information supplements, and should be read together with, the information contained or incorporated by reference in other parts of this prospectus. This summary highlights selected information from this prospectus. As a result, it does not contain all the information that may be important to you and is qualified in its entirety by more detailed information appearing elsewhere in, or incorporated by reference into, this prospectus. You should carefully read this entire prospectus, including the documents incorporated by reference herein, which are described under Where You Can Find More Information and Incorporation of Certain Information by Reference before making an investment decision. You should pay special attention to the Risk Factors section of this prospectus and the Risk Factors section of the Kindred 2014 10-K before making an investment decision.

In this prospectus, unless otherwise specified or the context requires otherwise:

- *Kindred, we, us, our and the Company are references to Kindred Healthcare, Inc. and its consolidated subsidiaries, including Gentiva and Centerre;*

- *Gentiva refers to Gentiva Health Services, Inc. and its consolidated subsidiaries; and*

- *Centerre refers to Centerre Healthcare Corporation and its consolidated subsidiaries.*

With respect to the discussion of the terms of the notes on the cover page, in the section entitled Summary Summary of the Exchange Offer, in the section entitled Summary Summary of the New Notes and in the section entitled Description of the Notes, references to we, us or our include only Kindred Healthcare, Inc. and not any other consolidated subsidiaries of Kindred Healthcare, Inc.

Company Overview

General

Kindred is one of the largest diversified post-acute healthcare providers in the United States. At June 30, 2015, Kindred, through its subsidiaries, provided healthcare services in 2,730 locations across 47 states.

We have organized our business into four operating divisions:

- **Hospital Division** Our hospital division provides long-term acute care (LTAC) services to medically complex patients through the operation of a national network of 96 transitional care (TC) hospitals with 7,124 licensed beds in 22 states as of June 30, 2015. We operate the largest network of TC hospitals in the United States based upon revenues. Our TC hospitals are certified as LTAC hospitals under the Medicare program.

- **Kindred at Home Division** Our Kindred at Home division (formerly known as the care management division) primarily provides home health, hospice and private duty services to patients in a variety of settings, including homes, nursing centers and other residential settings. As of June 30, 2015, we operated 656 Kindred at Home hospice, home health and non-medical home care locations in 41 states and are one of the largest home health and hospice companies in the United States based on revenues. While minor in scope at this time, our Kindred at Home Division is also developing (1) physician coverage across sites of service, (2) care managers to improve care transitions, (3) information sharing and technology connectivity, (4) patient placement tools, and (5) condition-specific clinical programs and outcome measures.

Kindred Rehabilitation Services Kindred Rehabilitation Services division (formerly known as the rehabilitation division) provides rehabilitation services primarily in hospitals and long-term care

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settings and operates 16 inpatient rehabilitation hospitals (IRFs) with 829 licensed beds in eight states. Within Kindred Rehabilitation Services, we are organized into two reportable operating segments: RehabCare (formerly known as skilled nursing rehabilitation services) and Kindred Hospital Rehabilitation Services (formerly known as hospital rehabilitation services). RehabCare provides contract therapy services primarily to freestanding nursing centers, school districts and hospice providers. As of June 30, 2015, RehabCare provided rehabilitative services in 1,789 sites of service in 44 states. Kindred Hospital Rehabilitation Services includes the provision of program management and therapy services on an inpatient basis in hospital-based inpatient rehabilitation units, LTAC hospitals, sub-acute (or skilled nursing) units, as well as on an outpatient basis to hospital-based and other satellite programs, and the operation of 16 IRFs. As of June 30, 2015, Kindred Hospital Rehabilitation Services operated or managed 99 hospital-based inpatient rehabilitation units, provided rehabilitation services in 120 LTAC hospitals, eight sub-acute (or skilled nursing) units and 139 outpatient clinics and operated 16 IRFs.

Nursing Center Division Our nursing center division provides quality, cost-effective care through the operation of a national network of 90 nursing centers (11,535 licensed beds) and seven assisted living facilities (375 beds) located in 18 states as of June 30, 2015. Through our nursing centers, we provide short stay patients and long stay residents with a full range of medical, nursing, rehabilitative, pharmacy and routine services, including daily dietary, social and recreational services.

We believe that the independent focus of each of our divisions on the unique aspects of its business enhances its ability to improve the quality of its operations and achieve operating efficiencies.

All financial and statistical information presented or incorporated by reference in this prospectus reflects the continuing operations of our businesses for all periods presented unless otherwise indicated.

Recent Acquisitions

On October 9, 2014, we entered into an Agreement and Plan of Merger with Gentiva Health Services, Inc. (Gentiva), providing for our acquisition of Gentiva (the Gentiva Merger). On February 2, 2015, we consummated the Gentiva Merger, with Gentiva continuing as the surviving company and our wholly owned subsidiary. The Gentiva Merger was funded in part by the offering of $1.35 billion aggregate principal amount of the Old Notes in a private placement. The Old Notes were issued initially by Kindred Escrow Corp. II, a wholly owned subsidiary of Kindred (the Escrow Issuer), and the gross proceeds from the offering were deposited into escrow pending the completion of the Gentiva Merger. Upon the consummation of the Gentiva Merger, the Escrow Issuer was merged with and into Kindred, and as a result we assumed the Escrow Issuer s obligations under the Old Notes and the Old Notes were guaranteed on a senior unsecured basis by each of our domestic 100% owned restricted subsidiaries that guarantee the Credit Facilities (as defined below).

On November 11, 2014, we entered into an agreement to acquire Centerre Healthcare Corporation (Centerre), a national company dedicated to operating IRFs. On January 1, 2015, we completed the acquisition of Centerre (the Centerre Acquisition) for a purchase price of approximately $195 million in cash.

Corporate and Other Information

Our business is conducted through Kindred Healthcare, Inc., a Delaware corporation and the issuer of the New Notes offered hereby, and its consolidated subsidiaries. Our principal executive offices are located at 680 South Fourth Street, Louisville, Kentucky 40202 and our telephone number is (502) 596-7300. Our corporate website address is *www.kindredhealthcare.com*. We do not incorporate the information contained on, or accessible through, our corporate website into this prospectus, and you should not consider it part of this prospectus.

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Summary of the Exchange Offer

Background	On December 18, 2014, the Escrow Issuer issued $750 million aggregate principal amount of the Old 2020 Notes and $600 million aggregate principal amount of the Old 2023 Notes in an unregistered offering. In connection with that offering, the Escrow Issuer entered into registration rights agreements with respect to each series of the Old Notes on December 18, 2014 (the Registration Rights Agreements), in which it agreed, among other things, to complete this exchange offer. Concurrently with the Gentiva Merger on February 2, 2015, we assumed the obligations of the Escrow Issuer under the Old Notes and the related indentures. In connection with that assumption, we entered into joinder agreements to the Registration Rights Agreements.
	Under the terms of the exchange offer, you are entitled to exchange the Old Notes for the New Notes evidencing the same indebtedness and with substantially similar terms. You should read the discussion under the heading Description of the Notes for further information regarding the New Notes.
The Exchange Offer	We are offering to exchange, for each $1,000 aggregate principal amount of our Old Notes validly tendered and accepted, $1,000 aggregate principal amount of our New Notes in authorized denominations.
	We will not pay any accrued and unpaid interest on the Old Notes that we acquire in the exchange offer. Instead, interest on the New Notes will accrue (a) from the later of (i) the last interest payment date on which interest was paid on the Old Note surrendered in exchange for the New Note or (ii) if the Old Note is surrendered for exchange on a date in a period that includes the record date for an interest payment date to occur on or after the date of such exchange and as to which interest will be paid, the date of such interest payment date, or (b) if no interest has been paid, from and including December 18, 2014, the original issue date of the Old Notes.
	As of the date of this prospectus, $750 million aggregate principal amount of the Old 2020 Notes are outstanding and $600 million aggregate principal amount of the Old 2023 Notes are outstanding.
Denominations of New Notes	Tendering holders of the Old Notes must tender the Old Notes in minimum denominations of $2,000 and integral multiples of $1,000 in

	excess thereof. The New Notes will be issued in minimum denominations of $2,000 and integral multiples of $1,000 in excess thereof.
Expiration Date	The exchange offer will expire at 5:00 p.m., New York City time, on October 28, 2015, unless we extend or terminate the exchange offer, in which case the Expiration Date will mean the latest date and time to which we extend the exchange offer.

Settlement Date	The settlement date of the exchange offer will be as soon as practicable after the Expiration Date of the exchange offer.
Withdrawal of Tenders	Tenders of the Old Notes may be withdrawn at any time prior to the Expiration Date.
Conditions to the Exchange Offer	Our obligation to consummate the exchange offer is subject to certain customary conditions, which we may assert or waive. See Description of the Exchange Offer Conditions to the Exchange Offer.
Procedures for Tendering	To participate in the exchange offer, you must follow the automatic tender offer program (ATOP) procedures established by The Depository Trust Company (DTC) for tendering the Old Notes held in book-entry form. The ATOP procedures require that the exchange agent receive, prior to the Expiration Date of the exchange offer, a computer-generated message known as an agent s message that is transmitted through ATOP and that DTC confirm that: DTC has received instructions to exchange your Old Notes; and you agree to be bound by the terms of the letter of transmittal. For more details, please read Description of the Exchange Offer Terms of the Exchange Offer and Description of the Exchange Offer Procedures for Tendering. If you elect to have the Old Notes exchanged pursuant to this exchange offer, you must properly tender your Old Notes prior to the Expiration Date. All Old Notes validly tendered and not validly withdrawn will be accepted for exchange. The Old Notes may be exchanged only in minimum denominations of $2,000 and integral multiples of $1,000 in excess thereof.
Consequences of Failure to Exchange	If we complete the exchange offer and you do not participate in it, then: your Old Notes will continue to be subject to the existing restrictions upon their transfer; we will have no further obligation to provide for the registration under the Securities Act of those Old Notes except under certain limited circumstances; and

	the liquidity of the market for your Old Notes could be adversely affected.
Certain Income Tax Considerations	The exchange pursuant to the exchange offer will not be a taxable event for U.S. federal income tax purposes. See Certain U.S. Federal Income Tax Considerations in this prospectus.
Use of Proceeds	We will not receive any proceeds from the issuance of the New Notes in this exchange offer.

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Exchange Agent	Wells Fargo Bank, National Association is the exchange agent for the exchange offer.
Regulatory Approvals	Other than the federal securities laws, there are no federal or state regulatory requirements that we must comply with and there are no approvals that we must obtain in connection with the exchange offer.

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Summary of the New Notes

Issuer	Kindred Healthcare, Inc., a Delaware corporation.
Securities Offered	$750 million aggregate principal amount of 8.00% Senior Notes due 2020.
	$600 million aggregate principal amount of 8.75% Senior Notes due 2023.
Maturity Date	January 15, 2020 with respect to the New 2020 Notes.
	January 15, 2023 with respect to the New 2023 Notes.
Interest Rate	8.00% per annum in the case of the New 2020 Notes and 8.75% per annum in the case of the New 2023 Notes, payable semi-annually in arrears on January 15 and July 15 of each year, commencing on January 15, 2016. Interest on the New Notes will accrue (a) from the later of (i) the last interest payment date on which interest was paid on the Old Note surrendered in exchange for the New Note or (ii) if the Old Note is surrendered for exchange on a date in a period that includes the record date for an interest payment date to occur on or after the date of such exchange and as to which interest will be paid, the date of such interest payment date, or (b) if no interest has been paid, from and including December 18, 2014, the original issue date of the Old Notes.
Optional Redemption	The New 2023 Notes will be redeemable at our option, in whole or in part, at any time on or after January 15, 2018, at the redemption prices set forth in this prospectus, together with accrued and unpaid interest, if any, to the date of redemption.
	At any time prior to January 15, 2018, we may redeem up to 35% of the aggregate original principal amount of the New Notes with the proceeds of one or more equity offerings of our common shares at a redemption price of 108.000% for the New 2020 Notes and 108.750% for the New 2023 Notes, of the principal amount of such series of New Notes, together with accrued and unpaid interest, if any, to the date of redemption.

At any time for the New 2020 Notes and at any time prior to January 15, 2018 for the New 2023 Notes, we may also redeem some or all of the New Notes at a redemption price equal to 100% of the principal amount of the New Notes plus accrued and unpaid interest, if any, to the date of redemption, plus a make-whole premium.

See Description of the Notes Optional Redemption.

Change of Control, Asset Sales

The occurrence of certain changes of control will require us to offer to purchase from you all or a portion of your New Notes at a price equal to 101% of their principal amount, together with accrued and unpaid interest, if any, to the date of purchase. See Description of the Notes Repurchase at the Option of Holders Change of Control.

Certain asset dispositions may require us, under certain circumstances, to use the proceeds from those asset dispositions to make an offer to purchase the New Notes at 100% of their principal amount, together with accrued and unpaid interest, if any, to the date of purchase. See Description of the Notes Repurchase at the Option of Holders Sales of Assets and Subsidiary Stock.

Guarantees

The New Notes will be fully and unconditionally guaranteed on a senior unsecured basis by all of our domestic 100% owned restricted subsidiaries that guarantee the Term Loan Credit Agreement dated as of June 1, 2011, as amended and restated from time to time (the Term Loan Facility) and the ABL Credit Agreement dated as of June 1, 2011, as amended and restated from time to time (the ABL Facility and, together with the Term Loan Facility, the Credit Facilities). Certain non-100% owned restricted subsidiaries that guarantee the Credit Facilities will not guarantee the New Notes (together with the unrestricted subsidiaries, the non-guarantor subsidiaries). All future domestic 100% owned restricted subsidiaries that will guarantee our indebtedness under the Credit Facilities will also fully and unconditionally guarantee the New Notes. The guarantees will be released when the guarantees of our indebtedness under the Credit Facilities are released and in certain other circumstances as described in Description of the Notes Subsidiary Guarantees.

The guarantees will be unsecured senior indebtedness of our guarantors and will have the same ranking with respect to indebtedness of our guarantors as the New Notes will have with respect to our indebtedness.

Ranking

The New Notes will:

- be our general unsecured senior obligations;
- rank equally in right of payment with all of our existing and future senior debt;
- be effectively junior in right of payment to our secured debt, including the Credit Facilities, to the extent of the value of the assets securing such debt;

- be structurally subordinated to all of the existing and future liabilities (including trade payables) of each of our subsidiaries that do not guarantee the New Notes; and

- be senior in right of payment to all of our existing and future subordinated debt.

As of June 30, 2015, (1) the New Notes and related guarantees ranked effectively junior to approximately $1.37 billion of senior secured

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indebtedness consisting solely of borrowings under the Credit Facilities, (2) we had additional borrowing capacity under the ABL Facility of approximately $523 million (subject to a borrowing base and after giving effect to approximately $63 million of letters of credit outstanding on June 30, 2015) and (3) the New Notes ranked effectively junior to approximately $8 million of secured indebtedness of our non-guarantor subsidiaries, consisting of bank notes and capital leases.

Form and Denomination

The New Notes will be issued in fully-registered form. The New Notes will be represented by one or more global notes, deposited with the Trustee (as defined below) as custodian for DTC, and registered in the name of Cede & Co., DTC s nominee. Beneficial interests in the global notes will be shown on, and any transfers will be effective only through, records maintained by DTC and its participants.

The New Notes will be issued in minimum denominations of $2,000 and integral multiples of $1,000 in excess thereof.

Certain Covenants

The indentures governing the New Notes contain certain covenants that, among other things, limit our and our restricted subsidiaries ability to:

- incur, assume or guarantee additional indebtedness;
- issue redeemable stock and preferred stock;
- pay dividends, make distributions or redeem or repurchase capital stock;
- prepay, redeem or repurchase debt that is junior in right of payment to the notes;
- make loans and investments;
- grant or incur liens;
- restrict dividends, loans or asset transfers from our subsidiaries;

- sell or otherwise dispose of assets, including capital stock of subsidiaries;
- enter into transactions with affiliates; and
- consolidate or merge with or into, or sell substantially all of our assets to, another person.

These covenants will be subject to a number of important exceptions and qualifications. For more details, see Description of the Notes.

If the New Notes are rated investment grade at any time by both Standard & Poor s Ratings Group, Inc. (S&P) and Moody s Investors Service, Inc. (Moody s), certain of these covenants will be suspended, and the holders of the New Notes will lose the protection of these covenants.

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Absence of Public Market for the New Notes

The New Notes are a new issue of securities and there is currently no established trading market for the New Notes. We do not intend to apply for a listing of the New Notes on any securities exchange or an automated dealer quotation system. Accordingly, there can be no assurance as to the development or liquidity of any market for the New Notes. The initial purchasers of the Old Notes have advised us that they currently intend to make a market in the notes. However, they are not obligated to do so, and any market making with respect to the notes may be discontinued without notice.

Governing Law

The New Notes are governed by, and construed in accordance with, the internal laws of the State of New York.

Book-Entry Depository

The Depository Trust Company.

Trustee

Wells Fargo Bank, National Association (the Trustee).

Risk Factors

In evaluating an investment in the New Notes, prospective investors should carefully consider, along with the other information included in this prospectus, the specific factors set forth under the heading Risk Factors in this prospectus and otherwise incorporated by reference herein.

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RATIO OF EARNINGS TO FIXED CHARGES

Our ratio of earnings to fixed charges for the six months ended June 30, 2015 and each of the five years in the period ended December 31, 2014 is set forth below. You should read this table in conjunction with the consolidated financial statements and notes incorporated by reference in this prospectus. For the purpose of computing these ratios, earnings consists of consolidated pretax income from continuing operations before adjustment for noncontrolling interests in consolidated subsidiaries and income or loss from equity investees, plus fixed charges, distributed income of equity investees and amortization of capitalized interest, less interest capitalized; fixed charges consists of interest expense from continuing and discontinued operations, amortized debt discounts and fees, interest capitalized related to indebtedness and an estimated interest component of rental expense.

	(dollars in thousands) Years ended December 31,					Six months ended
	2010	**2011**	**2012**	**2013**	**2014**	**June 30, 2015**
Ratio of Earnings to Fixed Charges(1)	1.18x				1.02x	

(1) For the years ended December 31, 2011, 2012 and 2013, there was a deficiency of earnings to cover fixed charges of $84,743, $17,995 and $50,955, respectively. For the six months ended June 30, 2015, there was a deficiency of earnings to cover fixed charges of $102,684.

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RISK FACTORS

Investing in the New Notes involves risk. In addition to the other information included or incorporated by reference in this prospectus, including the matters addressed under Cautionary Statement Regarding Forward-Looking Statements, you should carefully consider the risks and uncertainties described below, as well as the risks discussed in our public filings with the SEC (including under the heading Risk Factors in the Kindred 2014 10-K), before deciding to participate in the exchange offer and to invest in the New Notes. The risks and uncertainties described below and incorporated by reference into this prospectus are not the only ones related to our business, the exchange offer or the New Notes. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also materially and adversely affect our business operations, results of operations, financial condition, liquidity or prospects. The trading price of the New Notes could decline due to the materialization of any of these risks, and you may lose all or part of your original investment in the New Notes.

Risk Factors Relating to Our Indebtedness and the New Notes

Our indebtedness could adversely affect our cash flow and prevent us from fulfilling our obligations, including the New Notes.

We have a substantial amount of indebtedness. As of June 30, 2015, we had total indebtedness of approximately $3.25 billion in addition to the availability of approximately $523 million under the ABL Facility (subject to a borrowing base and after giving effect to approximately $63 million of letters of credit outstanding on June 30, 2015). The Gentiva Merger and the Centerre Acquisition significantly increased our aggregate indebtedness. As of June 30, 2015, we had:

- $1.37 billion of senior secured indebtedness under the Credit Facilities, which included approximately $185 million related to the ABL Facility;

- $500 million of senior unsecured indebtedness under our 6.375% Senior Notes due 2022 (the 6.375% Notes);

- $750 million of senior unsecured indebtedness under the Old 2020 Notes;

- $600 million of senior unsecured indebtedness under the Old 2023 Notes;

- $29 million of Mandatory Redeemable Preferred Stock, Series A, originally issued as part of the 7.50% Tangible Equity Units;

- approximately $523 million available for borrowing under the ABL Facility (subject to a borrowing base and after giving effect to approximately $63 million of letters of credit outstanding on June 30, 2015) which, if borrowed, would be senior secured indebtedness; and subject to our compliance with certain covenants and other conditions, we have the option to incur certain additional secured indebtedness and/or additional unsecured indebtedness, which would rank *pari passu* with the New Notes.

Our substantial amount of indebtedness could have important consequences for you. For example it could:

make it more difficult for us to satisfy our obligations with respect to our indebtedness, including with respect to the New Notes;

increase our vulnerability to general adverse economic and industry conditions;

expose us to fluctuations in the interest rate environment because the interest rates under the Credit Facilities are variable;

require us to dedicate a substantial portion of our cash flow from operations to make payments on our indebtedness, thereby reducing the availability of our cash flow to fund working capital, capital expenditures, acquisitions, dividends and other general corporate purposes;

limit our ability to borrow additional funds for working capital, capital expenditures, acquisitions and other general corporate purposes;

limit our flexibility in planning for, or reacting to, changes in our business and the industry in which we operate, which may place us at a competitive disadvantage compared to our competitors that have less debt; and

restrict us from pursuing business opportunities.

Our indebtedness may restrict our current and future operations, which could adversely affect our ability to respond to changes in our business and manage our operations.

The terms of the Credit Facilities, the indenture governing the 6.375% Notes and the indentures governing the New Notes include a number of restrictive covenants that impose significant operating and financial restrictions on us and our restricted subsidiaries, including restrictions on our and our restricted subsidiaries ability to, among other things:

incur additional indebtedness;

create liens;

consolidate or merge;

sell assets, including capital stock of our subsidiaries;

engage in transactions with our affiliates;

pay dividends on our capital stock or redeem, repurchase or retire our capital stock or indebtedness; and

make investments, loans, advances and acquisitions.

The terms of the Credit Facilities also include certain additional restrictive covenants that impose significant operating and financial restrictions on us and our restricted subsidiaries, including restrictions on our and our restricted subsidiaries ability to, among other things:

engage in business other than relating to owning, operating or managing healthcare facilities;

enter into sale and lease-back transactions;

- modify certain agreements;

- make or incur capital expenditures; and

- hold cash and temporary cash investments outside of collateral accounts.

In addition, the Credit Facilities require us to comply with financial covenants, including a maximum leverage ratio and a minimum fixed charge coverage ratio.

Our ability to comply with these agreements may be affected by events beyond our control, including prevailing economic, financial and industry conditions. These covenants could have an adverse effect on our business by limiting our ability to take advantage of financing, merger and acquisition or other opportunities. The breach of any of these covenants or restrictions could result in a default under the Credit Facilities, the indenture governing the 6.375% Notes and the indentures governing the New Notes.

We, including our subsidiaries, have the ability to incur substantially more indebtedness, including senior secured indebtedness, which could further increase the risks associated with our leverage.

Subject to the restrictions in the Credit Facilities, the indenture governing the 6.375% Notes and the indentures governing the New Notes, we, including our subsidiaries, have the ability to incur significant additional indebtedness. See Our indebtedness could adversely affect our cash flow and prevent us from fulfilling our obligations, including the New Notes. Although the terms of the Credit Facilities, the indenture governing the 6.375% Notes and the indentures governing the New Notes include restrictions on the incurrence of additional indebtedness, these restrictions are subject to a number of important exceptions, and indebtedness incurred in compliance with these restrictions could be substantial. If we incur significant additional indebtedness, the related risks that we face could increase.

Our failure to comply with the agreements relating to our outstanding indebtedness, including as a result of events beyond our control, could result in an event of default that could materially and adversely affect our business, financial condition, results of operations and liquidity.

If there were an event of default under any of the agreements relating to our outstanding indebtedness, including the Credit Facilities, the indenture governing the 6.375% Notes and the indentures governing the New Notes, we may not be able to incur additional indebtedness under the Credit Facilities and the holders of the defaulted debt could cause all amounts outstanding with respect to that debt to be due and payable immediately. We cannot assure you that our assets or cash flow would be sufficient to fully repay borrowings under our outstanding debt instruments if accelerated upon an event of default, which could have a material adverse effect on our ability to continue to operate as a going concern. Further, if we are unable to repay, refinance or restructure our secured debt, the holders of such debt could proceed against the collateral securing that indebtedness. In addition, any event of default or declaration of acceleration under one debt instrument also could result in an event of default under one or more of our other debt instruments or under the master lease agreements (Master Lease Agreements) with Ventas, Inc. (Ventas). Moreover, counterparties to some of our contracts material to our business may have the right to amend or terminate those contracts if we have an event of default or a declaration of acceleration under certain of our indebtedness, which could adversely affect our business, financial condition, results of operations and liquidity.

We may not be able to generate sufficient cash to pay rents related to our leased properties and service all of our indebtedness and may be forced to take other actions to satisfy our obligations under our indebtedness, which may not be successful.

A substantial portion of our cash flows from operations is dedicated to the payment of rents related to our leased properties, as well as principal and interest obligations on our outstanding indebtedness. Our ability to generate cash depends on many factors beyond our control, and any failure to meet our debt service obligations could harm our business, financial condition and results of operations. Our ability to make payments on and to refinance our indebtedness and to fund working capital needs and planned capital expenditures will depend on our ability to generate cash in the future. This, to a certain extent, is subject to general economic, financial, competitive, business, legislative, regulatory and other factors that are beyond our control.

If our business does not generate sufficient cash flow from operations or if future borrowings are not available to us in an amount sufficient to enable us to pay our indebtedness or to fund our other liquidity needs, we may need to refinance all or a portion of our indebtedness on or before the maturity thereof, sell assets, reduce or delay capital investments or seek to raise additional capital, any of which could have a material adverse effect on our operations. In addition, we may not be able to effect any of these actions, if necessary, on commercially reasonable terms or at all. The terms of existing or future debt instruments may limit or prevent us from taking any of these actions. Our ability to restructure or refinance our indebtedness will depend on the condition of the capital markets and our financial condition at such time. Any refinancing of our debt could be at higher interest rates and may require us to comply with more onerous covenants, which could further restrict our business operations. In addition, any failure to make scheduled payments of interest and principal on our outstanding indebtedness would likely result in a reduction of our credit rating, which could harm our ability to incur additional indebtedness on commercially reasonable terms or at all.

Our inability to generate sufficient cash flow to satisfy our debt service obligations, or to refinance or restructure our obligations on commercially reasonable terms or at all, would have an adverse effect, which could be material, on our business, financial condition, results of operations and liquidity.

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In addition, our Master Lease Agreements and/or our outstanding indebtedness:

- require us to dedicate a substantial portion of our cash flow to payments on our rent and interest obligations, thereby reducing the availability of cash flow to fund working capital, capital expenditures and other general corporate activities, including cash dividends;
- require us to pledge as collateral substantially all of our assets;
- require us to maintain a certain defined fixed coverage ratio above a specified level and a certain defined total indebtedness ratio below a specified level, thereby reducing our financial flexibility;
- require us to limit the amount of capital expenditures we can incur in any fiscal year; and
- restrict our ability to discontinue the operation of any leased property despite its level of profitability and otherwise restrict our operational flexibility.

These provisions:

- could have a material adverse effect on our ability to withstand competitive pressures or adverse economic conditions (including adverse regulatory changes);
- could adversely affect our ability to make material acquisitions, obtain future financing or take advantage of business opportunities that may arise;
- could increase our vulnerability to a downturn in general economic conditions or in our business; and
- could adversely affect our ability to continue to make cash dividends.

An increase in interest rates would increase the cost of servicing our debt and could reduce our profitability.

Borrowings under the Credit Facilities bear interest at variable rates. Interest rate changes could affect the amount of our interest payments, and accordingly, our future earnings and cash flows, assuming other factors are held constant. Pursuant to the terms of the Credit Facilities, we have entered into interest rate swaps that fix a portion of our interest rate interest payments in order to reduce interest rate volatility; however, any interest rate swaps we enter into do not fully mitigate our interest rate risk. As a result, an increase in interest rates, whether because of an increase in market interest rates or an increase in our own cost of borrowing, would increase the cost of servicing our debt and could materially reduce our profitability. For example, a change of one-eighth percent in the interest rates for the Credit Facilities would increase or decrease annual interest expense by approximately $2 million.

Our failure to pay rent or otherwise comply with the provisions of any of our Master Lease Agreements could materially adversely affect our business, financial position, results of operations and liquidity.

As of June 30, 2015, we lease 38 of our TC hospitals and 43 of our nursing centers from Ventas under our Master Lease Agreements. Our failure to pay the rent or otherwise comply with the provisions of any of our Master Lease Agreements would result in an Event of Default under such Master Lease Agreement and also could result in a default under the Credit Facilities and, if repayment of the borrowings under the Credit Facilities were accelerated, also under the indentures governing the New Notes and the indentures governing the 6.375% Notes. Upon an Event of Default, remedies available to Ventas include, without limitation, terminating such Master Lease Agreement, repossessing and reletting the leased properties and requiring us to remain liable for all obligations under such Master Lease Agreement, including the difference between the rent under such Master Lease Agreement and the rent payable as a result of reletting the leased properties, or requiring us to pay the net present value of the rent due for the balance of the term of such Master Lease Agreement. The exercise of such remedies would have a material adverse effect on our business, financial position, results of operations and liquidity.

For additional information on the Master Lease Agreements, see Item 1 Business Master Lease Agreements in Exhibit 99.1 to the Recast 8-K.

The New Notes will not be secured by any of our assets and therefore will be effectively junior to any secured indebtedness we may incur to the extent of the value of the collateral securing such indebtedness.

The New Notes will be general unsecured obligations ranking effectively junior in right of payment to all existing and future secured indebtedness to the extent of the collateral securing such indebtedness. Our obligations under the New Notes and our guarantors obligations under their guarantees of the New Notes are unsecured, but our obligations under the Credit Facilities are secured by a security interest in substantially all of the assets of the Company and subsidiary guarantors. As of June 30, 2015, we had (1) $750 million of senior unsecured indebtedness under the Old 2020 Notes (2) $600 million of senior unsecured indebtedness under the Old 2023 Notes, (3) $500 million of senior unsecured indebtedness under the 6.375% Notes, (4) $1.37 billion of senior secured indebtedness consisting solely of borrowings under the Credit Facilities and (5) additional borrowing capacity under the ABL Facility of approximately $523 million (subject to a borrowing base and after giving effect to approximately $63 million of letters of credit outstanding on June 30, 2015), which, if borrowed, would be senior secured indebtedness, and the option (subject to certain conditions) to incur additional incremental term loans under the Term Loan Facility or increase the asset-based revolving credit facility commitments under the ABL Facility by an aggregate amount not to exceed (x) $100 million, plus (y) an amount such that the senior secured leverage ratio (as defined in the Credit Facilities) is equal to or less than 3.50:1.00.

In the event that we are declared bankrupt, become insolvent or are liquidated or reorganized or if we default under the Credit Facilities, the lenders could foreclose on the pledged assets to the exclusion of holders of the New Notes, even if an event of default exists under the indentures governing the New Notes at such time. Furthermore, if the lenders foreclose upon and sell the pledged equity interests in any subsidiary guarantor of the New Notes, then that subsidiary guarantor will be released from its guarantee of the New Notes automatically and immediately upon such sale. In any such event, because the New Notes will not be secured by any of our assets or the equity interests in the subsidiary guarantors, it is possible that there would be no assets remaining from which your claims could be satisfied or, if any assets remained, they might be insufficient to satisfy your claims in full.

The New Notes will be structurally subordinated to all indebtedness of our existing subsidiaries that are not guarantors of the New Notes and our future subsidiaries that do not become guarantors of the New Notes.

The New Notes will not be guaranteed by any of our existing or future non-U.S. subsidiaries or any of our less than 100% owned U.S. subsidiaries. Certain of these non-guarantor subsidiaries guarantee our obligations under the Credit Facilities. As of June 30, 2015, the New Notes were structurally subordinated to the Credit Facilities with respect to our non-guarantor subsidiaries that guarantee our obligations under the Credit Facilities but not the New Notes and approximately $8 million of secured indebtedness of our non-guarantor subsidiaries, consisting of bank notes and capital leases. Accordingly, claims of holders of the New Notes will be structurally subordinated to the claims of creditors of these non-guarantor subsidiaries, including trade creditors. All obligations of our non-guarantor subsidiaries will have to be satisfied before any of the assets of such subsidiaries would be available for distribution, upon a liquidation or otherwise, to us or a guarantor of the New Notes.

In addition, the indentures governing the New Notes permit, subject to some limitations, these non-guarantor subsidiaries to incur additional indebtedness and does not include any limitation on the amount of other liabilities, such as trade payables, that may be incurred by these subsidiaries.

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There are many other companies that produce products in the markets in which we compete.

Our competitive position depends on our ability to maintain a competitive advantage on the basis of product quality, know-how, proprietary data, market knowledge, service capability, technological innovation, business reputation, and price competitiveness. Our sales and marketing programs aim to compete by offering our customers a broad range of world-class technologies and products, superior global sales and distribution support, and a secure and multi-location source of product supply.

Recently there has been a considerable amount of consolidation activity in the electronic component industry, some of which involved our primary competitors. We view the industry consolidation as an opportunity for us to gain business as an independent second-source supplier.

Patents and Licenses

We have made a significant investment in securing intellectual property protection for our technology and products. We seek to protect our technology by, among other things, filing patent applications for technology considered important to the development of our business. We also rely upon trade secrets, unpatented know-how, continuing technological innovation, and the aggressive pursuit of licensing opportunities to help develop and maintain our competitive position.

Our ability to compete effectively with other companies depends, in part, on our ability to maintain the proprietary nature of our technology. Although we have been awarded, have filed applications for, or have been licensed under, numerous patents in the United States and other countries, there can be no assurance concerning the degree of protection afforded by these patents or the likelihood that pending patents will be issued.

We require all of our technical, research and development, sales and marketing, and management employees and most consultants and other advisors to execute confidentiality agreements upon the commencement of employment or consulting relationships with us. These agreements provide that all confidential information developed or made known to the entity or individual during the course of the entity's or individual's relationship with us is to be kept confidential and not disclosed to third parties except in specific circumstances. Substantially all of our technical, research and development, sales and marketing, and management employees have entered into agreements providing for the assignment to us of rights to inventions made by them while employed by us.

When we believe other companies are misappropriating our intellectual property rights, we vigorously enforce those rights through legal action, and we intend to continue to do so. See Item 3, "Legal Proceedings."

Although we have numerous United States and foreign patents covering certain of our products and manufacturing processes, no particular patent is considered individually material to our business.

Employees

As of December 31, 2018, we employed approximately 24,100 full time employees, of whom approximately 91% were located outside the United States. Our future success is substantially dependent on our ability to attract and retain highly qualified technical and administrative personnel. Some of our employees outside the United States are members of trade unions, and employees at one U.S. facility are represented by a trade union. Our relationship with our employees is generally good. However, no assurance can be given that, if we continue to restructure our operations and/or reduce employee hours in response to changing economic conditions, labor unrest or strikes will not occur.

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Environment, Health and Safety

We have adopted an Environmental Health and Safety Corporate Policy that commits us to achieve and maintain compliance with applicable environmental laws, to promote proper management of hazardous materials for the safety of our employees and the protection of the environment, and to minimize the hazardous materials generated in the course of our operations. This policy is implemented with accountability directly to the Board of Directors. In addition, our manufacturing operations are subject to various federal, state, and local laws restricting discharge of materials into the environment.

We are involved in environmental remediation programs at various sites currently or formerly owned by us and our subsidiaries both within and outside of the U.S., in addition to involvement as a potentially responsible party ("PRP") at Superfund sites. Certain obligations as a PRP have arisen in connection with business acquisitions. The remediation programs are on-going and the ultimate cost of site cleanup is difficult to predict given the uncertainties regarding the extent of the required cleanup, the interpretation of applicable laws and regulations and alternative cleanup methods. See Item 3, "Legal Proceedings."

We are not involved in any pending or threatened proceedings that would require curtailment of our operations. We continually expend funds to ensure that our facilities comply with applicable environmental regulations. While we believe that we are in material compliance with applicable environmental laws, we cannot accurately predict future developments and do not necessarily have knowledge of all past occurrences on sites that we currently occupy. More stringent environmental regulations may be enacted in the future, and we cannot determine the modifications, if any, in our operations that any such future regulations might require, or the cost of compliance with such regulations. Moreover, the risk of environmental liability and remediation costs is inherent in the nature of our business and, therefore, there can be no assurance that material environmental costs, including remediation costs, will not arise in the future.

With each acquisition, we attempt to identify potential environmental concerns and to minimize, or obtain indemnification for, the environmental matters we may be required to address. In addition, we establish reserves for specifically identified potential environmental liabilities. We believe that the reserves we have established are adequate. Nevertheless, we have in the past and may in the future inherit certain pre-existing environmental liabilities, generally based on successor liability doctrines. Although we have never been involved in any environmental matter that has had a material adverse impact on our overall operations, there can be no assurance that in connection with any past or future acquisition we will not be obligated to address environmental matters that could have a material adverse impact on our operations.

Company Information and Website

We file annual, quarterly, and current reports, proxy statements, and other documents with the Securities and Exchange Commission ("SEC") under the Securities Exchange Act of 1934. The SEC maintains an Internet website that contains reports, proxy and information statements, and other information regarding issuers, including us, that file electronically with the SEC. The public can obtain any documents that we file with the SEC at http://www.sec.gov.

In addition, our company website can be found on the Internet at www.vishay.com. The website contains information about us and our operations. Copies of each of our filings with the SEC on Form 10-K, Form 10-Q, and Form 8-K, and all amendments to those reports, can be viewed and downloaded free of charge as soon as reasonably practicable after the reports and amendments are electronically filed with or furnished to the SEC. To view the reports, access ir.vishay.com and click on "SEC Filings."

The following corporate governance related documents are also available on our website:

- Corporate Governance Principles
- Code of Business Conduct and Ethics
- Code of Ethics Applicable to the Company's Chief Executive Officer, Chief Financial Officer, Principal Accounting Officer or Controller and Financial Managers
- Audit Committee Charter
- Nominating and Corporate Governance Committee Charter
- Compensation Committee Charter
- Policy on Director Attendance at Annual Meetings
- Nominating and Corporate Governance Committee Policy Regarding Qualification of Directors
- Procedures for Securityholders' Submissions of Nominating Recommendations
- Securityholder Communications with Directors and Interested Party Communication with Non-Management Directors
- Whistleblower and Ethics Hotline Procedures
- Related Party Transactions Policy

To view these documents, access ir.vishay.com and click on "Corporate Governance."

Any of the above documents can also be obtained in print by any stockholder upon request to our Investor Relations Department at the following address:

Corporate Investor Relations
Vishay Intertechnology, Inc.
63 Lancaster Avenue
Malvern, PA 19355-2143
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Item 1A. RISK FACTORS

From time to time, information provided by us, including but not limited to statements in this report, or other statements made by or on our behalf, may contain "forward-looking" information within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements involve a number of risks, uncertainties, and contingencies, many of which are beyond our control, which may cause actual results, performance, or achievements to differ materially from those anticipated. Set forth below are important factors that could cause our results, performance, or achievements to differ materially from those in any forward-looking statements made by us or on our behalf. You should understand that it is not possible to predict or identify all such factors. Consequently, you should not consider the following to be a complete discussion of all potential risks or uncertainties.

Risks relating to our business generally

Our business is cyclical and future periods of decline and recovery are not predictable.

The electronic component industry is highly cyclical and experiences periods of decline from time to time. We and others in the electronic component industry have experienced these conditions in the recent past and cannot predict when we may experience such downturns in the future. Market conditions, such as a decline in product demand on a global basis, could result in order cancellations and deferrals, lower average selling prices, and a material and adverse impact on our results of operations. These declines in demand are driven by market conditions in the end markets for our products. Changes in the demand mix, needed technologies, and these end markets may adversely affect our ability to match our products, inventory, and capacity to meet customer demand and could adversely affect our operating results and financial condition. A slowdown in demand or recessionary trends in the global economy makes it more difficult for us to predict our future sales and manage our operations, and could adversely impact our results of operations.

We may not have adequate manufacturing capacity to satisfy future increases in demand for our products.

Our business is cyclical and in periods of a rising economy, we may experience intense demand for our products. During such periods, we may have difficulty expanding our manufacturing capacity to satisfy demand. Factors which could limit such expansion include delays in procurement of manufacturing equipment, shortages of skilled personnel, and physical constraints on expansion of our facilities. If we are unable to meet our customers' requirements and our competitors sufficiently expand production, we could lose customers and/or market share. These losses could have an adverse effect on our financial condition and results of operations. Also, capacity that we add during upturns in the business cycle may result in excess capacity during periods when demand for our products recede, resulting in inefficient use of capital which could also adversely affect us.

We have incurred, and may in the future incur, restructuring costs and associated asset write-downs.

To remain competitive, particularly when business conditions are difficult, we sometimes attempt to reduce our cost structure by restructuring our existing businesses, where we seek to achieve synergies, eliminate redundant facilities and staff positions, and move operations, where possible, to jurisdictions with lower labor costs. We incurred significant restructuring expenses from 2014 to 2017, including accelerated depreciation expenses related to assets that were no longer used after the implementation of the associated restructuring programs. The programs were substantially implemented as of December 31, 2017.

Additionally, our long-term strategy includes growing through the integration of acquired businesses, and GAAP requires plant closure and employee termination costs that we incur in connection with our acquisition activities to be recorded as expenses in our consolidated statement of operations, as such expenses are incurred. For this reason, we expect to have some level of future restructuring expenses due to acquisitions.

Our business is cyclical, and in periods of a rising economy we may experience intense demand for our products. If our restructuring activities result in us not being able to satisfy the intense demand from our customers during a rising economy and our competitors sufficiently expand production, we could lose customers and/or market share. These losses could have an adverse effect on our operations, financial condition, and results of operations.

In the past we have grown through successful integration of acquired businesses, but this may not continue.

Our long-term historical growth in revenues and net earnings has resulted in large part from our strategy of expansion through acquisitions. Despite our plan to continue to grow, in part, through targeted acquisitions, we may be unable to continue to identify, have the financial capabilities to acquire, or successfully complete transactions with suitable acquisition candidates. We are subject to various U.S. and foreign competition laws and regulations that may affect our ability to complete certain acquisitions. Also, if an acquired business fails to operate as anticipated, cannot be successfully integrated with our other businesses, or we cannot effectively mitigate the assumed, contingent, and unknown liabilities acquired, our results of operations, financial condition, enterprise value, market value, and prospects could all be materially adversely affected.

To remain successful, we must continue to innovate, and our investments in new technologies may not prove successful.

Our future operating results are dependent on our ability to continually develop, introduce, and market new and innovative products, to modify existing products, to respond to technological change, and to customize certain products to meet customer requirements. There are numerous risks inherent in this process, including the risks that we will be unable to anticipate the direction of technological change or that we will be unable to develop and market new products and applications in a timely fashion to satisfy customer demands. If this occurs, we could lose customers and experience adverse effects on our financial condition and results of operations.

In addition to our own research and development initiatives, we periodically invest in technology start-up enterprises, in which we may acquire a controlling or noncontrolling interest but whose technology would be available to be commercialized by us. There are numerous risks in investments of this nature including the limited operating history of such start-up entities, their need for capital, and their limited or absence of production experience, as well as the risk that their technologies may prove ineffective or fail to gain acceptance in the marketplace. Certain of our historical investments in start-up companies have not succeeded, and there can be no assurance that our current and future investments in start-up enterprises will prove successful.

Our results are sensitive to raw material availability, quality, and cost.

Many of our products require the use of raw materials that are produced in only a limited number of regions around the world or are available from only a limited number of suppliers. Our results of operations may be materially adversely affected if we have difficulty obtaining these raw materials, the quality of available raw materials deteriorates, or there are significant price increases for these raw materials. The determination that any of the raw materials used in our products are conflict minerals originating from the Democratic Republic of the Congo or adjoining countries could increase the probability that we will encounter the challenges noted above, incur additional expenses to comply with government regulations, and face public scrutiny. For periods in which the prices of these raw materials are rising, we may be unable to pass on the increased cost to our customers, which would result in decreased margins for the products in which they are used. For periods in which the prices are declining, we may be required to write down our inventory carrying cost of these raw materials, because we record our inventory at the lower of cost or market. Depending on the extent of the difference between market price and our carrying cost, this write-down could have a material adverse effect on our results of operations.

From time to time there have been short-term market shortages of certain raw materials used in our products. While these shortages have not historically adversely affected our ability to increase production of products containing these materials, they have historically resulted in higher raw material costs for us. We cannot make any assurances that any of these market shortages in the future would not adversely affect our ability to increase production, particularly during periods of growing demand for our products. To assure availability of raw materials in times of shortage, we may enter into long-term supply contracts for these materials, which may prove costly, unnecessary, and burdensome when the shortage abates.

Our ability to compete effectively with other companies depends, in part, on our ability to maintain the proprietary nature of our technology and to operate our business without infringing or violating the intellectual property rights of others.

Protection of intellectual property often involves complex legal and factual issues. We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our proprietary technologies are covered by valid and enforceable patents or are effectively maintained as trade secrets. We have applied, and will continue to apply, for patents covering our technologies and products, as we deem appropriate. However, our applications may not result in issued patents. Also, our existing patents and any future patents may not be sufficiently broad to prevent others from practicing our technologies or from developing competing products. Others may independently develop similar or alternative technologies, design around our patented technologies, or may challenge or seek to invalidate our patents. Also, the legal system in certain countries in which we operate may not provide or may not continue to provide sufficient, intellectual property legal protections and remedies.

Litigation regarding patent and other intellectual property rights is prevalent in the electronic components industry, particularly the discrete semiconductor sector. We have on occasion been notified that we may be infringing on patent and other intellectual property rights of others. In addition, customers purchasing components from us have rights to indemnification under certain circumstances if such components violate the intellectual property rights of others. Further, we have observed that in the current business environment, electronic component and semiconductor companies have become more aggressive in asserting and defending patent claims against competitors. We will continue to vigorously defend our intellectual property rights, and may become party to disputes regarding patent licensing and cross patent licensing. Although licenses are generally offered in such situations and we have successfully resolved these situations in the past, there can be no assurance that we will not be subject to future litigation alleging intellectual property rights infringement, or that we will be able to obtain licenses on acceptable terms. An unfavorable outcome regarding one of these matters could have a material adverse effect on our business and results of operations.

We face intense competition in our business, and we market our products to an increasingly concentrated group of customers.

Our business is highly competitive worldwide, with low transportation costs and few import barriers. We compete principally on the bases of product quality and reliability, availability, customer service, technological innovation, timely delivery, and price. The electronic component industry has become increasingly concentrated and globalized in recent years and our major competitors, some of which are larger than us, have significant financial resources and technological capabilities.

Our customers have become increasingly concentrated in recent years, and as a result, their buying power has increased and they have had greater ability to negotiate favorable pricing and terms. This trend has adversely affected our average selling prices, particularly for commodity components.

Our backlog is subject to customer cancellation.

Many of the orders that comprise our backlog may be canceled by our customers without penalty. Our customers may on occasion double and triple order components from multiple sources to ensure timely delivery when demand exceeds global supply. They often cancel orders when business is weak and inventories are excessive. Therefore, we cannot be certain that the amount of our backlog accurately reflects the level of orders that we will ultimately deliver. Our results of operations could be adversely impacted if customers cancel a material portion of orders in our backlog.

Future changes in our environmental liability and compliance obligations may harm our ability to operate or increase our costs.

Our operations, products and/or product packaging are subject to, among other matters, environmental laws and regulations governing, among other matters, air emissions, wastewater discharges, the handling, disposal and remediation of hazardous substances, wastes and certain chemicals used or generated in our manufacturing processes, employee health and safety labeling or other notifications with respect to the content or other aspects of our processes, products or packaging, restrictions on the use of certain materials in or on design aspects of our products or product packaging, and responsibility for disposal of products or product packaging. We establish reserves for specifically identified potential environmental liabilities. Nevertheless, we have in the past and may in the future inherit certain pre-existing environmental liabilities, generally based on successor liability doctrines, or otherwise incur environmental liabilities. We are involved in remediation programs and related litigation at various current and former properties and at third-party disposal sites both within and outside of the U.S., including involvement as a potentially responsible party at Superfund sites. Although we have never been involved in any environmental matter that has had a material adverse impact on our overall operations, there can be no assurance that in connection with any past or future acquisition, future developments, including related to our remediation programs, or otherwise, we will not be obligated to address environmental matters that could have a material adverse impact on our results of operations. In addition, more stringent environmental laws and regulations may be enacted in the future, and we cannot presently determine the modifications, if any, in our operations that any such future regulations might require, or the cost of compliance with current and future laws and regulations. In order to resolve liabilities at various sites, we have entered into various administrative orders and consent decrees, some of which may be, under certain conditions, reopened or subject to renegotiation.

Our products are sold to or used in goods sold to the U.S. government and other governments. By virtue of such sales, we are subject to various regulatory requirements and risks in the event of non-compliance.

We sell products under prime and subprime contracts with the U.S. government and other governments. Many of these products are used in military applications. Government contractors must comply with specific procurement regulations and other requirements. These requirements, although customary in government contracts, impact our performance and compliance costs. Failure to comply with these regulations and requirements could result in contract modifications or termination, and the assessment of penalties and fines, which could negatively impact our results of operations and financial condition. Our failure to comply with these regulations and requirements could also lead to suspension or debarment, for cause, from government contracting or subcontracting for a period of time. Among the causes for debarment are violations of various statutes, including those related to procurement integrity, export control, government security regulations, employment practices, protection of the environment, accuracy of records and the recording of costs, and foreign corruption. The termination of a government contract as a result of any of these acts could have a negative impact on our results of operations and financial condition and could have a negative impact on our reputation and ability to procure other government contracts in the future.

We have qualified certain of our products under various military specifications approved and monitored by the United States Defense Electronic Supply Center and under certain European military specifications. These products are assigned certain classification levels. In order to maintain the classification level of a product, we must continuously perform tests on the products and the results of these tests must be reported to governmental agencies. If a product fails to meet the requirements of the applicable classification level, its classification may be reduced to a lower level. A decrease in the classification level for a product with a military application could have an adverse impact on the net revenues and earnings attributable to that product.

Our future success is substantially dependent on our ability to attract and retain highly qualified technical, managerial, marketing, finance, and administrative personnel.

Rapid changes in technologies, frequent new product introductions, and declining average selling prices over product life cycles require us to attract and retain highly qualified personnel to develop and manufacture products that feature technological innovations and bring them to market on a timely basis. Our complex operations also require us to attract and retain highly qualified administrative personnel in functions such as legal, tax, accounting, financial reporting, auditing, and treasury. The market for personnel with such qualifications is highly competitive. While we have employment agreements with certain of our executives, we have not entered into employment agreements with all of our key personnel.

The loss of the services of or the failure to effectively recruit qualified personnel could have a material adverse effect on our business.

Interruptions in our information technology systems could adversely affect our business.

We rely on the efficient and uninterrupted operation of complex information technology systems and networks to operate our business. Any significant system or network disruption, including, but not limited to, new system implementations, computer viruses, security breaches, facility issues or energy blackouts could have a material adverse impact on our operations and results of operations. Such network disruption could result in a loss of the confidentiality of our intellectual property or the release of sensitive competitive information or customer or employee personal data. Any loss of such information could harm our competitive position, result in a loss of customer confidence, and cause us to incur significant costs to remedy the damages caused by the disruptions or security breaches. We have implemented protective measures to prevent against and limit the effects of system or network disruptions, but there can be no assurance that such measures will be sufficient to prevent or limit the damage from any future disruptions and any such disruption could have a material adverse impact on our business and results of operations.

Third-party service providers, such as foundries, subcontractors, distributors, and vendors have access to certain portions of our sensitive data. In the event that these service providers do not properly safeguard our data that they hold, security breaches and loss of our data could result. Any such loss of data by our third-party service providers could have a material adverse impact on our business and results of operations.

Significant fluctuations in interest rates could adversely affect our results of operations and financial position.

We are exposed to changes in interest rates as a result of our borrowing activities and our cash balances. Our credit facility bears interest at variable rates based on LIBOR. A significant increase in LIBOR would significantly increase our interest expense. A general increase in interest rates would be largely offset by an increase in interest income earned on our cash and short-term investment balances, which are currently greater than our debt balances. However, there can be no assurance that the interest rate earned on cash and short-term investments will move in tandem with the interest rate paid on our variable rate debt.

Our existing credit facility restricts our current and future operations and requires compliance with certain financial covenants.

Our existing credit facility includes restrictions on, among other things, incurring indebtedness, incurring liens on assets, making investments and acquisitions, making asset sales, and paying cash dividends and making other restricted payments. Our existing credit facility also requires us to comply with other covenants, including the maintenance of specific financial ratios. If we are not in compliance with all of such covenants, the credit facility could be terminated by the lenders, and all amounts outstanding pursuant to the credit facility could become immediately payable. Additionally, our convertible debt instruments have cross-default provisions that could accelerate repayment in the event the indebtedness under the credit facility is accelerated.

Future acquisitions could require us to issue additional indebtedness or equity.

If we were to undertake a substantial acquisition for cash, the acquisition would likely need to be financed in part through bank borrowings or the issuance of public or private debt. This acquisition financing would likely decrease our ratio of earnings to fixed charges and adversely affect other leverage criteria. Under our existing credit facility, we are required to obtain the lenders' consent for certain additional debt financing and to comply with other covenants including the application of specific financial ratios. We cannot make any assurances that the necessary acquisition financing would be available to us on acceptable terms if and when required. If we were to undertake an acquisition for equity, the acquisition may have a dilutive effect on the interests of the holders of our common stock.

Risks relating to Vishay's operations outside the United States

We are subject to the risks of political, economic, and military instability in countries outside the United States in which we operate.

We have substantial operations outside the United States, and approximately 75% of our revenues during 2018 were derived from sales to customers outside the United States. Certain of our assets are located, and certain of our products are produced, in countries which are subject to risks of social, political, economic, and military instability. This instability could result in wars, riots, nationalization of industry, currency fluctuation, and labor unrest. These conditions could have an adverse impact on our ability to operate in these regions and, depending on the extent and severity of these conditions, could materially and adversely affect our overall financial condition, results of operations, and our ability to access our liquidity.

Our business has been in operation in Israel for 48 years, where we have substantial manufacturing operations. Although we have never experienced any material interruption in our operations attributable to these factors, in spite of several Middle East crises, including wars, our financial condition and results of operations might be adversely affected if events were to occur in the Middle East that interfered with our operations in Israel.

Our global operations are subject to extensive anti-corruption laws and other regulations.

The U.S. Foreign Corrupt Practices Act and similar foreign anti-corruption laws generally prohibit companies and their intermediaries from making improper payments or providing anything of value to improperly influence foreign government officials for the purpose of obtaining or retaining business, or obtaining an unfair advantage. Recent years have seen a substantial increase in the global enforcement of anti-corruption laws. Our continued operation and expansion outside the United States, including in developing countries, could increase the risk of such violations or violations under other regulations relating to limitations on or licenses required for sales made to customers located in certain countries. Violations of these laws may result in severe criminal or civil sanctions, could disrupt our business, and result in a material adverse effect on our reputation, business and results of operations or financial condition.

We attempt to improve profitability by controlling labor costs, but these activities could result in labor unrest or considerable expense.

Historically, our primary labor cost controlling strategy was to transfer manufacturing operations to countries with lower production costs, such as the Czech Republic, the Dominican Republic, Hungary, India, Israel, Malaysia, Mexico, the People's Republic of China, and the Philippines. We believe that our manufacturing footprint is suitable to serve our customers and end markets, while maintaining lower manufacturing costs. We do not anticipate further transferring any significant existing operations to lower-labor-cost countries; however, acquired operations may be transferred to lower-labor-cost countries when integrated into Vishay. Currently, our primary labor cost controlling strategy involves reducing hours and limiting the use of subcontractors and foundries when demand for our products decreases. Shifting operations to lower-labor-cost countries, reducing hours, or limiting the use of subcontractors and foundries could result in production inefficiencies, higher costs, and/or strikes or other types of labor unrest.

We are subject to foreign currency exchange rate risks which may impact our results of operations.

We are exposed to foreign currency exchange rate risks, particularly due to market values of transactions in currencies other than the functional currencies of certain subsidiaries. From time to time, we utilize forward contracts to hedge a portion of projected cash flows from these exposures.

Our significant foreign subsidiaries are located in Germany, Israel, and Asia. We finance our operations in Europe and certain locations in Asia in local currencies. Our operations in Israel and most significant locations in Asia are largely financed in U.S. dollars, but these subsidiaries also have significant transactions in local currencies. Our exposure to foreign currency risk is mitigated to the extent that the costs incurred and the revenues earned in a particular currency offset one another. Our exposure to foreign currency risk is more pronounced in situations where, for example, production labor costs are predominantly paid in local currencies while the sales revenue for those products is denominated in U.S. dollars. This is particularly the case for products produced in Israel, the Czech Republic, and China.

A change in the mix of the currencies in which we transact our business could have a material effect on results of operations. Furthermore, the timing of cash receipts and disbursements could have a material effect on our results of operations, particularly if there are significant changes in exchange rates in a short period of time.

Most of our operating cash is generated by our non-U.S. subsidiaries, and our U.S. parent company and U.S. subsidiaries have significant payment obligations.

We generate a significant amount of cash and profits from our non-U.S. subsidiaries. For several years, substantially all of our cash and cash equivalents and short-term investments were held by subsidiaries outside of the United States.

During 2018, we repatriated over $700 million to the United States, net of withholding and other foreign taxes. We used substantially all of these repatriated amounts to reduce the outstanding balance of the credit facility to zero, to repay certain intercompany indebtedness, and to fund repurchases of our convertible senior debentures in the fourth fiscal quarter of 2018.

Following these transactions, approximately 10.2% of our cash and cash equivalents and short-term investments are held by our United States subsidiaries. Our unused revolving credit facility provides us with additional U.S. liquidity.

U.S. tax obligations, cash dividends to stockholders, share repurchases, additional convertible debt repurchases, and principal and interest payments on our debt instruments need to be paid by our U.S. parent company, Vishay Intertechnology, Inc. Our U.S. subsidiaries have other operating cash needs.

If our U.S. cash and cash equivalents and short-term investment and other liquidity sources are inadequate to satisfy these obligations, we may be required to repatriate additional cash to the United States. If we are unable to repatriate adequate cash to the United States to satisfy these obligations, it could materially and adversely affect our overall financial condition, results of operations and our liquidity.

Changes in U.S. trade policies, and related factors beyond our control, may adversely impact our business, financial condition, and results of operations.

Our business is subject to risks associated with U.S. and foreign legislation and regulations relating to imports, including quotas, duties, tariffs or taxes, and other import charges or restrictions, which could adversely affect our operations and our ability to import products. The U.S. has taken actions that impact U.S. trade with China, including imposing tariffs on certain goods manufactured in China and imported into the U.S., including certain of our products. Such actions may impact our competitiveness and adversely affect the demand for these products, or if those costs cannot be passed on to our customers, could adversely impact our results of operations for affected segments and the Company as a whole.

Further changes in U.S. trade policy could trigger additional retaliatory actions by affected countries. If these consequences are realized, it could result in a general economic downturn or otherwise have a material adverse effect on our business.

Risks related to our capital structure

The holders of our Class B common stock have effective voting control of our company, giving them the effective ability to prevent a change in control transaction.

We have two classes of common stock: common stock and Class B common stock. The holders of common stock are entitled to one vote for each share held, while the holders of Class B common stock are entitled to 10 votes for each share held. At December 31, 2018, the holders of Class B common stock held approximately 47.8% of the voting power of the Company. The ownership of Class B common stock is highly concentrated, and holders of Class B common stock effectively can cause the election of directors and approve other actions as stockholders. Mrs. Ruta Zandman (a member of our Board of Directors) controls the voting of, solely or on a shared basis with Marc Zandman (our Executive Chairman) and Ziv Shoshani (a member of our Board of Directors), approximately 89.7% of our Class

B common stock and 43.0% of the total voting power of our capital stock as of December 31, 2018. Holders of our Class B common stock may act in ways that are contrary to, or not in the best interests of, holders of our common stock. The voting rights of the holders of our Class B common stock effectively give such holders the ability to prevent transactions that would result in a change in control of us, including transactions in which holders of our common stock might otherwise receive a premium for their shares over the then-current market price.

Our reluctance to issue substantial additional shares in order not to dilute the interests of our existing stockholders could impede growth.

Our overall long-term business strategy has historically included a strong focus on acquisitions financed alternatively through cash on hand or the incurrence of indebtedness. We may in the future be presented with attractive investment or strategic opportunities that, because of their size and our financial condition at the time, would require the issuance of substantial additional amounts of our common stock. Some or all of our holders of Class B common stock may exert considerable influence over our policies, business and affairs, and in any corporate transaction or other matter, including those described above. If such opportunities were to arise, our Board of Directors may consider the potentially dilutive effect on the interests and voting power of our existing stockholders, including our Class B stockholders. Any resulting reluctance to issue additional shares could impede our future growth.

Our outstanding convertible debt instruments may impact the trading price of our common stock.

We believe that many investors in, and potential purchasers of, convertible debt instruments employ, or seek to employ, a convertible arbitrage strategy with respect to these instruments. Investors that employ a convertible arbitrage strategy with respect to convertible debt instruments typically implement that strategy by selling short the common stock underlying the convertible instrument and dynamically adjusting their short position while they hold the instrument. The implementation of this strategy by investors in our convertible debentures, as well as related market regulatory actions, could have a significant impact on the trading prices of our common stock, and the trading prices and liquidity of our convertible debentures. The price of our common stock and our convertible debentures could also be affected by possible sales of our common stock by investors who view our convertible debentures as more attractive means of equity participation in us.

Anti-takeover defenses in our amended and restated certificate of incorporation, our amended and restated bylaws and under Delaware law may impede or discourage a merger, a takeover attempt or other business combinations, which could also reduce the market price of our common stock.

We are a Delaware corporation, and the anti-takeover provisions of Delaware law impose various impediments to the ability of a third party to acquire control of us, even if a change in control would be beneficial to our existing stockholders. Our amended and restated certificate of incorporation and amended and restated bylaws also contain provisions that could delay or prevent a change in control of our company. These provisions could also make it difficult for stockholders to elect directors that are not nominated by the current members of our board of directors or take other corporate actions, including effecting changes in our management. These provisions include:

- the provision that our Class B common stock is generally entitled to ten votes per share, while our common stock is entitled to one vote per share, enabling the holders of our Class B common stock to effectively control the outcome of substantially all matters submitted to a vote of our stockholders, including the election of directors and change of control transactions;
- the provision establishing a classified board of directors with three-year staggered terms and the provision that a director may be removed only for cause, each of which could delay the ability of stockholders to change the membership of a majority of our board of directors;
- the ability of our board of directors to issue shares of preferred stock and to determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer;
- the right of our board of directors to elect a director to fill a vacancy created by the expansion of our board of directors or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our board of directors;
- the requirement that a special meeting of stockholders may be called only by the directors or by any officer instructed by the directors to call the meeting, which could delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors; and
- the ability of our board of directors, by majority vote, to amend the bylaws, which may allow our board of directors to take additional actions to prevent an unsolicited takeover and inhibit the ability of an acquirer to amend the bylaws to facilitate an unsolicited takeover attempt.

In addition, as a Delaware corporation, we are subject to Section 203 of the Delaware General Corporation Law. This statute prohibits a Delaware corporation listed on a national securities exchange from engaging in a business combination with an interested stockholder (generally a person who, together with its affiliates, owns or within the last three years has owned 15% or more of our voting stock subject to certain exceptions) for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner. The application of Section 203 also could have the effect of delaying or preventing a change in control of us. Any of these provisions could, under certain circumstances, depress the market price of our common stock.

The ability of our board of directors or a committee thereof to create and issue a new series of preferred stock and certain provisions of Delaware law and our certificate of incorporation and bylaws could impede a merger, takeover attempt or other business combination involving us or discourage a potential acquirer from making a tender offer for our common stock, which, under certain circumstances, could reduce the market price of our common stock.

Risks related to the spin-off of the Vishay Precision Group

Vishay Precision Group is using the Vishay name under license from us, which could result in product and market confusion or the loss of certain of our rights to the Vishay name.

VPG has a worldwide, perpetual and royalty-free license from us to use the "Vishay" mark as part of its corporate name and in connection with the manufacture, sale, and marketing of the products and services that comprise its measurements and foil resistors businesses. The license of the Vishay name to VPG is important to VPG because the success of VPG depends on the reputation of the Vishay brand for these products and services built over many years. Nonetheless, there exists the risk that the use by VPG could cause confusion in the marketplace over the products of the two companies, that any negative publicity associated with a product or service of VPG following the spin-off could be mistakenly attributed to our company or that we could lose our own rights to the "Vishay" mark if we fail to impose sufficient controls on VPG's use of the mark.

General Economic and Business Risks

In addition to the risks relating specifically to our business, a variety of other factors relating to general conditions could cause actual results, performance, or achievements to differ materially from those expressed in any of our forward-looking statements. These factors include:

- overall economic and business conditions;
- competitive factors in the industries in which we conduct our business;
- changes in governmental regulation;
- changes in tax requirements, including tax rate changes, new tax laws, and revised tax law interpretations;
- changes in GAAP or interpretations of GAAP by governmental agencies and self-regulatory groups;
- interest rate fluctuations, foreign currency rate fluctuations, and other capital market conditions; and
- economic and political conditions in international markets, including governmental changes and restrictions on the ability to transfer capital across borders.

Our common stock, traded on the New York Stock Exchange, has in the past experienced, and may continue to experience, significant fluctuations in price and volume. We believe that the financial performance and activities of other publicly traded companies in the electronic component industry could cause the price of our common stock to fluctuate substantially without regard to our operating performance.

We operate in a continually changing business environment, and new factors emerge from time to time. Other unknown and unpredictable factors also could have a material adverse effect on our future financial condition and results of operations.

Item 1B. UNRESOLVED STAFF COMMENTS

None.

Item 2. PROPERTIES

At December 31, 2018, our business had 49 manufacturing locations. Our manufacturing facilities include owned and leased locations. Some locations include both owned and leased facilities in the same location. The list of manufacturing facilities below excludes manufacturing facilities that are presently idle due to our restructuring activities. See Note 4 to our consolidated financial statements for further information related to our restructuring efforts, as well as additional information in "Cost Management" included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations."

In the opinion of management, our properties and equipment generally are in good operating condition and are adequate for our present needs. Owning many of our manufacturing facilities provides us meaningful financial and operating benefits, including long-term stability and a necessary buffer for economic downturns. We do not anticipate difficulty in renewing existing leases as they expire or in finding alternative facilities.

The principal locations of our owned manufacturing facilities, along with available space including administrative offices, are as follows:

Owned Locations	Business Segment	Approx. Available Space (Square Feet)
United States		
Columbus, NE	Resistors & Inductors	199,000
Bennington, VT	Capacitors	64,000
Yankton, SD	Resistors & Inductors	60,000
Warwick, RI	Resistors & Inductors	56,000
Niagara Falls, NY	Resistors & Inductors	34,000
Marshall, MN	Resistors & Inductors	22,000
Non-U.S.		
Vocklabruck, Austria	Diodes	100,000
People's Republic of China		
Tianjin	Diodes	374,000
Shanghai	Optoelectronic Components	195,000
Xi'an	MOSFETs and Diodes	121,000
Czech Republic		
Blatna	Capacitors	261,000
Dolni Rychnov	Resistors & Inductors and Capacitors	183,000
Prachatice	Resistors & Inductors	92,000
Volary	Resistors & Inductors	35,000
France		
Nice	Resistors & Inductors	221,000
Chateau Gontier	Resistors & Inductors	82,000
Hyeres	Resistors & Inductors	59,000
Germany		
Selb	Resistors & Inductors and Capacitors	414,000
Heide	Resistors & Inductors	219,000

Landshut	Capacitors	75,000
Fichtelberg	Resistors & Inductors	36,000
Budapest, Hungary	Diodes	101,000
Loni, India	Resistors & Inductors and Capacitors	340,000
Israel		
Dimona	Resistors & Inductors and Capacitors	404,000
Migdal Ha'Emek	Capacitors	288,000
Be'er Sheva	Resistors & Inductors and Capacitors	276,000
Turin, Italy	Diodes	99,000
Miharu, Japan	Capacitors	165,000
Melaka, Malaysia	Optoelectronic Components	156,000
Juarez, Mexico	Resistors & Inductors	60,000
Famalicao, Portugal	Capacitors	222,000
Republic of China (Taiwan)		
Taipei	Diodes	366,000
Kaohsiung	MOSFETs	63,000

The principal locations of our leased manufacturing facilities, along with available space including administrative offices, are as follows:

Leased Locations	Business Segment	Approx. Available Space (Square Feet)
United States		
Milwaukee, WI	Resistors & Inductors	42,000
Ontario, CA	Resistors & Inductors	38,000
Dover, NH	Resistors & Inductors	35,000
Hollis, NH	Resistors & Inductors	25,000
Duluth, MN	Resistors & Inductors	16,000
Non-U.S.		
Klagenfurt, Austria	Capacitors	150,000
People's Republic of China		
Danshui	Capacitors	446,000
Shanghai	MOSFETs	300,000
Zhuhai	Resistors & Inductors	179,000
Prestice, Czech Republic	Resistors & Inductors	15,000
Santo Domingo, Dominican Republic	Resistors & Inductors	44,000
Germany		
Itzehoe	MOSFETs	199,000
Heilbronn	Diodes and Optoelectronic Components	139,000
Mumbai, India	Diodes	34,000
Juarez, Mexico	Resistors & Inductors	102,000
Manila, Philippines	Diodes and Optoelectronic Components	149,000
Kaohsiung, Republic of China (Taiwan)	Diodes and MOSFETs	130,000

Item 3. LEGAL PROCEEDINGS

From time to time we are involved in routine litigation incidental to our business. Management believes that such matters, either individually or in the aggregate, should not have a material adverse effect on our business or financial condition.

Antitrust Class Action Complaints

Vishay Polytech Co., Ltd. ("VPC"), a subsidiary of Vishay which was purchased from Holy Stone Enterprises Co., Ltd. ("Holy Stone") in June 2014, is a named defendant, among other manufacturers, in purported antitrust class action complaints in the United States and Canada. The complaints allege restraints of trade in aluminum and tantalum electrolytic capacitors, and in some cases, film capacitors, and seek injunctive relief and unspecified joint and several treble damages. Vishay Intertechnology, Inc. and VPC are parties to similar cases filed in Canada.

Holy Stone has agreed to indemnify Vishay and VPC for losses, including penalties and expenses associated with the subject matter of the litigation described above. Notwithstanding this indemnity obligation, the Company and VPC intend to defend vigorously against the civil complaints.

Korea Fair Trade Commission

On September 17, 2018, the Korea Fair Trade Commission ("KFTC") announced a fine of approximately $32,000 against VPC, for violations of applicable antitrust laws. Concurrently, the KFTC issued a corrective order prohibiting VPC from engaging in similar activities again and referred the matter to the Korean Ministry of Justice for further review and action. To our knowledge, the Ministry of Justice has not publicized its decision, which is pending judicial review and acceptance. The conduct attributable to VPC occurred prior to the acquisition of that entity from Holy Stone in 2014.

Intellectual Property Matters

We are engaged in discussions with various parties regarding patent licensing and cross patent licensing issues. In addition, we have observed that in the current business environment, electronic component and semiconductor companies have become more aggressive in asserting and defending patent claims against competitors. We are a party to disputes alleging infringement of third-party patents. When we believe other companies are misappropriating our intellectual property rights, we vigorously enforce those rights through legal action, and we intend to continue to do so.

Environmental Matters

Vishay is involved in environmental remediation programs at various sites currently or formerly owned by Vishay and its subsidiaries both within and outside of the U.S., in addition to involvement as a potentially responsible party ("PRP") at Superfund sites. Certain obligations as a PRP have arisen in connection with business acquisitions. The remediation programs are on-going and the ultimate cost of site cleanup is difficult to predict given the uncertainties regarding the extent of the required cleanup, the interpretation of applicable laws and regulations, and alternative cleanup methods. See also Note 13 to our consolidated financial statements.

Item 4. MINE SAFETY DISCLOSURES

None.

EXECUTIVE OFFICERS OF THE REGISTRANT

The following table sets forth certain information regarding our executive officers as of February 15, 2019:

Name	Age	Positions Held
Marc Zandman*	57	Executive Chairman of the Board, Chief Business Development Officer, and President, Vishay Israel Ltd.
Dr. Gerald Paul*	69	Chief Executive Officer, President, and Director
Lori Lipcaman	61	Executive Vice President and Chief Financial Officer
Johan Vandoorn	61	Executive Vice President and Chief Technical Officer
David Valletta	58	Executive Vice President Worldwide Sales
Joel Smejkal	52	Executive Vice President and Business Head Passive Components
Clarence Tse	60	Executive Vice President and Business Head Semiconductors
Werner Gebhardt	60	Executive Vice President Global Human Resources

* Member of the Executive Committee of the Board of Directors.

Marc Zandman was appointed Executive Chairman of the Board and Chief Business Development Officer effective June 5, 2011. Mr. Zandman has served as a Director of Vishay since 2001 and President of Vishay Israel Ltd. since 1998. Mr. Zandman previously was Vice Chairman of the Board from 2003 to June 2011, and Chief Administration Officer from 2007 to June 2011. Mr. Zandman was Group Vice President of Vishay Measurements Group from 2002 to 2004. Mr. Zandman has served in various other capacities with Vishay since 1984. He is the son of the late Dr. Felix Zandman, Vishay's Founder. Mr. Zandman controls, on a shared basis with Ruta Zandman and Ziv Shoshani, approximately 34.0% of the total voting power of our capital stock as of December 31, 2018. He also is non-executive Chairman of Vishay Precision Group, Inc., an independent, publicly-traded company spun-off from Vishay Intertechnology in 2010.

Dr. Gerald Paul was appointed Chief Executive Officer effective January 1, 2005. Dr. Paul has served as a Director of the Company since 1993, and has been President of the Company since March 1998. Dr. Paul also was Chief Operating Officer from 1996 to 2006. Dr. Paul previously was an Executive Vice President of the Company from 1996 to 1998, and President of Vishay Electronic Components, Europe from 1994 to 1996. Dr. Paul has been Managing Director of Vishay Electronic GmbH, a subsidiary of the Company, since 1991. Dr. Paul has been employed by Vishay and a predecessor company since 1978.

Lori Lipcaman was appointed Executive Vice President and Chief Financial Officer of the Company effective September 1, 2011. Ms. Lipcaman had been appointed Executive Vice President Finance and Chief Accounting Officer in September 2008. Previously, she served as Vishay's Corporate Senior Vice President, Operations Controller, from March 1998 to September 2008. Prior to that, she served in various positions of increasing responsibility in finance and controlling since joining the Company in May 1989.

Johan Vandoorn was appointed Executive Vice President and Chief Technical Officer effective August 1, 2011. Mr. Vandoorn is responsible for Vishay's technical development and internal growth programs. Mr. Vandoorn has held various positions of increasing responsibility since Vishay's acquisition of BCcomponents Holdings BV ("BCcomponents") in 2002, including Executive Vice President – Passive Components (2006 – 2012). Mr. Vandoorn had been Vice President – Global Operations of BCcomponents from 2000 until its acquisition by Vishay, and previously worked for Philips Components ("Philips") from 1980 until Philips sold the BCcomponents business to a private equity firm in 1998.

David Valletta serves as Vishay's Executive Vice President – Worldwide Sales, a position he has held since 2007. Mr. Valletta has held various positions of increasing responsibility since Vishay's acquisition of Vitramon in 1994. Prior to joining Vitramon, Mr. Valletta also worked for AVX Corporation. His experience with Vishay includes various positions within the Americas region in direct and distribution sales management and global sales responsibility for the Company's key strategic customers.

Joel Smejkal was appointed Executive Vice President and Business Head Passive Components effective January 1, 2017. Mr. Smejkal has held various positions of increasing responsibility since joining Vishay in 1990 including Senior Vice President Global Distribution Sales (2012 - 2016). Mr. Smejkal's experience with Vishay includes worldwide and divisional leadership roles in engineering, marketing, operations and sales. He was a product developer of 18 U.S. Patents for the Power Metal Strip® resistor technology and brings significant business development, marketing and sales experience.

Clarence Tse was appointed Executive Vice President and Business Head Semiconductors effective January 1, 2017. Mr. Tse has held various positions of increasing responsibility since Vishay's acquisition of Siliconix/Telefunken in 1998, including Senior Vice President, Diodes Division (2008 - 2016), Senior Vice President, Power Diodes Division (2002 - 2008) and Vice President, Finance and Administration Asia (1998 - 2001). Mr. Tse was first hired by Siliconix in 1985.

Werner Gebhardt was appointed Executive Vice President Global Human Resources effective January 1, 2017. Mr. Gebhardt has held various positions of increasing responsibility since Vishay's acquisition of Draloric Electronic GmbH ("Draloric") in 1987, including Sr. Vice President Global Human Resources (2011 - 2014) and Administrative President Europe (2006 - 2011). Mr. Gebhardt's experience with Vishay includes leadership roles in Administration and Human Resources. Mr. Gebhardt had been employed by Draloric since 1975.

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 New York Stock Exchange under the symbol VSH. The following table sets forth the high and low sales prices for our common stock as reported on the New York Stock Exchange composite tape for the indicated fiscal quarters. Holders of record of our common stock totaled approximately 1,000 at February 13, 2019. Because many of the shares of our common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of beneficial owners represented by these stockholders of record.

In 2014, the Company's Board of Directors instituted a quarterly cash dividend program and declared the first cash dividend in the history of Vishay. Quarterly cash dividends have been paid in each quarter since the first fiscal quarter of 2014. We expect to continue to pay quarterly dividends, although the amount and timing of any future dividends remains subject to authorization of our Board of Directors.

The following table sets forth, for the indicated periods, the high and low sales prices of our common stock and the quarterly cash dividends declared.

	Common stock price range				Dividends declared	
	2018		2017		per share	
	High	Low	High	Low	2018	2017
Fourth quarter	$21.37	$16.73	$23.45	$18.75	$0.0850	$0.0675
Third quarter	$26.50	$20.08	$18.85	$16.45	$0.0850	$0.0625
Second quarter	$25.00	$17.51	$17.60	$15.40	$0.0850	$0.0625
First quarter	$23.85	$17.15	$17.00	$15.35	$0.0675	$0.0625

At February 13, 2019, we had outstanding 12,097,409 shares of Class B common stock, par value $.10 per share, each of which entitles the holder to ten votes. The Class B common stock generally is not transferable except in certain very limited instances, and there is no market for those shares. The Class B common stock is convertible, at the option of the holder, into common stock on a share for share basis. As a result of the passing of our founder and former Executive Chairman, Dr. Felix Zandman, Mrs. Ruta Zandman (a member of our Board of Directors) controls the voting of, solely or on a shared basis with Marc Zandman (our Executive Chairman) and Ziv Shoshani (a member of our Board of Directors) approximately 89.7% of our Class B common stock and 43.0% of the total voting power of our capital stock as of December 31, 2018.

Certain of our debt obligations contain restrictions as to the payment of cash dividends. See "Financial Condition, Liquidity, and Capital Resources" included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations."

In October 2018, our Board of Directors authorized us to begin repurchasing certain convertible debt instruments in open market repurchases or through privately negotiated transactions, subject to market and business conditions, legal requirements, and other factors. Such authorization also includes the open market repurchase of an equivalent number of shares issued upon the exercise of the conversion rights by any holder of convertible debentures. In the fourth fiscal quarter of 2018, the Company repurchased $53.7 million, $116.9 million, and $78.8 million principal amount of the Company's convertible senior debentures due 2040, due 2041, and due 2042, respectively. The aggregate purchase price for the repurchases was $376.0 million. The convertible senior debentures that Vishay repurchased during the fourth fiscal quarter had been convertible into 18.1 million shares of Vishay common stock, assuming physical settlement.

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Stock Performance Graph

The line graph below compares the cumulative total stockholder return on Vishay's common stock over a 5-year period with the returns on the Standard & Poor's MidCap 400 Stock Index (of which Vishay is a component), the Standard & Poor's 500 Stock Index, and the Philadelphia Semiconductor Index. The line graph assumes that $100 had been invested at December 31, 2013 and assumes that all dividends were reinvested.

	Base Period	Years Ending December 31,				
Company Name / Index	2013	2014	2015	2016	2017	2018
Vishay Intertechnology, Inc.	100	108.45	94.27	129.09	167.69	147.92
S&P 500 Index	100	113.69	115.26	129.05	157.22	150.33
S&P MidCap 400 Index	100	109.77	107.38	129.65	150.71	134.01
Philadelphia Semiconductor Index	100	130.61	128.53	179.07	251.67	236.46

Item 6. SELECTED FINANCIAL DATA

The following table sets forth selected consolidated financial information as of and for the fiscal years ended December 31, 2018, 2017, 2016, 2015, and 2014. This table should be read in conjunction with our consolidated financial statements and accompanying notes, filed herewith, commencing on page F-1 of this report (table and notes in thousands, except per share amounts):

	As of and for the years ended December 31,				
				(2)	(2)
	2018 (3)	2017 (4) recast (1)	2016 (5) recast (1)	2015 (6)	2014 (7)
Statement of Operations Data:					
Net revenues	$3,034,689	$2,599,368	$2,317,328	$2,300,488	$2,493,282
Costs of products sold	2,146,165	1,896,259	1,743,506	1,758,268	1,881,990
Gross profit	888,524	703,109	573,822	542,220	611,292
Selling, general, and administrative expenses	403,404	367,831	356,006	362,226	385,696
Restructuring and severance costs	-	11,273	19,199	19,215	20,897
Impairment of intangible assets	-	-	1,559	57,600	-
Impairment of goodwill	-	-	-	5,380	-
U.S. pension settlement charges	-	-	-	-	15,588
Operating income	485,120	324,005	197,058	97,799	189,111
Other income (expense)					
Interest expense	(36,680)	(27,850)	(25,623)	(25,685)	(24,457)
Other components of net periodic pension expense	(13,118)	(12,417)	(16,020)	-	-
Other	8,037	1,738	4,716	7,976	2,489
Loss on disposal of equity affiliate	-	(6,112)	-	-	-
Gain (loss) on early extinguishment of debt	(26,583)	-	4,597	-	-
U.S. pension settlement charges	-	-	(79,321)	-	-
Gain (loss) related to Tianjin explosion	-	-	8,809	(5,350)	-
Total other income (expense)	(68,344)	(44,641)	(102,842)	(23,059)	(21,968)
Income before taxes and noncontrolling interest	416,776	279,364	94,216	74,740	167,143
Income taxes	70,239	298,924	44,843	182,473	49,300
Net earnings (loss)	346,537	(19,560)	49,373	(107,733)	117,843
Noncontrolling interest	779	784	581	781	214
Net earnings (loss) attributable to Vishay stockholders	$345,758	$(20,344)	$48,792	$(108,514)	$117,629
Basic earnings (loss) per share attributable to Vishay stockholders:	$2.39	$(0.14)	$0.33	$(0.73)	$0.80
Diluted earnings (loss) per share attributable to Vishay stockholders:	$2.24	$(0.14)	$0.32	$(0.73)	$0.77
Weighted average shares outstanding – basic	144,370	145,633	147,152	147,700	147,567
Weighted average shares outstanding – diluted	154,622	145,633	150,697	147,700	153,716
Cash dividends per share	$0.3225	$0.2550	$0.2500	$0.2400	$0.2400

Balance Sheet Data:					
Total assets	$3,106,198	$3,462,089	$3,080,701	$3,152,986	$3,274,151
Long-term debt, less current portion	494,509	370,470	357,023	436,738	444,055
Working capital	1,139,780	1,632,655	1,410,522	1,429,768	1,461,686
Total Vishay stockholders' equity	1,382,384	1,430,367	1,567,727	1,622,476	1,825,366

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(1) Recast due to the retrospective adoption of Financial Accounting Standards Board ("FASB") ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606) and ASU No. 2017-07, Compensation - Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, on January 1, 2018. See Note 1 to our consolidated financial statements.

(2) Does not include an adjustment to reflect the retrospective adoption of ASUs No. 2014-09 or No. 2017-07. As described in Note 1 to our consolidated financial statements, effective January 1, 2018, we adopted two ASUs that required retrospective adoption to previously issued financial statements. We used a financial statement approach when adopting the ASUs and recorded a cumulative effect adjustment as of the beginning of the periods presented in the audited financial statements (January 1, 2016). Periods prior to January 1, 2016 have not been adjusted to reflect the retrospective adoption of the ASUs.

(3) Includes the results of UltraSource from February 8, 2018 and EuroPower Holdings Ltd. from June 11, 2018. Also includes $26,583 of loss on early extinguishment of debt, $54,877 net tax benefit due to the change in deferred taxes due to early extinguishment of debt, $25,496 net tax expense related to the changes in estimates related to the enactment of the Tax Cuts and Jobs Act in the United States ("TCJA"), and $10,047 tax benefit related to our repatriation of foreign earnings to the United States plan. These items, net of their tax consequences, had a positive $0.12 effect on earnings per share attributable to Vishay stockholders. These items are more fully described in the notes to the consolidated financial statements.

(4) Includes $11,273 of restructuring and severance costs, $6,112 of loss on disposal of an equity affiliate, $234,855 net tax expense related to the enactment of the TCJA in the United States, $1,565 tax expense due to the effects of changes in uncertain tax positions, and $5,802 tax benefit related to our previous repatriation of foreign earnings to the United States plan. These items, net of their tax consequences, had a negative $1.57 effect on earnings (loss) per share attributable to Vishay stockholders. These items are more fully described in the notes to the consolidated financial statements.

(5) Includes the results of Sonntag Electronic GmbH from January 1, 2016. Also includes $19,199 of restructuring and severance costs, $1,559 of intangible asset impairment charges, a $4,597 gain on early extinguishment of debt, a $8,809 gain on the settlement of insurance claims related to the Tianjin explosion, $79,321 of non-cash pension settlement charges, $34,853 tax expense from accumulated other comprehensive income as a result of the pension settlement, $8,704 tax benefit due to the effects of changes in uncertain tax positions, and $3,553 tax benefit related to the planned repatriation of foreign earnings to the United States. These items, net of their tax consequences, had a negative $0.53 effect on earnings per share attributable to Vishay stockholders. These items are more fully described in the notes to the consolidated financial statements.

(6) Includes $19,215 of restructuring and severance costs, $57,600 of intangible asset impairment charges, $5,380 of goodwill impairment charges, a loss of $5,350 related to the Tianjin explosion, a $163,954 tax expense related to the planned repatriation of foreign earnings to the United States, a $8,8880 tax benefit due to the effects of changes in valuation allowances, and a $2,629 tax benefit due to the effects of changes in uncertain tax positions. These items, net of their tax consequences, had a negative $1.45 effect on earnings (loss) per share attributable to Vishay stockholders.

(7) Includes the results of Holy Stone Polytech, from June 11, 2014, and the results of Capella from September 1, 2014, including the noncontrolling interest for the period before full control was obtained. Also includes $20,897 of restructuring and severance costs, $15,588 of U.S. pension plan non-cash settlement charges, a $25,706 tax expense related to a planned repatriation of foreign earnings to the United States, a $25,706 tax benefit due to the effects of changes in uncertain tax positions, and a $1,228 one-time tax benefit related to tax law changes. These items, net of their tax consequences, had a negative $0.15 effect on earnings per share attributable to Vishay stockholders.

Management believes that stating the impact on net earnings of items such as goodwill and intangible assets impairment charges, gains and losses on early extinguishment of debt, restructuring and severance costs, material pension settlement charges, material gains and losses on sales of property, special tax items, and other items is meaningful to investors because it provides insight with respect to intrinsic operating results of the Company.

Item 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

This Management's Discussion and Analysis ("MD&A") is intended to provide an understanding of Vishay's financial condition, results of operations and cash flows by focusing on changes in certain key measures from year to year. The MD&A should be read in conjunction with our Consolidated Financial Statements and accompanying Notes filed herewith, commencing on page F-1 of this report. This discussion contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in these forward-looking statements as a result of various factors, including those discussed elsewhere in this Annual Report on Form 10-K, particularly in Item 1A. "Risk Factors."

Overview

Vishay Intertechnology, Inc. is a global manufacturer and supplier of semiconductors and passive components, including power MOSFETs, power integrated circuits, transistors, diodes, optoelectronic components, resistors, capacitors, and inductors. Discrete semiconductors and passive components manufactured by Vishay are used in virtually all types of electronic products, including those in the industrial, computing, automotive, consumer electronic products, telecommunications, power supplies, military/aerospace, and medical industries.

We operate in five product segments, MOSFETs, Diodes, Optoelectronic Components, Resistors & Inductors, and Capacitors.

Since 1985, we have pursued a business strategy of growth through focused research and development and acquisitions. Through this strategy, we have grown to become one of the world's largest manufacturers of discrete semiconductors and passive components. We expect to continue our strategy of acquisitions while also maintaining a prudent capital structure.

We are focused on enhancing stockholder value and improving earnings per share. In addition to our growth plan, we also have opportunistically repurchased our stock. In 2014, our Board of Directors instituted a quarterly dividend payment program and declared the first cash dividend in the history of Vishay. The quarterly cash dividend was increased by 26% to $0.085 per share in the second fiscal quarter of 2018. In the second fiscal quarter of 2018, we issued $600 million convertible senior notes due 2025. We used the net proceeds from the issuance of these notes to repurchase $220.0 million and $69.1 million principal amount of convertible senior debentures due 2040 and due 2042, respectively. In October 2018, our Board of Directors authorized us to begin repurchasing certain convertible debt instruments in open market repurchases or through privately negotiated transactions. In the fourth fiscal quarter of 2018, we repurchased $53.7 million, $116.9 million, and $78.8 million principal amount of convertible senior debentures due 2040, due 2041, and due 2042, respectively, pursuant to this authorization. The repurchases were funded using cash on hand. Total repurchased convertible senior debentures in 2018 were convertible into approximately 41.4 million shares of stock. We recognized losses totaling $26.6 million on the early extinguishment of the repurchased convertible senior debentures.

On August 2, 2017, our Board of Directors approved a stock repurchase plan, authorizing us to repurchase, in the aggregate, up to $150 million of our outstanding common stock. We repurchased 2,250,236 shares of stock for $39.9 million in 2017 pursuant to the stock repurchase plan. The stock repurchase plan expired on June 1, 2018. Additionally, we repurchased 1,752,454 shares of stock for $23.2 million pursuant to our stock repurchase plan that began in May 2016 and expired on May 2, 2017.

As part of the amendment and restatement of the revolving credit facility in December 2015, we completed an evaluation of our anticipated domestic cash needs over the next several years and our most efficient use of liquidity, with consideration of the amount of cash that can be repatriated to the U.S. efficiently with lesser withholding taxes in foreign jurisdictions. As a result of that evaluation, during the fourth quarter of 2015, we recognized income tax expense of $164.0 million, including U.S. federal and state income taxes, incremental foreign income taxes, and withholding taxes payable to foreign jurisdictions, on $300 million of foreign earnings which we had expected to repatriate to the U.S. over the next several years. We repatriated $38 million and $46 million to the U.S. pursuant to this plan in 2017 and 2016, respectively.

The Tax Cuts and Jobs Act ("TCJA") was enacted in December 2017. As permitted by Securities and Exchange Commission ("SEC") Staff Accounting Bulletin ("SAB") No. 118, the net tax expense recorded in our financial statements due to the enactment of the TCJA for the fourth fiscal quarter of 2017, and throughout 2018, was considered "provisional," based on reasonable estimates. As of December 31, 2018, the defined measurement period has ended and the net tax expense for the enactment of the TCJA is considered final. See further information in "U.S. Tax Reform: Tax Cuts and Jobs Act" below.

As a result of the enactment of the TCJA, we terminated the aforementioned cash repatriation plan and replaced it with a plan to repatriate approximately $1.2 billion of unremitted foreign earnings in Israel, Germany, Austria, and France. We repatriated approximately $724.0 million to the United States, and paid withholding and foreign taxes of approximately $156.8 million in 2018. Substantially all of the amounts repatriated were used to reduce the outstanding balance of the credit facility, to repay certain intercompany indebtedness, and to fund repurchases of our convertible senior debentures in the fourth fiscal quarter of 2018 as described above.

Our business and operating results have been and will continue to be impacted by worldwide economic conditions. Our revenues are dependent on end markets that are impacted by consumer and industrial demand, and our operating results can be adversely affected by reduced demand in those global markets. For several years, we implemented aggressive cost reduction programs. We continue to monitor the current economic environment and its potential effects on our customers and the end markets that we serve. Additionally, we continue to closely monitor our costs, inventory, and capital resources to respond to changing conditions and to ensure we have the management, business processes, and resources to meet our future needs. In the fourth fiscal quarter of 2017, we substantially completed our cost reduction programs, which had been ongoing since 2013. Our cost reduction programs are more fully described in Note 4 to the consolidated financial statements and in "Cost Management" below. See additional information regarding our competitive strengths and key challenges as disclosed in Part 1.

We recorded noncash intangible asset impairment charges of $1.6 million in 2016. Our intangible assets impairment tests are more fully described in Notes 1 and 20 to the consolidated financial statements.

On August 12, 2015, a major explosion occurred in the port of Tianjin, China. We own and operate a diodes manufacturing facility in Tianjin near the port. The shockwave of the explosion resulted in some damage to the facility and caused a temporary shutdown. We received insurance payments totaling $13.4 million and recognized a gain of $8.8 million related to this incident and the insurance proceeds received in 2016.

In December 2016, we completed the termination and settlement of our qualified U.S. pension plan. The settlement resulted in a non-cash pre-tax charge of $79.3 million to recognize the unrecognized actuarial items related to the pension plan recorded in accumulated other comprehensive income. The pension plan termination and settlement is more fully described in Note 11 to the consolidated financial statements.

We utilize several financial metrics, including net revenues, gross profit margin, segment operating income, end-of-period backlog, book-to-bill ratio, inventory turnover, change in average selling prices, net cash and short-term investments (debt), and free cash generation to evaluate the performance and assess the future direction of our business. (See further discussion in "Financial Metrics" and "Financial Condition, Liquidity, and Capital Resources.") We believe that supply has started to catch up with demand in the fourth fiscal quarter of 2018, which caused a decrease in orders and several key financial metrics versus the prior fiscal quarter. Overall demand was higher in 2018 versus 2017, which caused a significant increase in revenues and several key financial metrics versus the prior year.

Net revenues for the year ended December 31, 2018 were $3.035 billion, compared to net revenues of $2.599 billion and $2.317 billion for the years ended December 31, 2017 and 2016, respectively. Net earnings attributable to Vishay stockholders for the year ended December 31, 2018 were $345.8 million, or $2.24 per diluted share, compared to net loss attributable to Vishay stockholders of $(20.3) million, or $(0.14) per share for the year ended December 31, 2017, and net earnings attributable to Vishay stockholders of $48.8 million, or $0.32 per share, for the year ended December 31, 2016.

We define adjusted net earnings as net earnings determined in accordance with GAAP adjusted for various items that management believes are not indicative of the intrinsic operating performance of our business. We define free cash as the cash flows generated from continuing operations less capital expenditures plus net proceeds from the sale of property and equipment. The reconciliations below include certain financial measures which are not recognized in accordance with GAAP, including adjusted net earnings, adjusted earnings per share, and free cash. These non-GAAP measures should not be viewed as alternatives to GAAP measures of performance or liquidity. Non-GAAP measures such as adjusted net earnings, adjusted earnings per share, and free cash do not have uniform definitions. These measures, as calculated by Vishay, may not be comparable to similarly titled measures used by other companies. Management believes that adjusted net earnings and adjusted earnings per share are meaningful because they provide insight with respect to our intrinsic operating results. Management believes that free cash is a meaningful measure of our ability to fund acquisitions, repay debt, and otherwise enhance stockholder value through stock repurchases or dividends.

Net earnings (loss) attributable to Vishay stockholders for the years ended December 31, 2018, 2017, and 2016 include items affecting comparability. The items affecting comparability are (in thousands, except per share amounts):

	Years ended December 31,		
	2018	2017	2016
GAAP net earnings (loss) attributable to Vishay stockholders	$345,758	$(20,344)	$48,792
Reconciling items affecting operating income:			
Restructuring and severance costs	$-	$11,273	$19,199
Impairment of intangible assets	-	-	1,559
Reconciling items affecting other income (expense):			
Loss (gain) on early extinguishment of debt	$26,583	$-	$(4,597)
Loss on disposal of equity affiliate	-	6,112	-
U.S. pension settlement charges	-	-	79,321
Gain related to Tianjin explosion	-	-	(8,809)
Reconciling items affecting tax expense (benefit):			
Enactment of TCJA	$25,496	$234,855	$-
Effects of cash repatriation program	(10,047)	(5,802)	(3,553)
Change in deferred taxes due to early extinguishment of debt	(54,877)	-	-
Additional tax expense from AOCI - pension plans	-	-	34,853
Effects of changes in uncertain tax positions	-	1,565	(8,704)
Tax effects of pre-tax items above	(5,812)	(3,331)	(29,901)
Adjusted net earnings	$327,101	$224,328	$128,160
Adjusted weighted average diluted shares outstanding	154,622	157,010	150,697
Adjusted earnings per diluted share *	$2.12	$1.43	$0.85

* Includes add-back of interest on exchangeable notes in periods where the notes are dilutive.

Although the term "free cash" is not defined in GAAP, each of the elements used to calculate free cash is presented as a line item on the face of our consolidated statement of cash flows prepared in accordance with GAAP.

	Years ended December 31,		
	2018	2017	2016
Net cash provided by continuing operating activities	$258,506	$368,777	$296,509
Proceeds from sale of property and equipment	55,561	1,685	5,701
Less: Capital expenditures	(229,899)	(170,432)	(134,635)
Free cash	$84,168	$200,030	$167,575

Our results for 2018 and 2017 represent the effects of a strong business environment, our cost reduction programs, and our organic growth initiatives. We experienced a relatively sharp upturn in demand beginning in the first fiscal quarter of 2017 that continued through the first nine fiscal months 2018, which further improved results. Distributors, particularly of semiconductor products in Asia, normalized their backlogs in the third fiscal quarter of 2018 and we experienced a further normalization of demand in the fourth fiscal quarter of 2018, which negatively impacted the book-to-bill ratio. Our percentage of euro-based sales approximates our percentage of euro-based expenses so the foreign currency impact on revenues was substantially offset by the impact on expenses. Our pre-tax results were consistent with expectations based on our business model.

Our 2018 free cash results were significantly impacted by the payment of cash taxes of $156.8 million related to the cash repatriated to the U.S. and the payment of the $14.8 million 2018 installment of the U.S. transition tax.

Financial Metrics

We utilize several financial metrics to evaluate the performance and assess the future direction of our business. These key financial measures and metrics include net revenues, gross profit margin, operating margin, segment operating income, end-of-period backlog, and the book-to-bill ratio. We also monitor changes in our inventory turnover and our or publicly available average selling prices ("ASP").

Gross profit margin is computed as gross profit as a percentage of net revenues. Gross profit is generally net revenues less costs of products sold, but also deducts certain other period costs, particularly losses on purchase commitments and inventory write-downs. Losses on purchase commitments and inventory write-downs have the impact of reducing gross profit margin in the period of the charge, but result in improved gross profit margins in subsequent periods by reducing costs of products sold as inventory is used. Gross profit margin is clearly a function of net revenues, but also reflects our cost management programs and our ability to contain fixed costs.

Operating margin is computed as gross profit less operating expenses as a percentage of net revenues. We evaluate business segment performance on segment operating margin. Only dedicated, direct selling, general, and administrative expenses of the segments are included in the calculation of segment operating income. Segment operating margin is computed as operating income less items such as restructuring and severance costs, asset write-downs, goodwill and indefinite-lived intangible asset impairments, inventory write-downs, gain or losses on purchase commitments, global operations, sales and marketing, information systems, finance and administrative groups, and other items, expressed as a percentage of net revenues. We believe that evaluating segment performance excluding such items is meaningful because it provides insight with respect to intrinsic operating results of the segment. Operating margin is clearly a function of net revenues, but also reflects our cost management programs and our ability to contain fixed costs.

End-of-period backlog is one indicator of future revenues. We include in our backlog only open orders that we expect to ship in the next twelve months. If demand falls below customers' forecasts, or if customers do not control their inventory effectively, they may cancel or reschedule the shipments that are included in our backlog, in many instances without the payment of any penalty. Therefore, the backlog is not necessarily indicative of the results to be expected for future periods.

An important indicator of demand in our industry is the book-to-bill ratio, which is the ratio of the amount of product ordered during a period as compared with the product that we ship during that period. A book-to-bill ratio that is greater than one indicates that our backlog is building and that we are likely to see increasing revenues in future periods. Conversely, a book-to-bill ratio that is less than one is an indicator of declining demand and may foretell declining revenues.

We focus on our inventory turnover as a measure of how well we are managing our inventory. We define inventory turnover for a financial reporting period as our costs of products sold for the four fiscal quarters ending on the last day of the reporting period divided by our average inventory (computed using each fiscal quarter-end balance) for this same period. A higher level of inventory turnover reflects more efficient use of our capital.

Pricing in our industry can be volatile. Using our and publicly available data, we analyze trends and changes in average selling prices to evaluate likely future pricing. The erosion of average selling prices of established products is typical for semiconductor products. We attempt to offset this deterioration with ongoing cost reduction activities and new product introductions. Our specialty passive components are more resistant to average selling price erosion. All pricing is subject to governing market conditions and is independently set by us.

The quarter-to-quarter trends in these financial metrics can also be an important indicator of the likely direction of our business. The following table shows net revenues, gross profit margin, operating margin, end-of-period backlog, book-to-bill ratio, inventory turnover, and changes in ASP for our business as a whole during the five fiscal quarters beginning with the fourth fiscal quarter of 2017 through the fourth fiscal quarter of 2018 (dollars in thousands):

	4th Quarter 2017*	1st Quarter 2018	2nd Quarter 2018	3rd Quarter 2018	4th Quarter 2018
Net revenues	$673,462	$716,795	$761,030	$780,972	$775,892
Gross profit margin	26.3 %	28.6 %	29.9 %	30.3 %	28.3 %
Operating margin (1)	11.3 %	14.5 %	16.2 %	17.7 %	15.4 %
End-of-period backlog	$1,320,200	$1,498,700	$1,595,200	$1,559,700	$1,497,100
Book-to-bill ratio	1.28	1.22	1.17	0.95	0.94
Inventory turnover	4.5	4.6	4.6	4.4	4.5
Change in ASP vs. prior quarter	-0.2 %	-0.2 %	0.7 %	0.6 %	0.7 %

* Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.
(1) Operating margin for the fourth fiscal quarter of 2017 includes $6.1 million of restructuring and severance expenses (see Note 4 to our consolidated financial statements).

See "Financial Metrics by Segment" below for net revenues, book-to-bill ratio, and gross profit margin broken out by segment.

Revenues for the fourth fiscal quarter of 2018 decreased slightly versus the third fiscal quarter of 2018, but increased significantly versus the prior year quarter. Distributors, particularly of semiconductor products in Asia, normalized their backlogs in the third fiscal quarter and we experienced a further normalization of demand in the fourth fiscal quarter, which decreased the backlog and negatively impacted the book-to-bill ratio. Many of our product lines are operating at or near capacity. We continue to raise critical manufacturing capacities, while remaining careful in adding operational fixed costs. Pricing pressures have been minimal due to the strong business environment.

Gross profit margin decreased versus the prior fiscal quarter, but increased versus the fourth fiscal quarter of 2017. The fluctuations versus the prior year are primarily volume-driven, partially offset by the impact of U.S. tariffs on goods imported from China in 2018. Gross profit margin decreased sequentially primarily due to the impact of U.S. tariffs on goods imported from China, higher materials prices, and higher repair and maintenance costs.

The book-to-bill ratio decreased to 0.94 in the fourth fiscal quarter of 2018 from 0.95 in the third fiscal quarter of 2018. The book-to-bill ratios for distributors and original equipment manufacturers ("OEM") were 0.90 and 0.98, respectively, versus ratios of 0.80 and 1.15, respectively, during the third fiscal quarter of 2018.

Financial Metrics by Segment

The following table shows net revenues, book-to-bill ratio, gross profit margin, and segment operating margin broken out by segment for the five fiscal quarters beginning with the fourth fiscal quarter of 2017 through the fourth fiscal quarter of 2018 (dollars in thousands):

	4th Quarter 2017*	1st Quarter 2018	2nd Quarter 2018	3rd Quarter 2018	4th Quarter 2018
MOSFETs					
Net revenues	$122,077	$127,506	$136,559	$144,260	$139,318
Book-to-bill ratio	1.59	1.23	0.96	0.88	1.08
Gross profit margin	25.5 %	25.1 %	28.1 %	27.0 %	26.2 %
Segment operating margin	18.2 %	17.7 %	20.9 %	20.5 %	18.9 %
Diodes					
Net revenues	$159,466	$167,017	$182,466	$186,492	$176,961
Book-to-bill ratio	1.34	1.30	1.08	0.86	0.83
Gross profit margin	26.1 %	25.9 %	28.7 %	29.3 %	26.2 %
Segment operating margin	23.0 %	22.7 %	25.8 %	26.6 %	23.3 %
Optoelectronic Components					
Net revenues	$69,389	$71,958	$75,709	$76,443	$65,617
Book-to-bill ratio	1.21	1.24	1.20	0.88	0.75
Gross profit margin	30.1 %	37.8 %	34.9 %	36.2 %	28.8 %
Segment operating margin	23.8 %	31.7 %	29.3 %	30.3 %	22.2 %
Resistors & Inductors					
Net revenues	$216,795	$244,046	$253,947	$257,330	$262,963
Book-to-bill ratio	1.19	1.15	1.16	1.02	0.94
Gross profit margin	29.0 %	32.2 %	33.5 %	34.3 %	32.5 %
Segment operating margin	25.8 %	28.7 %	30.0 %	31.1 %	29.4 %
Capacitors					
Net revenues	$105,735	$106,268	$112,349	$116,447	$131,033
Book-to-bill ratio	1.08	1.26	1.59	1.03	1.02

Gross profit margin	19.5	%	22.9	%	22.3	%	23.0	%	24.7	%
Segment operating margin	14.7	%	17.8	%	17.5	%	18.6	%	20.4	%

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

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U.S. Tax Reform: Tax Cuts and Jobs Act

On December 22, 2017, the TCJA was enacted in the United States. The TCJA represents sweeping changes in U.S. tax law. Among the numerous changes in tax law, the TCJA permanently reduced the U.S. corporate income tax rate to 21% beginning in 2018; imposed a one-time transition tax on deferred foreign earnings; established a partial territorial tax system by allowing a 100% dividends received deduction on qualifying dividends paid by foreign subsidiaries; limited deductions for net interest expense; expanded the U.S. taxation of foreign earned income to include "global intangible low-taxed income" ("GILTI") of foreign subsidiaries; and imposed a base erosion and anti-abuse minimum tax ("BEAT").

Under U.S. GAAP (specifically, Accounting Standards Codification ("ASC") Topic 740, Income Taxes ("ASC Topic 740")), the effects of changes in tax rates and laws on deferred tax balances are recognized in the period in which the new legislation is enacted. The effect of tax law changes on deferred tax balances was recorded as a component of income tax expense in the fourth fiscal quarter of 2017.

In response to the TCJA, the Staff of the U.S. Securities and Exchange Commission issued Staff Accounting Bulletin No. 118 ("SAB No. 118") to provide guidance to registrants in applying ASC Topic 740 in connection with the TCJA. SAB No. 118 provided that in the period of enactment, the income tax effects of the TCJA may be reported as a provisional amount based on a reasonable estimate (to the extent a reasonable estimate can be determined), which would be subject to adjustment during a "measurement period". The measurement period began in the reporting period of the TCJA's enactment and ends when a registrant has obtained, prepared, and analyzed the information that was needed in order to complete the accounting requirements under ASC Topic 740. The measurement period ended in December 2018 and the income tax effects of the TCJA are no longer provisional.

As further described below, the Company adjusted its estimates for the impact of enactment of the TCJA in the second and third fiscal quarters of 2018. The net tax expense due to the enactment of the TCJA is no longer considered provisional.

The amount of provisional net tax expense recorded in 2017 and adjustments recorded during the measurement period in 2018 that are directly and indirectly related to the TCJA are summarized as follows (amounts in thousands):

		Years ended December 31,	
	Total	2018	2017
Remeasurement of net deferred tax liabilities	$(76,027)	$(1,211)	$(74,816)
Transition tax on unremitted foreign earnings	222,983	7,425	215,558
Incremental foreign taxes on assumed repatriation	232,282	19,282	213,000
Reversal of deferred taxes due to cancellation of 2015 repatriation plan	(118,887)	-	(118,887)
Total tax expense related to the enactment of the TCJA	$260,351	$25,496	$234,855

As a result of the TCJA, we recognized a tax benefit of $76.0 million to remeasure our net deferred tax liabilities at the lower, 21% rate.

The TCJA transitioned the U.S. from a worldwide tax system to a partial territorial tax system. Under previous law, companies could indefinitely defer U.S. income taxation on unremitted foreign earnings. The TCJA imposed a one-time transition tax on deferred foreign earnings of 15.5% for liquid assets and 8% for illiquid assets, payable in defined increments over eight years. As a result of this requirement, we recognized provisional tax expense of $215.6 million in the fourth fiscal quarter of 2017 and an additional $7.4 million of tax expense in 2018 based on additional analysis completed, and expect to pay $184.5 million, net of estimated applicable foreign tax credits, and after utilization of net operating loss, R&D credit, and foreign tax credit carryforwards. We paid the first installment of

$14.8 million in 2018. These previously deferred foreign earnings may now be repatriated to the United States without additional U.S. federal taxation. However, any such repatriation could incur withholding and other foreign taxes in the source and intervening foreign jurisdictions, and certain U.S. state taxes.

Due to the changes in taxation of dividends received from foreign subsidiaries, and also because of the need to finance the payment of the transition tax, we made the determination during the fourth fiscal quarter of 2017 that certain unremitted foreign earnings in Israel, Germany, Austria, and France are no longer permanently reinvested, and recorded provisional tax expense of $213.0 million to accrue the incremental foreign income taxes and withholding taxes payable to foreign jurisdictions assuming the repatriation to the United States of these approximately $1.1 billion of available foreign earnings. As a result of additional analysis completed in 2018, the Company revised the amount available to be repatriated to the U.S. to approximately $1.2 billion and recorded additional tax expense of $19.3 million to accrue the incremental foreign income taxes and withholding taxes payable to foreign jurisdictions. We repatriated approximately $724.0 million to the United States, and paid withholding and foreign taxes of approximately $156.8 million in 2018. See further information in "Financial Condition, Liquidity, and Capital Resources" below.

After completing the 2018 phases of cash repatriation, there is approximately $300 million of unremitted foreign earnings that we have deemed not permanently reinvested and thus have accrued foreign withholding and other taxes. We expect to repatriate these remaining amounts at a measured pace over several years, and may decide to ultimately not repatriate some of these amounts.

There are additional amounts of unremitted foreign earnings in other countries, which continue to be reinvested indefinitely, and we have made no provision for incremental foreign income taxes and withholding taxes payable to foreign jurisdictions related to these amounts. Determination of the amount of the unrecognized deferred foreign tax liability for these amounts is not practicable because of the complexities associated with its hypothetical calculation.

During the fourth fiscal quarter of 2015, we recognized income tax, including U.S. federal and state income taxes, incremental foreign income taxes, and withholding taxes payable to foreign jurisdictions, on $300 million of foreign earnings. This tax expense was recognized in 2015 following an evaluation of our anticipated domestic cash needs over the next several years and our most efficient use of liquidity, and with consideration of the amount of cash that could be repatriated to the U.S. efficiently with lesser withholding taxes in foreign jurisdictions. We repatriated $38.0 million and $46.0 million pursuant to this program in 2017 and 2016, respectively. Prior to the enactment of the TCJA, the related deferred tax liability for the 2015 repatriation plan was $118.9 million. We terminated the 2015 cash repatriation plan and recorded an income tax benefit to reverse this deferred tax liability, which was replaced by the liability for the transition tax and foreign income and withholding taxes described above.

The deferred tax liability related to these unremitted foreign earnings is based on the available sources of cash, applicable tax rates, foreign currency exchange rates, and other factors and circumstances, as of each balance sheet date. Changes in these underlying facts and circumstances result in changes in the deferred tax liability balance, which are recorded as tax benefit or expense. We recorded expense of $10.0 million in 2018 for such remeasurements.

We expect to continue to generate a significant amount of cash and profits from our non-U.S. subsidiaries, and our provision for income taxes will continue to be based on various assertions regarding the future use of that cash and profits. Such assertions require us to consider a wide variety of U.S. federal and foreign tax laws, and the application of such laws to our operational and strategic needs.

Our GAAP interest expense generally exceeds our U.S.-based operating income, resulting in pre-tax losses in the U.S. We have historically recorded U.S. federal tax benefits on these losses, at 35%, which had the effect of reducing our consolidated GAAP tax rate. Accordingly, the reduction in the statutory U.S. tax rate will generally increase our consolidated GAAP tax rate due to the lower tax benefits recognized on a GAAP basis.

The TCJA expanded the U.S. current taxation of foreign earned income beginning in 2018. GILTI is income of our non-U.S. subsidiaries that exceeds an allowable return and which will then be included in U.S. current taxable income, subject to certain adjustments, and possibly reduced by indirect foreign tax credits. The TCJA also imposed BEAT. BEAT could potentially increase our U.S. federal income tax by disallowing certain otherwise deductible payments from the U.S. to non-U.S. subsidiaries and imposing a minimum tax if greater than the regular tax.

Certain provisions of the TCJA had a significant impact on our effective tax rate for the year ended December 31, 2018, and are expected to have a significant impact in future periods. Because the various provisions of the TCJA are interrelated, and because of changes in our operations and changes in our capital structure in response to the TCJA, the impact of any specific provision of the TCJA cannot be isolated. We recognized a significant amount of GILTI income in 2018, but were able to utilize related foreign tax credits to reduce the impact on the effective tax rate. The inclusion of significant GILTI income was a contributing factor in allowing us to avoid a limitation on the deductibility of our U.S. interest expense in 2018. We were not subject to the BEAT minimum tax in 2018, but BEAT could increase our future tax when the BEAT tax rate is higher.

We historically derived significant cash tax savings from our convertible senior debentures. For U.S. federal income tax purposes, the interest deduction for the convertible debentures is computed based on the comparable yield of a hypothetical fixed rate debt instrument with similar terms and conditions but no conversion feature. Accordingly, annual interest deductions are calculated at 8.0%, 8.375%, and 7.5% of the adjusted issue price. The adjusted issue price, and consequently the interest deduction for income tax purposes, grows over the term of the debt due to the difference between the interest deduction using a comparable yield applied to the adjusted issue price, and the coupon rate of 2.25% on the principal amount. Interest expense recognized in accordance with GAAP is calculated at the comparable yield multiplied by the carrying amount of the liability component of convertible debentures, which is substantially lower than the adjusted issue price for tax purposes. The difference between the tax and GAAP interest computations resulted in substantially greater interest deductions for tax purposes than GAAP interest expense. The TCJA limits deduction for net interest expense, which makes the convertible debentures less tax-efficient financial instruments. We repurchased $273.7 million, $116.9 million, and $147.9 million principal amount of convertible senior debentures due 2040, due 2041, and due 2042, respectively, in 2018. Our repurchase of a substantial portion of the outstanding convertible debentures reduced our full year 2018 tax rate and will reduce our expected future annual effective tax rates. While the remaining convertible debentures due 2040 and 2042 are currently convertible at the option of the holders, none of the convertible debentures are currently callable by us.

We continue to evaluate the TCJA's provisions and may prospectively adjust our business practices and further adjust our financial and capital structure accordingly. See "Financial Condition, Liquidity, and Capital Resources" below for further information.

Acquisition Activity

As part of our growth strategy, we seek to expand through targeted acquisitions of other manufacturers of electronic components that have established positions in major markets, reputations for product quality and reliability, and product lines with which we have substantial marketing and technical expertise. This includes exploring opportunities to acquire targets to gain market share, penetrate different geographic markets, enhance new product development, round out our existing product lines, or grow our high margin niche market businesses. Acquisitions of passive components businesses would likely be made to strengthen and broaden our position as a specialty product supplier; acquisitions of discrete semiconductor businesses would be made to increase market share and to generate synergies. To limit our financial exposure, we have implemented a policy not to pursue acquisitions if our post-acquisition debt would exceed 2.5x our pro forma earnings before interest, taxes, depreciation, and amortization ("EBITDA"). For these purposes, we calculate pro forma EBITDA as the adjusted EBITDA of Vishay and the target for Vishay's four preceding fiscal quarters, with a pro forma adjustment for savings which management estimates would have been achieved had the target been acquired by Vishay at the beginning of the four fiscal quarter period.

On February 8, 2018, we acquired substantially all of the assets and liabilities of UltraSource, Inc. ("UltraSource"), a U.S.-based, privately-held thin film circuit and thin film interconnect manufacturer, for $13.6 million. The results and operations of this acquisition have been included in the Resistors & Inductors segment since February 8, 2018. UltraSource contributed $17.4 million of net revenues to the year ended December 31, 2018.

On June 11, 2018, we acquired EuroPower Holdings Ltd. ("EuroPower"), a distributor of electronic components in the United Kingdom, for $2.9 million, net of cash acquired. The results and operations of this acquisition have been included in the Resistors & Inductors segment since June 11, 2018. EuroPower did not have a material impact on the Company's consolidated results for the year ended December 31, 2018.

In the fourth fiscal quarter of 2015, we deposited the $6.8 million purchase price of Sonntag Electronic GmbH ("Sonntag"). The acquisition was effective January 1, 2016. Sonntag is a distributor of electronic components in Germany.

Subsequent Events

On January 3, 2019, we acquired substantially all of the assets and liabilities of Bi-Metallix, Inc. ("Bi-Metallix"), a U.S.-based, privately-held provider of electron beam continuous strip welding services for $12.0 million, subject to customary post-closing adjustments. We were a major customer of Bi-Metallix, and the acquired business will be vertically integrated into our Resistors & Inductors segment.

There is no assurance that we will be able to identify and acquire additional suitable acquisition candidates at price levels and on terms and conditions we consider acceptable.

Cost Management

We place a strong emphasis on controlling our costs, and use various measures and metrics to evaluate our cost structure.

We define variable costs as expenses that vary with respect to quantity produced. Fixed costs do not vary with respect to quantity produced over the relevant time period. Contributive margin is calculated as net revenue less variable costs. It may be expressed in dollars or as a percentage of net revenue. Management uses this measure to determine the amount of profit to be expected for any change in revenues. While these measures are typical cost accounting measures, none of these measures are recognized in accordance with GAAP. The classification of expenses as either variable or fixed is judgmental and other companies might classify such expenses differently. These measures, as calculated by Vishay, may not be comparable to similarly titled measures used by other companies.

We closely monitor variable costs and seek to achieve the contributive margin in our business model. Over a period of many years, we have generally maintained a contributive margin of between 45% - 47% of revenues. The erosion of average selling prices, particularly of our semiconductor products, that is typical of our industry, and inflation negatively impact contributive margin and drive us to continually seek ways to reduce our variable costs. Our variable cost reduction efforts include increasing the efficiency in our production facilities by expending capital for automation, reducing materials costs, materials substitution, increasing wafer size and shrinking dies to maximize efficiency in our semiconductor production processes, and other yield improvement activities.

Our cost management strategy also includes a focus on controlling fixed costs recorded as costs of products sold or selling, general, and administrative expenses and maintaining our break-even point (adjusted for acquisitions). We seek to limit increases in selling, general, and administrative expenses to the rate of inflation, excluding foreign currency exchange effects and substantially independent of sales volume changes. At constant fixed costs, we would expect each $1 million increase in revenues to increase our operating income by approximately $450,000 to $470,000. Sudden changes in the business conditions, however, may not allow us to quickly adapt our manufacturing capacity and cost structure.

Occasionally, our ongoing cost containment activities are not adequate and we must take actions to maintain our cost competitiveness. We incurred significant restructuring expenses in our past to reduce our cost structure. Historically, our primary cost reduction technique was through the transfer of production to the extent possible from high-labor-cost countries to lower-labor-cost countries. We believe that our manufacturing footprint is suitable to serve our customers and end markets, while maintaining lower manufacturing costs. Since 2013, our cost reduction programs have primarily focused on reducing fixed costs, including selling, general, and administrative expenses.

In the fourth fiscal quarter of 2013, we announced various cost reduction programs as part of our continuous efforts to improve efficiency and operating performance. The programs primarily focused on a plan to enhance the competitiveness of our MOSFETs segment and a voluntary separation / early retirement offer to certain employees Company-wide. These programs, including the extension of the MOSFET Enhanced Competitiveness Program, were substantially completed as of December 31, 2017.

Programs were also initiated in 2015. The programs initiated in 2015 included a plan to reduce selling, general, and administrative costs company-wide, and targeted streamlining and consolidation of production for certain product lines within our Capacitors and Resistors & Inductors segments. The implementation of these programs did not impact planned R&D activities, or our growth initiatives in Asian markets. As of December 31, 2017, these programs were substantially implemented.

See Note 4 to our consolidated financial statements for additional information.

We do not anticipate any material restructuring activities in 2019. We continue to monitor the economic environment and its potential effects on our customers and the end markets that we serve. We also continue to closely monitor our costs and may be required to implement additional restructuring activities if we were to experience a significant economic downturn.

Our long-term strategy includes growth through the integration of acquired businesses, and GAAP requires plant closure and employee termination costs that we incur in connection with our acquisition activities to be recorded as expenses in our consolidated statement of operations, as such expenses are incurred. We have not incurred any material plant closure or employee termination costs related to any of the businesses acquired since 2011, but we expect to have some level of future restructuring expenses due to acquisitions.

Even as we seek to manage our costs, we continue to pursue our growth plans through investing in capacities for strategic product lines, and through increasing our resources for R&D, technical marketing, and field application engineering; supplemented by opportunistic acquisitions of specialty businesses.

Growth Plan

We are focused on enhancing stockholder value and improving earnings per share by growing our business and opportunistically repurchasing our stock. We plan to grow our business through intensified internal growth supplemented by opportunistic acquisitions, while at the same time maintaining a prudent capital structure. To foster intensified internal growth, we have increased our worldwide R&D and engineering technical staff; we are expanding critical manufacturing capacities; we are increasing our technical field sales force in Asia to increase our market access to the industrial segment and increase the design-in of our products in local markets; and we are directing increased funding and focus on developing products to capitalize on the connectivity, mobility, and sustainability growth drivers of our business. These efforts as well as our broad and innovative product portfolio and strong position in distribution worldwide have us positioned very well in case of a dramatic upturn in the economy. Since 2011, we have acquired the specialty product businesses of Huntington Electric, HiRel Systems, LLC, MCB Industrie, and UltraSource. In 2014, we made strategic acquisitions of Holy Stone Polytech and Capella and plan to use the technology and engineering capabilities acquired to further grow our business. We continue to explore additional acquisition opportunities.

Foreign Currency Translation

We are exposed to foreign currency exchange rate risks, particularly due to transactions in currencies other than the functional currencies of certain subsidiaries. We occasionally use forward exchange contracts to economically hedge a portion of our projected cash flows from these exposures.

GAAP requires that entities identify the "functional currency" of each of their subsidiaries and measure all elements of the financial statements in that functional currency. A subsidiary's functional currency is the currency of the primary economic environment in which it operates. In cases where a subsidiary is relatively self-contained within a particular country, the local currency is generally deemed to be the functional currency. However, a foreign subsidiary that is a direct and integral component or extension of the parent company's operations generally would have the parent company's currency as its functional currency. We have both situations among our subsidiaries.

Foreign Subsidiaries which use the Local Currency as the Functional Currency

We finance our operations in Europe and certain locations in Asia in local currencies, and accordingly, these subsidiaries utilize the local currency as their functional currency. For those subsidiaries where the local currency is the functional currency, assets and liabilities in the consolidated balance sheets have been translated at the rate of exchange as of the balance sheet date. Translation adjustments do not impact the results of operations and are reported as a separate component of stockholders' equity.

For those subsidiaries where the local currency is the functional currency, revenues and expenses are translated at the average exchange rate for the year. While the translation of revenues and expenses into U.S. dollars does not directly impact the consolidated statement of operations, the translation effectively increases or decreases the U.S. dollar equivalent of revenues generated and expenses incurred in those foreign currencies. The dollar was weaker during 2018 versus 2017 and during 2017 versus 2016, with the translation of foreign currency revenues and expenses into U.S. dollars increasing reported revenues and expenses versus the prior years.

Foreign Subsidiaries which use the U.S. Dollar as the Functional Currency

Our operations in Israel and most significant locations in Asia are largely financed in U.S. dollars, and accordingly, these subsidiaries utilize the U.S. dollar as their functional currency. For those foreign subsidiaries where the U.S. dollar is the functional currency, all foreign currency financial statement amounts are remeasured into U.S. dollars. Exchange gains and losses arising from remeasurement of foreign currency-denominated monetary assets and liabilities are included in the results of operations. While these subsidiaries transact most business in U.S. dollars, they may have significant costs, particularly payroll-related, which are incurred in the local currency. The cost of products sold and selling, general, and administrative expense for the year ended December 31, 2018 have been slightly unfavorably impacted (compared to the prior year) by local currency transactions of subsidiaries which use the U.S. dollar as their functional currency.

See Item 7A for additional discussion of foreign currency exchange risk.

Critical Accounting Policies and Estimates

Our significant accounting policies are summarized in Note 1 to our consolidated financial statements. We identify here a number of policies that entail significant judgments or estimates.

Revenue Recognition

Revenue is measured based on the consideration specified in contracts with customers, and excludes any sales incentives and amounts collected on behalf of third parties. We recognize revenue when we satisfy our performance obligations.

We have a broad line of products that we sell to original equipment manufacturers ("OEMs"), electronic manufacturing services ("EMS") companies, which manufacture for OEMs on an outsourcing basis, and independent distributors that maintain large inventories of electronic components for resale to OEMs and EMS companies.

We recognize revenue on sales to distributors when the distributor takes control of the products ("sold-to" model). We have agreements with distributors that allow distributors a limited credit for unsaleable products, which we refer to as a "scrap allowance." Consistent with industry practice, we also have a "stock, ship and debit" program whereby we consider requests by distributors for credits on previously purchased products that remain in distributors' inventory, to enable the distributors to offer more competitive pricing. In addition, we have contractual arrangements whereby we provide distributors with protection against price reductions initiated by us after product is sold by us to the distributor and prior to resale by the distributor.

We recognize the estimated variable consideration to be received as revenue and record a related accrued expense for the consideration not expected to be received, based upon an estimate of product returns, scrap allowances, "stock, ship and debit" credits, and price protection credits that will be attributable to sales recorded through the end of the period. We make these estimates based upon sales levels to our customers during the period, inventory levels at the distributors, current and projected market conditions, and historical experience under the programs. While we utilize a number of different methodologies to estimate the accruals, all of the methodologies take into account sales levels to customers during the relevant period, inventory levels at the distributors, current and projected market trends and conditions, recent and historical activity under the relevant programs, changes in program policies, and open requests for credits. These procedures require the exercise of significant judgments. We believe that we have a reasonable basis to estimate future credits under the programs.

See Notes 1 and 2 to our consolidated financial statements for further information.

Convertible Debt Instruments

We currently have four issuances of convertible debt instruments outstanding. GAAP requires us to separately account for the liability and equity components of convertible debt instruments in a manner that reflects our nonconvertible debt borrowing rate when interest costs are recognized in subsequent periods. The resulting discount on the debt is amortized as non-cash interest expense in future periods. Additionally, upon extinguishment of convertible debt instruments, GAAP requires the aggregate repurchase payment to be allocated between the liability and equity (including temporary equity) components of the convertible debt instruments, using our nonconvertible debt borrowing rate at the time of extinguishment. The estimated nonconvertible debt borrowing rate can significantly impact the accounting for convertible debt instruments. The estimation of our nonconvertible debt borrowing rate requires significant judgment. We employ a market approach and base our estimate on observed data from companies with similar capital structures and debt instruments as well as data obtained from third-party financial institutions. We believe we have a reasonable basis to estimate our nonconvertible debt borrowing rate.

See Notes 1 and 6 to our consolidated financial statements for further information.

Inventories and Purchase Commitments

We value our inventories at the lower of cost or net realizable value, with cost determined under the first-in, first-out method. The valuation of our inventories requires our management to make market estimates. For work in process goods, we are required to estimate the cost to completion of the products and the prices at which we will be able to sell the products. For finished goods, we must assess the prices at which we believe the inventory can be sold. Inventories are also adjusted for estimated obsolescence and written down to net realizable value based upon estimates of future demand, technology developments and market conditions.

Certain metals used in the manufacture of our products are traded on active markets, and can be subject to significant price volatility. Our policy is to enter into short-term commitments to purchase defined portions of annual consumption of these metals if market prices decline below budget. We record losses and related liabilities when the contractually obligated purchase price under our purchase commitments exceed quoted market prices for the metals.

Goodwill

See Note 1 to our consolidated financial statements for a description of our goodwill impairment tests.

The fair value of reporting units for goodwill impairment testing purposes is measured primarily using present value techniques based on projected cash flows from the reporting unit. The calculated results are evaluated for reasonableness using comparable company data. The determination of the fair value of the reporting units requires us to make significant estimates and assumptions. These estimates and assumptions primarily include, but are not limited to: the selection of appropriate peer group companies; control premiums appropriate for acquisitions in the industries in which we compete; the discount rate; terminal growth rates; and forecasts of revenue, operating income, depreciation and amortization, and capital expenditures.

Due to the inherent uncertainty involved in making these estimates, actual financial results could differ from those estimates. In addition, changes in assumptions concerning future financial results or other underlying assumptions could have a significant impact on the fair value of the reporting unit and the amount of the goodwill impairment charge.

Impairment of Long-Lived Assets

See Notes 1 and 20 to our consolidated financial statements for a description of our long-lived assets impairment analyses.

The evaluation of the recoverability of long-lived assets, and the determination of their fair value, requires us to make significant estimates and assumptions measured at a point in time. These estimates and assumptions primarily include, but are not limited to: the identification of the asset group at the lowest level of independent cash flows and the principal asset of the group; the discount rate; terminal growth rates; and forecasts of revenue, operating income, depreciation and amortization, and capital expenditures.

Due to the inherent uncertainty involved in making these estimates, actual results could differ from those estimates. In addition, changes in underlying assumptions would have a significant impact on the conclusion that an asset group's carrying value is recoverable or the determination of any impairment charge if it was determined that the asset values were not recoverable.

Accounts Receivable

Our accounts receivable represent a significant portion of our current assets. We are required to estimate the collectibility of our receivables and to establish allowances for the amount of receivables that will prove uncollectible. We base these allowances on our historical collection experience, the length of time our receivables are outstanding, the financial circumstances of individual customers, and general business and economic conditions. Due to our large number of customers and their dispersion across many countries and industries, we have limited exposure to concentrations of credit risk. As of December 31, 2018, one customer comprised 15.9% of our accounts receivable balance. This customer comprised 16.1% of our accounts receivable balance as of December 31, 2017. No other customer accounted for more than 10% of our accounts receivable balance as of December 31, 2018 or December 31, 2017. We continually monitor the credit risks associated with our accounts receivable and adjust the allowance for uncollectible accounts accordingly. We believe that our accounts receivable credit risk exposure beyond such allowance is not material to the financial statements.

Pension and Other Postretirement Benefits

Our defined benefit plans are concentrated in the United States, Germany, and the Republic of China (Taiwan). At December 31, 2018, our U.S. plans include various non-qualified plans. As further described below, our U.S. plan qualified under the Employee Retirement Income Security Act of 1974 ("ERISA") was terminated and settled in 2016. The table below summarizes information about our pension and other postretirement benefit plans. This information should be read in conjunction with Note 11 to our consolidated financial statements (amounts in thousands):

	Benefit obligation	Plan assets	Funded position	Informally funded assets	Net position	Unrecognized actuarial items
U.S. non-qualified pension plans	$ 38,169	$ -	$ (38,169)	$ 23,608	$ (14,561)	$ 5,501
German pension plans	172,548	-	(172,548)	4,309	(168,239)	50,948
Taiwanese pension plans	67,188	45,647	(21,541)	-	(21,541)	19,202
Other pension plans	32,222	25,173	(7,049)	-	(7,049)	6,548
OPEB plans	14,947	-	(14,947)	-	(14,947)	787
Other retirement obligations	14,521	-	(14,521)	-	(14,521)	-
	$ 339,595	$ 70,820	$ (268,775)	$ 27,917	$ (240,858)	$ 82,986

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Accounting for defined benefit pension and other postretirement plans involves numerous assumptions and estimates. The discount rate at which obligations could effectively be settled and the expected long-term rate of return on plan assets are two critical assumptions in measuring the cost and benefit obligations of our pension and other postretirement benefit plans. Other important assumptions include the anticipated rate of future increases in compensation levels, estimated mortality, and for certain postretirement medical plans, increases or trends in health care costs. Management reviews these assumptions at least annually. We use independent actuaries and investment advisers to assist us in formulating assumptions and making estimates. These assumptions are updated periodically to reflect the actual experience and expectations on a plan specific basis as appropriate.

In the U.S., we utilize published long-term high quality bonds to determine the discount rate at the measurement date. In Germany and the Republic of China (Taiwan), we utilize published long-term government bond rates to determine the discount rate at the measurement date. We utilize bond yields at various maturity dates that reflect the timing of expected future benefit payments. We believe the discount rates selected are the rates at which these obligations could effectively be settled.

Non-qualified plans in the U.S. are considered by law to be unfunded. However, the Company maintains assets in a rabbi trust to fund benefit payments under certain of these plans. Such assets would be subject to creditor claims under certain conditions. (See also Notes 11 and 18 to our consolidated financial statements.)

Many of our non-U.S. plans are unfunded based on local laws and customs. For those non-U.S. plans that do maintain investments, their asset holdings are primarily cash and fixed income securities, based on local laws and customs. Some non-U.S. plans also informally fund their plans by holding certain available-for-sale investments. Such assets would be subject to creditor claims under certain conditions. (See also Note 18 to our consolidated financial statements.)

We set the expected long-term rate of return based on the expected long-term average rates of return to be achieved by the underlying investment portfolios. In establishing this rate, we consider historical and expected returns for the asset classes in which the plans are invested, advice from pension consultants and investment advisors, and current economic and capital market conditions. The expected return on plan assets is incorporated into the computation of pension expense. The difference between this expected return and the actual return on plan assets is deferred. The net deferral of past asset losses (gains) affects the calculated value of plan assets and, ultimately, future pension expense (income).

During the fourth fiscal quarter of 2008, we adopted amendments to our principal U.S. defined benefit pension plans, such that effective January 1, 2009, the plans were frozen. Pursuant to these amendments, no new employees may participate in the plans, no further participant contributions were required or permitted, and no further benefits accrued after December 31, 2008.

In the second fiscal quarter of 2015, we began the process of terminating the Vishay Retirement Plan, our remaining U.S. qualified pension plan. We completed the termination and settlement of the Vishay Retirement Plan in December 2016. The termination and settlement required no additional cash contributions. Excess plan assets were transferred to a qualified defined contribution retirement plan. We recognized pre-tax non-cash settlement charges aggregating $79.3 million in 2016, representing previously unrecognized actuarial items.

We continue to seek to de-risk our global pension exposures. Such actions could result in increased net periodic pension cost due to lower expected rates of return on plan assets and/or possible additional charges to recognize unamortized actuarial items if all or a portion of the obligations were to be settled.

We believe that the current assumptions used to estimate plan obligations and annual expenses are appropriate. However, if economic conditions change or if our investment strategy changes, we may be inclined to change some of our assumptions, and the resulting change could have a material impact on the consolidated statements of operations and on the consolidated balance sheet.

Income Taxes

We have recorded deferred tax assets representing future tax benefits, but may not be able to realize these future tax benefits in certain jurisdictions. Significant judgment is required in determining the expected future realizability of these deferred tax assets. We periodically evaluate the realizability of our deferred tax assets by assessing the valuation allowance and by adjusting the amount of such allowance, if necessary. The factors used to assess the likelihood of realization include deferred tax liabilities, our forecast of future taxable income, and available tax planning strategies that could be implemented to realize the net deferred tax assets. We have generally recognized net deferred tax assets only where there is a recent history of taxable income and forecasts of future taxable income. During the year-ended December 31, 2018, we generated an excess U.S. foreign tax credit of $57.9 million. Because we do not anticipate sufficient U.S. foreign source income during the carryforward period, we have not recognized the benefit of the carryforward as of December 31, 2018.

We and our subsidiaries file U.S. federal income tax returns, as well as tax returns in multiple states and foreign jurisdictions. Our U.S. federal tax returns are open to examination for all years after 2012. During 2018, the examinations of certain tax returns were concluded and certain statutes of limitations lapsed. Our tax provision for the year-ended December 31, 2018 includes tax benefits related to the resolution of these matters. The tax returns of significant non-U.S. subsidiaries which are currently under examination include India (2004 through 2014), Italy (2012 through 2016), Germany (2013 through 2016), Israel (2016), and Taiwan (2016). We and our subsidiaries also file income tax returns in other taxing jurisdictions around the world, many of which are still open to examination.

See "U.S. Tax Reform: Tax Cuts and Jobs Act" above, for a discussion of the net expense recorded related to the TCJA and qualitative disclosure of the future impact of the TCJA on our financial position, financial results, and liquidity.

See Notes 1 and 5 to consolidated financial statements for additional information.

Results of Operations

Statement of operations' captions as a percentage of net revenues and the effective tax rates were as follows:

	Years ended December 31,		
	2018	2017*	2016*
Costs of products sold	70.7%	73.0 %	75.2 %
Gross profit	29.3%	27.0 %	24.8 %
Selling, general, and administrative expenses	13.3%	14.2 %	15.4 %
Operating income	16.0%	12.5 %	8.5 %
Income before taxes and noncontrolling interest	13.7%	10.7 %	4.1 %
Net earnings (loss) attributable to Vishay stockholders	11.4%	(0.8)%	2.1 %
Effective tax rate	16.9%	107.0 %	47.6 %

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

Net Revenues

Net revenues were as follows (dollars in thousands):

	2018	2017**	2016**
Net revenues	$3,034,689	$2,599,368	$2,317,328
Change versus prior year	$435,321	$282,040	
Percentage change versus prior year	16.7 %	12.2 %	

**Recast for the retrospective adoption of ASU 2014-09. See Note 1 to our consolidated financial statements.

Changes in net revenues were attributable to the following:

	2018 vs. 2017	2017 vs. 2016
Change attributable to:		
Increase in volume	13.5 %	14.8 %
Change in average selling prices	0.4 %	-2.6 %
Foreign currency effects	1.6 %	0.7 %
Acquisitions	0.8 %	0.0 %
Other	0.4 %	-0.7 %
Net change	16.7 %	12.2 %

We experienced a substantial, broad-based increase in demand for our products beginning in the first fiscal quarter of 2017 that continued through the third fiscal quarter of 2018 before supply started to catch up with demand in the fourth fiscal quarter of 2018. The increases in demand resulted in increases in net revenues compared to the prior year periods.

Gross Profit and Margins

Gross profit margins for the year ended December 31, 2018 were 29.3%, as compared to 27.0% for the year ended December 31, 2017. The increase is primarily due to increased sales volume. We were able to offset the negative impacts of inflation by cost reductions and innovation, and maintain our contributive margin.

Gross profit margins for the year ended December 31, 2017 were 27.0%, as compared to 24.8% for the year ended December 31, 2016. The increase is primarily due to increased sales volume. We were able to offset the negative impacts of inflation and average selling price decline by cost reductions and innovation, and maintain our contributive margin.

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Segments

Analysis of revenues and gross profit margins for our segments is provided below.

MOSFETs

Net revenues of the MOSFETs segment were as follows (dollars in thousands):

	Years ended December 31,		
	2018	2017**	2016**
Net revenues	$547,643	$467,476	$405,949
Change versus comparable prior year period	$80,167	$61,527	
Percentage change versus comparable prior year period	17.1 %	15.2 %	

**Recast for the retrospective adoption of ASU 2014-09. See Note 1 to our consolidated financial statements.

Changes in MOSFETs segment net revenues were attributable to the following:

	2018 vs. 2017	2017 vs. 2016
Change attributable to:		
Increase in volume	17.0 %	20.0 %
Decrease in average selling prices	-0.3 %	-3.6 %
Foreign currency effects	0.6 %	0.3 %
Other	-0.2 %	-1.5 %
Net change	17.1 %	15.2 %

Gross profit margins for the MOSFETs segment were as follows:

	Years ended December 31,		
	2018	2017*	2016*
Gross profit margins	26.6 %	23.4 %	14.4 %

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

The MOSFETs segment significantly increased its net revenues in 2018 versus the prior year. Sales volume increased in all regions, particularly Europe and Americas, and to all customer types. Declining average selling prices had only small offsetting effects on the growth.

The gross profit margin for 2018 was higher than the prior year primarily due to the significant increase in net revenues, a more profitable product mix, and the impact of the completed cost reduction program (see below), partially offset by the impact of U.S. tariffs on goods imported from China and higher materials prices.

The continuing positive business climate further reduced the pricing pressure for our established MOSFETs products in 2018. Furthermore, additional volume from new capacity could be sold at higher prices. Overall, we experienced only a slight decline in average selling prices in 2018 versus a moderate decline in average selling prices in 2017.

In 2017, we completed major cost reduction activities, which had been ongoing since 2013, to improve the operating results of the MOSFETs segment. See "Cost Management" above and Note 4 to our consolidated financial statements.

We continue to make capital and R&D investments in this business. We will maintain our R&D and management presence in the Silicon Valley area, and moved into a new R&D facility in San Jose in 2018. We are in the process of increasing manufacturing volume at third-party foundries and maximizing the output of our internal fab to meet the increased demand.

Diodes

Net revenues of the Diodes segment were as follows (dollars in thousands):

	Years ended December 31, 2018	2017**	2016**
Net revenues	$712,936	$619,958	$552,766
Change versus comparable prior year period	$92,978	$67,192	
Percentage change versus comparable prior year period	15.0 %	12.2 %	

**Recast for the retrospective adoption of ASU 2014-09. See Note 1 to our consolidated financial statements.

Changes in Diodes segment net revenues were attributable to the following:

	2018 vs. 2017	2017 vs. 2016
Change attributable to:		
Increase in volume	10.9 %	15.6 %
Change in average selling prices	2.0 %	-3.0 %
Foreign currency effects	1.3 %	0.5 %
Other	0.8 %	-0.9 %
Net change	15.0 %	12.2 %

Gross profit margins for the Diodes segment were as follows:

	Years ended December 31, 2018	2017*	2016*
Gross profit margins	27.6%	26.6 %	24.7 %

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

Net revenues of our Diodes segment increased significantly in 2018 versus the prior year. The increase was primarily from volume increases in all regions and all customer types, especially distributors in the Americas, higher average selling prices, and the positive impacts of a stronger euro. We continue to increase our manufacturing capacity in all critical lines to meet the increased demand.

Gross profit margin increased versus the prior year primarily due to increases in net revenues, increases in average selling prices, and the effects of our cost reduction activities, partially offset by the impact of U.S. tariffs on goods imported from China, increased materials prices, and general cost inflation.

The continuing positive business climate mostly eliminated the pricing pressure for our established Diodes products. The net increase in average selling prices are primarily due to a more favorable customer mix and the impact of U.S. tariffs passed through to customers.

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Optoelectronic Components

Net revenues of the Optoelectronic Components segment were as follows (dollars in thousands):

	Years ended December 31,		
	2018	2017**	2016**
Net revenues	$289,727	$284,429	$269,162
Change versus comparable prior year period	$5,298	$15,267	
Percentage change versus comparable prior year period	1.9 %	5.7 %	

**Recast for the retrospective adoption of ASU 2014-09. See Note 1 to our consolidated financial statements.

Changes in Optoelectronic Components segment net revenues were attributable to the following:

	2018 vs. 2017	2017 vs. 2016
Change attributable to:		
Increase in volume	0.6 %	7.6 %
Decrease in average selling prices	-1.3 %	-2.7 %
Foreign currency effects	1.9 %	0.7 %
Other	0.7 %	0.1 %
Net change	1.9 %	5.7 %

Gross profit margins for the Optoelectronic Components segment were as follows:

	Years ended December 31,		
	2018	2017*	2016*
Gross profit margin	34.6%	34.5 %	32.5 %

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

The Optoelectronic Components segment net revenues increased slightly in 2018 versus the prior year. The increase is primarily due to the positive impact of a stronger euro as volume increases in Europe and with distributors in the Americas, were mostly offset by decreases in Asia and end customers in the Americas and declining average selling prices.

The increase in gross profit margin in 2018 versus the prior year is primarily due to a more profitable product mix, the impact of our cost reduction activities, and the net impact of a stronger euro, which impacted revenues more than expenses, which offset the negative impact from lower average selling prices and general cost inflation.

The overall positive business environment resulted in reduced pricing pressure for our established Optoelectronic Components products. We only experienced a slight decline in average selling prices versus the prior year, which was less than half of the decline that we experienced in 2017.

Resistors & Inductors

Net revenues of the Resistors & Inductors segment were as follows (dollars in thousands):

	Years ended December 31,		
	2018	2017**	2016**
Net revenues	$1,018,286	$843,529	$753,524
Change versus comparable prior year period	$174,757	$90,005	
Percentage change versus comparable prior year period	20.7 %	11.9 %	

**Recast for the retrospective adoption of ASU 2014-09. See Note 1 to our consolidated financial statements.

Changes in Resistors & Inductors segment net revenues were attributable to the following:

	2018 vs. 2017	2017 vs. 2016
Change attributable to:		
Increase in volume	15.8 %	13.8 %
Decrease in average selling prices	-0.1 %	-2.1 %
Foreign currency effects	2.2 %	0.9 %
Acquisitions	2.4 %	0.0 %
Other	0.4 %	-0.7 %
Net change	20.7 %	11.9 %

Gross profit margins for the Resistors & Inductors segment were as follows:

	Years ended December 31,		
	2018	2017*	2016*
Gross profit margin	33.1 %	29.9 %	29.8 %

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

Net revenues of the Resistors & Inductors segment increased significantly versus the prior year. All regions experienced growth in net revenues versus the prior year. Distribution and the automotive end-market contributed the most to the revenue increase. The acquisition of UltraSource in the first fiscal quarter of 2018 also contributed to the revenue increase. See further information in "Acquisition Activity" above and in Note 3 to our consolidated financial statements.

The gross profit margin increased versus the prior year. The higher sales volume and cost reduction efforts were partially offset by some negative impacts of general wage increases and the negative impact of U.S. tariffs on goods imported from China.

Due to the positive business environment, average selling prices declined only slightly versus the prior year.

Capital spending projects to expand capacity are underway to meet the increased demand.
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Capacitors

Net revenues of the Capacitors segment were as follows (dollars in thousands):

	Years ended December 31,		
	2018	2017**	2016**
Net revenues	$466,097	$383,976	$335,927
Change versus comparable prior year period	$82,121	$48,049	
Percentage change versus comparable prior year period	21.4 %	14.3 %	

**Recast for the retrospective adoption of ASU 2014-09. See Note 1 to our consolidated financial statements.

Changes in Capacitors segment net revenues were attributable to the following:

	2018 vs. 2017	2017 vs. 2016
Change attributable to:		
Change in volume	17.5 %	15.3 %
Change in average selling prices	1.1 %	-1.9 %
Foreign currency effects	2.0 %	1.0 %
Other	0.8 %	-0.1 %
Net change	21.4 %	14.3 %

Gross profit margins for the Capacitors segment were as follows:

	Years ended December 31,		
	2018	2017*	2016*
Gross profit margin	23.3 %	20.4 %	19.9 %

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

Net revenues of the Capacitors segment in 2018 increased significantly versus the prior year. All regions experienced growth in net revenues. Distribution and the industrial and automotive end-markets contributed the most to the revenue increase.

The gross profit margin increased versus the prior year. The increase is primarily due to increased sales volume and increased average selling prices, partially offset by general wage increases, higher material prices, and the negative impact of U.S. tariffs on goods imported from China.

Due to the positive business environment, average selling prices have increased slightly versus the prior year.

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Selling, General, and Administrative Expenses

Selling, general, and administrative ("SG&A") expenses are summarized as follows (dollars in thousands):

	Years ended December 31,		
	2018	2017*	2016*
Total SG&A expenses	$403,404	$367,831	$356,006
as a percentage of sales	13.3 %	14.2 %	15.4 %

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1 to our consolidated financial statements.

The overall increase in SG&A expenses versus the prior year is primarily due to general salary and cost inflation, higher incentive compensation, increased R&D spending, and exchange rate impacts, which were partially offset by the effects of our restructuring programs. The overall increase in SG&A expenses in 2017 versus 2016 is primarily due to higher incentive compensation and exchange rate impacts.

Certain items included in SG&A expenses impact the comparability of these amounts, as summarized below (in thousands):

	Years ended December 31,		
	2018	2017	2016
Amortization of intangible assets	$11,807	$14,263	$14,842
Net loss (gain) on sale of assets	(2,216)	(265)	(4,054)

Certain intangible assets became fully amortized in the second fiscal quarter of 2017 and in the third fiscal quarter of 2018. In September 2016, we began to amortize our Siliconix tradenames, which were previously considered indefinite-lived, over their remaining useful life of 10 years. See Note 20 to our consolidated financial statements.

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Other Income (Expense)

2018 Compared to 2017

Interest expense for the year ended December 31, 2018 increased by $8.8 million versus the year ended December 31, 2017. The increase is primarily attributable to the issuance of convertible senior notes due 2025 in the second fiscal quarter of 2018. The increase is partially offset by reduced interest expense on the revolving credit facility and convertible senior debentures as a result of using cash repatriated in 2018 to reduce the outstanding balance of the revolving credit facility and to repurchase convertible senior debentures.

In June 2018, we issued $600 million principal amount of 2.25% senior convertible notes due 2025 to qualified institutional investors. We used the net proceeds from this offering to repurchase $289.1 million principal amounts of convertible senior debentures for $585.0 million. We used repatriated cash to repurchase $249.4 million principal amount of convertible senior debentures in the fourth fiscal quarter of 2018 for $376.0 million. We recognized a $26.6 million loss on early extinguishment of the repurchased convertible debentures in 2018.

Based on our current debt structure, including our expected usage of the revolving credit facility, we expect future interest expense to be approximately $8.5 million per quarter, of which $4.1 million will be payable in cash and the remainder will represent non-cash accretion and amortization of issuance costs.

The following table analyzes the components of the line "Other" on the consolidated statements of operations (in thousands):

	Years ended December 31, 2018	2017	Change
Foreign exchange gain (loss)	$(1,991)	$(4,536)	$2,545
Interest income	11,940	6,482	5,458
Investment income (loss)†	(1,646)	-	(1,646)
Other	(266)	(208)	(58)
	$8,037	$1,738	$6,299

† Recognized in "Other" subsequent to the prospective adoption of ASU 2016-01. Previously recorded in accumulated other comprehensive income until realized. See Note 1 to our consolidated financial statements.

2017 Compared to 2016

Interest expense for the year ended December 31, 2017 increased by $2.2 million versus the year ended December 31, 2016. The increase is primarily due to higher average outstanding balances and slightly higher interest rates on our revolving credit facility and increased amortization of the debt discounts associated with our convertible senior debentures, partially offset by decreases in the estimated values of the embedded derivatives associated with our convertible debentures.

In 2017, we sold our 50% interest in an investment accounted for using the equity method, and recorded a loss aggregating to $6.1 million. The loss recorded in March 2017 included our proportionate share of the investee's accumulated other comprehensive loss of $1.1 million, recognized upon discontinuation of the equity investment, and the estimated cost of certain contingencies pending resolution related to the investee. In December 2017, the contingencies were favorably settled and we reduced the loss by $0.9 million. The loss on disposal is not deductible for income tax purposes.

The following table analyzes the components of the line "Other" on the consolidated statements of operations (in thousands):

	Years ended December 31, 2017	2016	Change
Foreign exchange gain (loss)	$(4,536)	$292	$(4,828)
Interest income	6,482	4,264	2,218
Other	(208)	160	(368)
	$1,738	$4,716	$(2,978)

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Income Taxes

For the years ended December 31, 2018, 2017, and 2016, the effective tax rates were 16.9%, 107.0%, and 47.6%, respectively. With the reduction in the U.S. statutory rate to 21% beginning January 1, 2018, we expect that our effective tax rate will now be higher than the U.S. statutory rate, excluding unusual transactions. Historically, the effective tax rates were generally less than the U.S. statutory rate primarily because of earnings in foreign jurisdictions. While our effective tax rate has historically been less than the pre-2018 U.S. statutory rate, the effective tax rates for 2017 and 2016 were higher than the U.S. statutory rate, primarily due to certain discrete items recorded in each year. These items were $39.4 million (tax benefit) in 2018, $230.6 million in 2017, and $22.6 million in 2016.

The effective tax rate for the years ended December 31, 2018 and 2017 was significantly impacted by the effect of the TCJA (see "U.S. Tax Reform: Tax Cuts and Jobs Act" above). As permitted by SAB No. 118, the net tax expense recorded in our financial statements for the fourth fiscal quarter of 2017 due to the enactment of the TCJA was considered "provisional," based on reasonable estimates. The net tax expense recorded in 2017 was $234.9 million. We recorded adjustments of $25.5 million during the measurement period, as defined in SAB No. 118, as additional details were collected and analyzed.

The effective tax rate for the year ended December 31, 2018 was also significantly impacted by the effect of the repurchase of convertible senior debentures. We recognized a tax benefit of $54.9 million resulting from the extinguishments, reflecting the reduction in deferred tax liabilities related to the special tax attributes of the debentures. See Note 6 to our consolidated financial statements.

We also recorded a tax benefit of $10.0 million due to the remeasurement of the deferred tax liability related to our cash repatriation program. These types of remeasurement adjustments will continue until the amounts are repatriated. We repatriated $724 million to the U.S. pursuant to this program in 2018. As a result of the repatriations, we paid cash taxes of $156.8 million in 2018.

The effective tax rate for the year ended December 31, 2017 was also significantly impacted by a $5.8 million tax benefit recorded for the periodic remeasurement related to the 2015 cash repatriation program described below, and $1.6 million of net tax expense for changes in uncertain tax positions.

For the year ended December 31, 2016, the discrete items include $34.9 million of additional tax expense related to the termination and settlement of the Vishay Retirement Plan (see above and Notes 10 and 11 to the consolidated financial statements), $8.7 million (tax benefit) for changes in uncertain tax positions largely related to statute expiration, and $3.6 million tax benefit for periodic remeasurement of the deferred tax liability related to the cash repatriation program described below.

The 2015 cash repatriation program was expected to occur over several years, and the deferred tax liability is based on the available sources of cash, applicable tax rates, and other factors and circumstances, as of each respective balance sheet date. Changes in the underlying facts and circumstances result in changes in the deferred tax liability balance, which are recorded as tax benefit or expense. As a result of the TCJA, we have terminated the 2015 cash repatriation plan and replaced it as described in "U.S. Tax Reform: Tax Cut and Jobs Act" above.

We operate in a global environment with significant operations in various locations outside the United States. Accordingly, the consolidated income tax rate is a composite rate reflecting our earnings and the applicable tax rates in the various locations where we operate. Part of our historical strategy has been to achieve cost savings through the transfer and expansion of manufacturing operations to countries where we can take advantage of lower labor costs and available tax and other government-sponsored incentives.

Additional information about income taxes is included in Note 5 to our consolidated financial statements.

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Financial Condition, Liquidity, and Capital Resources

We focus on our ability to generate cash flows from operations. The cash generated from operations is used to fund our capital expenditure plans, and cash in excess of our capital expenditure needs is available to fund our acquisition strategy, to reduce debt levels, and to pay dividends and repurchase stock. We have generated cash flows from operations in excess of $200 million in each of the last 17 years, and cash flows from operations in excess of $100 million in each of the last 24 years.

Management uses a non-GAAP measure, "free cash," to evaluate our ability to fund acquisitions, repay debt, and otherwise enhance stockholder value through stock repurchases or dividends. See "Overview" above for "free cash" definition and reconciliation to GAAP. Vishay has generated positive "free cash" in each of the past 22 years, and "free cash" in excess of $80 million in each of the last 17 years. In this volatile economic environment, we continue to focus on the generation of free cash, including an emphasis on cost controls.

During 2018, we repatriated approximately $724 million to the United States, and paid cash taxes of $156.8 million related to the repatriations. The payment of these cash taxes was recorded as an operating cash flow and any future cash taxes associated with the TCJA transition tax and related foreign taxes on repatriated cash will generally be recorded as operating cash flows. The payment of these cash taxes significantly impacted cash flows from operations and free cash for the year ended December 31, 2018. We expect our business to continue to be a reliable generator of free cash, partially offset by such tax payments. There is no assurance, however, that we will be able to continue to generate cash flows from operations and free cash at the same levels, or at all, going forward if the current economic environment worsens.

We maintain a revolving credit facility, first entered into in 2010, which was amended and restated on August 8, 2013, and further amended and restated on December 10, 2015. The credit facility provides an aggregate commitment of $640 million of revolving loans available until December 10, 2020, and we have the ability to request up to $50 million of incremental revolving commitments, subject to the satisfaction of certain conditions. At December 31, 2017, $150 million was outstanding under our credit facility. We used a portion of the cash repatriated to the U.S. in 2018 to reduce the outstanding balance of the credit facility to zero.

The credit facility allows an unlimited amount of defined "Restricted Payments," which include cash dividends to stockholders and share repurchases, provided our pro forma leverage ratio is less than 2.25 to 1. If our leverage ratio is greater than 2.25 to 1, the credit facility allows such payments up to $75 million per annum (subject to a cap of $225 million for the term of the facility). The credit facility provides us with significantly more flexibility to execute these transactions, and our ability to utilize some of our foreign-source income for these types of transactions provides even further financial flexibility.

Borrowings under the credit facility bear interest at LIBOR plus an interest margin. The applicable interest margin is based on our leverage ratio. Based on our leverage ratio for the fourth fiscal quarter of 2018, borrowings bore interest at LIBOR plus 1.50%. The interest rate on any borrowings increases to LIBOR plus 1.75% if our leverage ratio is between 1.50 to 1 and 2.50 to 1 and further increases to 2.00% if our leverage ratio equals or exceeds 2.50 to 1. Based on our leverage ratio as of the end of the fourth fiscal quarter of 2018, any new borrowings in the first fiscal quarter of 2019 will bear interest at LIBOR plus 1.50%.

We also pay a fee, also based on our leverage ratio, on undrawn amounts. The undrawn commitment fee, based on our leverage ratio for the fourth fiscal quarter of 2018, was 0.30% per annum. Such undrawn commitment fee increases to 0.35% per annum if our leverage ratio is between 1.50 to 1 and 2.50 to 1 and further increases to 0.40% per annum if our leverage ratio equals or exceeds 2.50 to 1. Based on our leverage ratio as of the end of the fourth fiscal quarter of 2018, our undrawn commitment fee in the first fiscal quarter of 2019 will be 0.30% per annum.

The borrowings under the credit facility are secured by a lien on substantially all assets, including accounts receivable, inventory, machinery and equipment, and general intangibles (but excluding real estate, intellectual property registered or licensed for use in, or arising under the laws of, any country other than the United States, assets located outside of the United States and deposit and securities accounts), of Vishay and certain significant subsidiaries located in the United States, and pledges of stock in certain significant domestic and foreign subsidiaries; and are guaranteed by certain significant subsidiaries. Certain of our subsidiaries are permitted to borrow under the credit facility, subject to the satisfaction of specified conditions. Any borrowings by these subsidiaries under the credit facility will be guaranteed by Vishay and certain subsidiaries.

The credit facility also limits or restricts us from, among other things, incurring indebtedness, incurring liens on assets, making investments and acquisitions, and making asset sales, and making other restricted payments (assuming our leverage ratio is greater than 2.25 to 1), and requires us to comply with other covenants, including the maintenance of specific financial ratios.

The financial maintenance covenants include (a) an interest expense coverage ratio of not less than 2.00 to 1; and (b) a leverage ratio of not more than 3.25 to 1 (and a pro forma ratio of 2.75 to 1 on the date of incurrence of additional debt). The computation of these ratios is prescribed in Article VI of the Credit Agreement between Vishay Intertechnology, Inc. and JPMorgan Chase Bank, N.A., which has been filed with the SEC as Exhibit 10.1 to our current report on Form 8-K filed December 10, 2015.

We were in compliance with all financial covenants under the credit facility at December 31, 2018. Our interest expense coverage ratio and leverage ratio were 17.69 to 1 and 1.00 to 1, respectively. We expect to continue to be in compliance with these covenants based on current projections.

If we are not in compliance with all of the required financial covenants, the credit facility could be terminated by the lenders, and any amounts then outstanding pursuant to the credit facility could become immediately payable. Additionally, our convertible debt instruments have cross-default provisions that could accelerate repayment in the event the indebtedness under the credit facility is accelerated.

The balance of our revolving credit facility was $150 million at December 31, 2017. We borrowed $389 million and repaid $539 million on our credit facility during 2018. The average outstanding balance on our credit facility calculated at fiscal month-ends was $124 million and the highest amount outstanding on our credit facility at a month end was $314 million during 2018.

The TCJA imposes a one-time transition tax on deferred foreign earnings of 15.5% for liquid assets and 8% for illiquid assets, payable in defined increments over eight years. As a result of this requirement, we expect to pay $184.5 million, net of estimated applicable foreign tax credits, and after utilization of net operating loss and R&D and FTC Credit carryforwards. Based on our U.S. cash position, we expect that we will be required to repatriate amounts from our non-U.S. subsidiaries to the United States to satisfy this tax obligation.

These previously deferred foreign earnings may now be repatriated to the United States without additional U.S. federal taxation. However, any such repatriation could incur withholding and other foreign taxes in the source jurisdiction, and certain U.S. state taxes. Accordingly, our tax expense for the impact of enactment of the TCJA included amounts for these incremental withholding and foreign taxes and certain U.S. state taxes.

During 2018, we repatriated approximately $724 million to the United States, and paid cash taxes of $156.8 million related to the repatriations. We used substantially all of these repatriated amounts to reduce the outstanding balance of the credit facility to zero, to repay certain intercompany indebtedness, and to fund our repurchase of convertible senior debentures in the fourth fiscal quarter of 2018 as more fully described below.

In June 2018, we issued $600 million principal amount of 2.25% senior convertible notes due 2025 to qualified institutional investors. We used the net proceeds from this offering to repurchase $220.0 million and $69.1 million principal amounts of convertible senior debentures due 2040 and 2042, respectively, for $585.0 million. In October 2018, our Board of Directors authorized us to begin repurchasing certain convertible debt instruments in open market repurchases or through privately negotiated transactions, subject to market and business conditions, legal requirements, and other factors. Such authorization also includes the open market repurchase of an equivalent number of shares issued upon the exercise of the conversion rights by any holder of convertible debentures. Such authorization does not obligate us to acquire any particular amount of convertible debt instruments, and it may be terminated or suspended at any time at our discretion, in accordance with applicable laws and regulations. During the fourth fiscal quarter of 2018, we repurchased $53.7 million, $116.9 million, and $78.8 million principal amount of convertible senior debentures due 2040, due 2041, and due 2042, respectively, for $376.0 million. We used cash on hand, primarily repatriated cash, to fund the repurchases.

Subsequent to December 31, 2018, through February 13, 2019, we have repurchased an additional $1.0 million and $12.3 million principal amounts of convertible senior debentures due 2040 and 2041, respectively, for $18.1 million.

As of December 31, 2018, approximately 90% of our cash and cash equivalents and short-term investment were held in countries outside of the United States. Our substantially undrawn credit facility provides us with significant operating liquidity in the United States. We expect to fund any future repurchases of convertible debentures, as well as other obligations required to be paid by the U.S. parent company, Vishay Intertechnology, Inc., including cash dividends to stockholders, share repurchases, and principal and interest payments on our debt instruments by borrowing under our revolving credit facility. Our U.S. subsidiaries also have operating cash needs.

After completing the 2018 phases of cash repatriation, there is approximately $300 million of unremitted foreign earnings that we have deemed not permanently reinvested and thus have accrued foreign withholding and other taxes. We expect to repatriate these remaining amounts at a measured pace over several years, and may decide to ultimately not repatriate some of these amounts.

We also continue to evaluate the TCJA's provisions and may further adjust our financial and capital structure and business practices accordingly.

Prior to six months before the maturity date, our convertible notes are convertible by the holders under certain circumstances. The convertible notes are not convertible as of December 31, 2018. Prior to three months before the maturity date, our convertible senior debentures are convertible by the holders under certain circumstances. The convertible debentures due 2042 became convertible subsequent to the December 31, 2016 evaluation of the conversion criteria, and have remained convertible for each subsequent quarterly evaluation through the December 31, 2018 evaluation, due to the sale price of our common stock exceeding 130% of the conversion price for the applicable periods. The convertible debentures due 2040 became convertible subsequent to the September 30, 2017 evaluation of the conversion criteria, and have remained convertible for each subsequent quarterly evaluation through the December 31, 2018 evaluation, due to the sale price of our common stock exceeding 130% of the conversion price for the applicable periods. Such debentures will remain convertible until March 30, 2019, at which time the conversion criteria will be reevaluated. At the direction of our Board of Directors, we intend, upon conversion, to repay the principal amount of the convertible debentures in cash and settle any additional amounts in shares of our common stock. We intend to finance the principal amount of any converted debentures using borrowings under our credit facility. Accordingly, the debt component of the convertible debentures due 2040 and due 2042 continues to be classified as a noncurrent liability on the consolidated balance sheets. No conversions have occurred to date. The convertible debentures due 2041 are not currently convertible.

Although we do not currently have any amounts outstanding on the revolving credit facility, management expects to use the credit facility from time-to-time to meet certain short-term financing needs. We expect that cash on-hand and cash flows from operations will be sufficient to meet our longer-term financing needs related to normal operating requirements, regular dividend payments, and our research and development and capital expenditure plans. Additional acquisition activity, share repurchases, convertible debt repurchases, or conversion of our convertible debentures may require additional borrowing under our credit facility or may otherwise require us to incur additional debt. No principal payments on our debt are due before the maturity of our revolving credit facility in December 2020.

We invest a portion of our excess cash in highly liquid, high-quality instruments with maturities greater than 90 days, but less than 1 year, which we classify as short-term investments on our consolidated balance sheets. As these investments were funded using a portion of excess cash and represent a significant aspect of our cash management strategy, we include the investments in the calculation of net cash and short-term investments (debt).

The interest rates on our short-term investments vary by location, but can be up to 150 bps higher than the interest rates on our cash accounts. The average interest rate on our short-term investments was 1.1% due to the low interest rate environment in Europe. Transactions related to these investments are classified as investing activities on our consolidated statements of cash flows.

The following table summarizes the components of net cash and short-term investments (debt) (in thousands):

	December 31, 2018	December 31, 2017
Credit Facility	$ -	$ 150,000
Convertible senior notes, due 2025*	495,203	-
Convertible senior debentures, due 2040*	539	110,412
Convertible senior debentures, due 2041*	12,812	56,641
Convertible senior debentures, due 2042*	923	62,518
Deferred financing costs	(14,968)	(9,101)
Total debt	494,509	370,470
Cash and cash equivalents	686,032	748,032
Short-term investments	78,286	547,136
Net cash and short-term investments (debt)	$ 269,809	$ 924,698

*Represents the carrying amount of the convertible debentures, which is comprised of the principal amount of the instruments, net of the unamortized discount and the associated embedded derivative liability, when applicable.

"Net cash and short-term investments (debt)" does not have a uniform definition and is not recognized in accordance with GAAP. This measure should not be viewed as an alternative to GAAP measures of performance or liquidity. However, management believes that an analysis of "net cash and short-term investments (debt)" assists investors in understanding aspects of our cash and debt management. The measure, as calculated by us, may not be comparable to similarly titled measures used by other companies.

Our financial condition as of December 31, 2018 continued to be strong, although the current ratio (current assets to current liabilities) decreased to 2.8 to 1, from 3.9 to 1 as of December 31, 2017. The decrease is primarily due to the decrease in cash and cash equivalents and short-term investments. Our ratio of total debt to Vishay stockholders' equity was 0.36 to 1 at December 31, 2018 as compared to a ratio of 0.26 to 1 at December 31, 2017. The increase in the ratio is primarily due to increases in long-term debt after the issuance of the convertible notes due 2025 and decreases in equity upon the repurchase of convertible senior debentures.

Cash flows provided by operating activities were $258.5 million for the year ended December 31, 2018, as compared to cash flows provided by operations of $368.8 million for the year ended December 31, 2017. The decrease in operating cash flows reflects the $156.7 million payment of cash taxes associated with repatriation activity and the first installments of the TCJA transition tax of $14.8 million.

Cash paid for property and equipment for the year ended December 31, 2018 was $229.9 million, as compared to $170.4 million for the year ended December 31, 2017. We expect capital spending of approximately $190 million in 2019, in accordance with requirements of our markets and our growth plans.

Cash paid for dividends to our common and Class B common stockholders totalled $46.5 million and $37.0 million for the years ended December 31, 2018 and 2017, respectively. We expect dividend payments in 2019 to total approximately $49.0 million. However, any future dividend declaration and payment remains subject to authorization by our Board of Directors.

On August 2, 2017, our Board of Directors approved a stock repurchase plan, authorizing us to repurchase, in the aggregate, up to $150 million of our outstanding common stock. The stock repurchase plan expired on June 1, 2018. We repurchased 2,250,236 shares of stock for $39.9 million pursuant to this plan. We did not repurchase any shares of stock in 2018.

Contractual Commitments and Off-Balance Sheet Arrangements

As of December 31, 2018 we had contractual obligations as follows (in thousands):

	Payments due by period				
	Total	Year 1	Years 2-3	Years 4-5	More than 5
Long-term debt	$636,556	$-	$-	$-	$636,556
Interest payments on long-term debt	110,183	16,243	30,458	28,645	34,837
Operating leases	84,273	18,911	25,927	16,280	23,155
Letters of credit	3,789	-	3,789	-	-
Expected pension and postretirement plan funding	210,013	21,355	42,681	41,923	104,054
Estimated costs to complete construction in progress	127,000	127,000	-	-	-
TCJA transition tax	169,710	14,757	29,515	42,428	83,010
Uncertain tax positions	22,670	4,784	-	-	17,886
Purchase commitments	57,489	40,697	16,792	-	-
Other long-term liabilities	61,603	-	-	-	61,603
Total contractual cash obligations	$1,483,286	$243,747	$149,162	$129,276	$961,101

Commitments for long-term debt are based on the amount required to settle the obligation. Accordingly, the discounts and capitalized deferred financing costs associated with our convertible debt instruments are excluded from the calculation of long-term debt commitments in the table above.

Commitments for interest payments on long-term debt are cash commitments based on the stated maturity dates of each agreement and include fees under our revolving credit facility, which expires on December 10, 2020. Commitments for interest payments on long-term debt exclude non-cash interest expense related to the amortization of the discount associated with our convertible debt instruments.

Various factors could have a material effect on the amount of future principal and interest payments. Among other things, approximately $636.7 million of our outstanding debt instruments are convertible into common stock. Also, although we intend to net share settle our convertible debt instruments, we have the option to settle these instruments in shares of common stock pursuant to the indentures governing these instruments. Principal and interest commitments associated with our convertible debt instruments are based on the amounts outstanding as of December 31, 2018 and do not consider any future repurchases. Additionally, interest commitments for our revolving credit facility are based on the rate prevailing at December 31, 2018, but actual rates are variable and are certain to change over time.

The TCJA imposes a one-time transition tax on deferred foreign earnings of 15.5% for liquid assets and 8% for illiquid assets, payable in defined increments over eight years. As a result of this requirement, we expect to pay $184.5 million, net of estimated applicable foreign tax credits, and after utilization of net operating loss and R&D and FTC Credit carryforwards.

Our consolidated balance sheet at December 31, 2018 includes liabilities associated with uncertain tax positions in multiple taxing jurisdictions where we conduct business. Due to the uncertain and complex application of tax regulations, combined with the difficulty in predicting when tax audits throughout the world may be concluded, we cannot make reliable estimates of the timing of the remaining cash outflows relating to these liabilities. Accordingly, we have classified the amount recorded as a current liability as payable within one year, and the remaining uncertain tax positions are classified as payments due after five years, although actual timing of payments may be sooner.

There are certain guarantees and indemnifications extended among Vishay and VPG in accordance with the terms of the Master Separation and Distribution Agreement and the Tax Matters Agreement. The guarantees primarily relate to certain contingent tax liabilities included in the Tax Matters Agreement. See Note 19 to our consolidated financial statements for further discussion of the Tax Matters Agreement. These obligations are included in the uncertain tax positions disclosed above, but were not material to us as of December 31, 2018.

Expected pension and postretirement plan funding is based on a projected schedule of benefit payments under the plans.

We maintain long-term foundry arrangements with subcontractors to ensure access to external front-end capacity for our semiconductor products. The purchase commitments in the table above represent the estimated minimum commitments for silicon wafers under these arrangements. Our actual purchases in future periods are expected to be greater than these minimum commitments.

Other long-term liabilities in the table above include obligations that are reflected on our consolidated balance sheets as of December 31, 2018. We include the current portion of the long-term liabilities in the table above. Other long-term liabilities for which we are unable to reasonably estimate the timing of the settlement are classified as payments due after five years in the table above, although actual timing of payments may be sooner.

For a further discussion of our long-term debt, pensions and other postretirement benefits, leases, uncertain tax positions, and purchase commitments, see Notes 5, 6, 11, and 13 to our consolidated financial statements.

We do not participate in, nor have we created, any off-balance sheet variable interest entities or other off-balance sheet financing, other than the operating leases described above.

Inflation

Normally, inflation does not have a significant impact on our operations as our products are not generally sold on long-term contracts. Consequently, we can adjust our selling prices, to the extent permitted by competition and other market conditions, to reflect cost increases caused by inflation.

See also "Commodity Price Risk" included in Item 7A, "Quantitative and Qualitative Disclosures About Market Risk" for additional related information.

Recent Accounting Pronouncements

See Note 1 to our consolidated financial statements for information about recent accounting pronouncements.

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Market Risk Disclosure

We are exposed to certain financial risks, including fluctuations in foreign currency exchange rates, interest rates, and commodity prices. We manage our exposure to these market risks through internally established policies and procedures and, when deemed appropriate, through the use of derivative financial instruments. Our policies do not allow speculation in derivative instruments for profit or execution of derivative instrument contracts for which there are no underlying exposures. We do not use financial instruments for trading purposes and we are not a party to any leveraged derivatives. We monitor our underlying market risk exposures on an ongoing basis and believe that we can modify or adapt our hedging strategies as needed.

Interest Rate Risk

We are exposed to changes in interest rates as a result of our borrowing activities and our cash balances. On a selective basis, we have in the past entered into interest rate swap or cap agreements to reduce the potential negative impact that increases in interest rates could have on our outstanding variable rate debt. As of December 31, 2018, 2017, and 2016 we did not have any outstanding interest rate swap or cap agreements.

The interest paid on our credit facility is based on a LIBOR spread. At December 31, 2018, we had no amounts outstanding under the revolving credit facility. Future borrowings under the revolving credit commitment will bear interest at LIBOR plus 1.50%.

Our convertible debt instruments bear interest at a fixed rate, and accordingly are not subject to interest rate fluctuation risks.

At December 31, 2018, we had $686.0 million of cash and cash equivalents and $78.3 million of short-term investments, which earn interest at various variable rates.

Based on the debt and cash positions at December 31, 2018, we would expect a 50 basis point increase or decrease in interest rates to increase or decrease our annualized net earnings by approximately $2.8 million.

See Note 6 to our consolidated financial statements for additional information about our long-term debt. Also see "Economic Outlook and Impact on Operations and Future Financial Results" included in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" for additional discussion of market risks.

Foreign Exchange Risk

We are exposed to foreign currency exchange rate risks, particularly due to market values of transactions in currencies other than the functional currencies of certain subsidiaries. We have in the past used forward exchange contracts to economically hedge a portion of these exposures. As of December 31, 2018 we did not have any outstanding forward exchange contracts.

Our significant foreign subsidiaries are located in Germany, Israel, and Asia. We finance our operations in Europe and certain locations in Asia in local currencies. Our operations in Israel and most significant locations in Asia are largely financed in U.S. dollars, but these subsidiaries also have significant transactions in local currencies. Our exposure to foreign currency risk is mitigated to the extent that the costs incurred and the revenues earned in a particular currency offset one another. Our exposure to foreign currency risk is more pronounced in Israel, the Czech Republic, and China because the percentage of expenses denominated in Israeli shekels, Czech koruna, and Chinese renminbi to total expenses is much greater than the percentage of sales denominated in Israeli shekels, Czech koruna, and Chinese renminbi to total sales. Therefore, if the Israeli shekel, Czech koruna, and Chinese renminbi strengthen against all or most of our other major currencies, our operating profit is reduced. Where possible, we maintain local currency denominated cash balances in these countries approximately equal to the local currency liabilities to naturally hedge our exposures. We also have a slightly higher percentage of euro-denominated sales than expenses. Therefore, when the euro strengthens against all or most of our other major currencies, our operating profit is slightly increased. Accordingly, we monitor several important cross-rates.

We have performed sensitivity analyses of our consolidated foreign exchange risk as of December 31, 2018 and 2017, using a model that measures the change in the values arising from a hypothetical 10% adverse movement in foreign currency exchange rates relative to the U.S. dollar, with all other variables held constant. The foreign currency exchange rates we used were based on market rates in effect at December 31, 2018 and 2017. The sensitivity analyses indicated that a hypothetical 10% adverse movement in foreign currency exchange rates would impact our net earnings by approximately $14.5 million and $9.0 million at December 31, 2018 and December 31, 2017, respectively, although individual line items in our consolidated statement of operations would be materially affected. For example, a 10% weakening in all foreign currencies would decrease the U.S. dollar equivalent of operating income generated in foreign currencies, which would be offset by foreign exchange gains of our foreign subsidiaries that have significant transactions in U.S. dollars or have the U.S. dollar as their functional currency.

A change in the mix of the currencies in which we transact our business could have a material effect on the estimated impact of the hypothetical 10% movement in the value of the U.S. dollar. Furthermore, the timing of cash receipts and disbursements could result in materially different actual results versus the hypothetical 10% movement in the value of the U.S. dollar, particularly if there are significant changes in exchange rates in a short period of time.

Commodity Price Risk

Although most materials incorporated in our products are available from a number of sources, certain materials are available only from a relatively limited number of suppliers or are subject to significant price volatility. Our results of operations may be materially and adversely affected if we have difficulty obtaining these raw materials, the quality of available raw materials deteriorates, or there are significant price changes for these raw materials. The determination that any of the raw materials used in our products are conflict minerals originating from the Democratic Republic of the Congo and adjoining countries could increase the probability that we will encounter the challenges noted above, incur additional expenses to comply with government regulations, and face public scrutiny. For periods in which the prices of these raw materials are rising, we may be unable to pass on the increased cost to our customers which would result in decreased margins for the products in which they are used. For periods in which the prices are declining, we may be required to write down our inventory carrying cost of these raw materials, since we record our inventory at the lower of cost or market. Depending on the extent of the difference between market price and our carrying cost, this write-down could have a material adverse effect on our net earnings. We also may need to record losses for adverse purchase commitments for these materials in periods of declining prices.

Silicon wafers are the most important raw material for the manufacturing of our semiconductor products. Silicon wafers are manufactured from high-purity silicon, a metalloid. There have at times been industry-wide shortages of high-purity silicon resulting primarily from growing demand of the electronic component and solar power industries, and limited growth in high-purity silicon manufacturing capacities. Shifts in demand for high-purity silicon and in turn, silicon wafers, have resulted in significant fluctuation in prices of silicon wafers.

We are a major consumer of the world's annual production of tantalum, a metal used in the manufacturing of tantalum capacitors. There are few suppliers that process tantalum ore into capacitor grade tantalum powder.

Palladium, a metal used to produce multi-layer ceramic capacitors, is currently found primarily in South Africa and Russia. Palladium is a commodity metal that is subject to price volatility. We periodically enter into short-term commitments to purchase palladium.

Certain metals used in the manufacture of our products, such as copper, are traded on active markets, and can be subject to significant price volatility. Our policy is to enter into short-term commitments to purchase defined portions of annual consumption of these metals if market prices decline below budget.

We estimate that a 10% increase or decrease in the costs of raw materials subject to commodity price risk would decrease or increase our net earnings by $8.5 million, assuming that such changes in our costs have no impact on the selling prices of our products and that we have no pending commitments to purchase metals at fixed prices.

Item 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The financial statements required by this Item are filed herewith, commencing on page F-1 of this report.

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

None.

Item 9A. CONTROLS AND PROCEDURES

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

An evaluation was performed under the supervision and with the participation of our management, including the Chief Executive Officer ("CEO") and Chief Financial Officer ("CFO"), of the effectiveness of the design and operation of our disclosure controls and procedures, as such term is defined under Rule 13a-15(e) and Rule 15d-15(e) promulgated under the Securities Exchange Act of 1934, as amended. Based on that evaluation, our CEO and CFO concluded that our disclosure controls and procedures were effective as of the end of the period covered by this annual report to ensure that information required to be disclosed in reports that we file or submit under the Exchange Act is: (1) recorded, processed, summarized, and reported within the time periods specified in the SEC's rules and forms; and (2) accumulated and communicated to our management, including our CEO and CFO, as appropriate to allow timely decisions regarding required disclosure.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Under the supervision and with the participation of our management, including our CEO and CFO, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2018 based on the 2013 framework set forth in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on that evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2018.

Ernst & Young LLP has issued an attestation report on the effectiveness of our internal control over financial reporting, as stated in their report which is included herein on page F-3.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting during our last fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Certifications

The certifications of our CEO and CFO pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 are filed as Exhibits 31.1 and 31.2 to this Annual Report on Form 10-K. We have also filed with the New York Stock Exchange the most recent Annual Certification as required by Section 303A.12(a) of the New York Stock Exchange Listed Company Manual.

Item 9B. OTHER INFORMATION

None.

PART III

Item 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE

We have a code of ethics applicable to our Chief Executive Officer, Chief Financial Officer, Principal Accounting Officer or Controller, and financial managers. The text of this code has been posted on our website. To view the code, go to our website at ir.vishay.com and click on Corporate Governance. You can obtain a printed copy of this code, free of charge, by contacting us at the following address:

Corporate Investor Relations
Vishay Intertechnology, Inc.
63 Lancaster Avenue
Malvern, PA 19355-2143

It is our intention to satisfy the disclosure requirement under Item 5.05 of Form 8-K regarding any amendment to, or any waiver from, a provision of this code by posting such information on our website, at the aforementioned address and location.

Certain information required under this Item with respect to our Executive Officers is set forth in Part I hereof under the caption "Executive Officers of the Registrant."
Other information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2018, our most recent fiscal year end, and is incorporated herein by reference.

Item 11. EXECUTIVE COMPENSATION

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2018, our most recent fiscal year end, and is incorporated herein by reference.

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

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2018, our most recent fiscal year end, and is incorporated herein by reference.

Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2018, our most recent fiscal year end, and is incorporated herein by reference.

Item 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

Information required under this Item will be contained in our definitive proxy statement, which will be filed within 120 days of December 31, 2018, our most recent fiscal year end, and is incorporated herein by reference.

PART IV

Item 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) Documents Filed as Part of Form 10-K

1. Financial Statements

The Consolidated Financial Statements for the year ended December 31, 2018 are filed herewith. See Index to the Consolidated Financial Statements on page F-1 of this report.

2. Financial Statement Schedules

All financial statement schedules have been omitted because they are not applicable, not material, or the required information is shown in the consolidated financial statements or the notes thereto.

3. Exhibits

3.1	Corrected Amended and Restated Certificate of Incorporation of Vishay Intertechnology, Inc. dated June 5, 2012. Incorporated by reference to Exhibit 3.1 to our current report on Form 8-K filed June 5, 2012.
3.2	Amended and Restated Bylaws dated June 1, 2011. Incorporated by reference to Exhibit 3.2 to our current report on Form 8-K filed June 2, 2011.
3.3	First Amendment to Amended and Restated Bylaws. Incorporated by reference to Exhibit 3.1 to our Current Report on Form 8-K, filed on August 11, 2015.
4.1	Note Instrument, dated as of December 13, 2002. Incorporated by reference to Exhibit 4.3 to our current report on Form 8-K filed December 23, 2002.
4.2	Indenture, dated as of November 9, 2010, by and between Vishay Intertechnology, Inc. and Wilmington Trust Company, as Trustee. Incorporated by reference to Exhibit 4.1 to our current report on Form 8-K filed November 9, 2010.
4.3	Indenture, dated as of May 13, 2011, by and between Vishay Intertechnology, Inc. and Wilmington Trust Company, as Trustee. Incorporated by reference to Exhibit 4.1 to our current report on Form 8-K filed May 13, 2011.
4.4	Indenture, dated as of May 31, 2012, by and between Vishay Intertechnology, Inc. and Union Bank, N.A., as Trustee. Incorporated by reference to Exhibit 4.1 to our current report on Form 8-K filed May 31, 2012.
4.5	Indenture, dated as of June 12, 2018, by and between Vishay Intertechnology, Inc. and HSBC Bank USA, N.A., as Trustee. Incorporated by reference to Exhibit 4.1 to our current report on Form 8-K filed June 13, 2018.
4.6	Form of Global Note, representing Vishay Intertechnology, Inc.'s 2.25% Senior Convertible Notes due 2025 (included as Exhibit A to the Indenture filed as Exhibit 4.5). Incorporated by reference to Exhibit 4.2 to our current report on Form 8-K, filed on June 13, 2018.
10.1†	Amended and restated Vishay Intertechnology 162(m) Cash Bonus Plan. Incorporated by reference to Annex A to our Proxy Statement, dated March 31, 2017, for our 2017 Annual Meeting of Stockholders.
10.2†	Vishay Intertechnology, Inc. 2007 Stock Incentive Program. Incorporated by reference to Annex A to our Proxy Statement, dated April 5, 2013, for our 2013 Annual Meeting of Stockholders.
10.3†	Amended and Restated Vishay Intertechnology, Inc. 2007 Stock Incentive Program. Incorporated by reference to Annex A to our definitive proxy statement, dated April 4, 2014, for our 2014 Annual Meeting of Stockholders.
10.4	Securities Investment and Registration Rights Agreement by and among Vishay Intertechnology, Inc. and the Original Holders (as defined), dated as of December 13, 2002. Incorporated by reference to Exhibit 4.4 to our current report on Form 8-K filed December 23, 2002.
10.5	Note Purchase Agreement between Vishay Intertechnology, Inc. and Subscribers (as defined), dated as of December 13, 2002. Incorporated by reference to Exhibit 4.2 to our current report on Form 8-K filed December 23, 2002.

10.6	Put and Call Agreement between Vishay Intertechnology, Inc. and the Initial Holders (as defined), dated as of December 13, 2002. Incorporated by reference to Exhibit 4.5 to our current report on Form 8-K filed December 23, 2002.
10.7	Press release, dated July 21, 2010, announcing the terms of the replacement notes to be issued to holders of Vishay's exchangeable floating-rate unsecured notes due 2102 and revised terms of its outstanding warrants as required due to the spin-off of Vishay Precision Group, Inc. on July 6, 2010. Incorporated by reference to Exhibit 99 to our current report on Form 8-K filed July 22, 2010.
10.8†	Employment agreement, between Vishay Europe GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Dr. Gerald Paul. Incorporated by reference to Exhibit 10.3 to our quarterly report on Form 10-Q for the fiscal quarter ended October 2, 2004.
10.9†	Amendment to Employment Agreement, dated August 8, 2010, between Vishay Europe GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Dr. Gerald Paul. Incorporated by reference to Exhibit 10.5 to our quarterly report on Form 10-Q for the fiscal quarter ended July 3, 2010.
10.10†	Amendment to Employment Agreement, dated August 28, 2011, between Vishay Europe GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Dr. Gerald Paul. Incorporated by reference to Exhibit 10.3 to our quarterly report on Form 10-Q for the fiscal quarter ended October 1, 2011.
10.11†	Employment Agreement between Vishay Israel Ltd. (a wholly owned subsidiary of Vishay Intertechnology, Inc.) and Marc Zandman. Incorporated by reference to Exhibit 10.2 to our quarterly report on Form 10-Q for the fiscal quarter ended October 2, 2004.
10.12†	Amendment to Employment Agreement, dated August 8, 2010, between Vishay Israel Ltd. (a wholly owned subsidiary of Vishay Intertechnology, Inc.) and Marc Zandman. Incorporated by reference to Exhibit 10.6 to our quarterly report on Form 10-Q for the fiscal quarter ended July 3, 2010.
10.13†	Amendment to Employment Agreement, dated August 30, 2011, between Vishay Israel Ltd. (a wholly owned subsidiary of Vishay Intertechnology, Inc.) and Marc Zandman. Incorporated by reference to Exhibit 10.2 to our quarterly report on Form 10-Q for the fiscal quarter ended October 1, 2011.

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10.14	†	Compensation Matters Agreement, dated August 23, 2011, between Vishay Intertechnology, Inc. and Lori Lipcaman. Incorporated by reference to Exhibit 10.4 to our quarterly report on Form 10-Q for the fiscal quarter ended October 1, 2011.
10.15	†	Amendment to Compensation Matters Agreement, dated March 4, 2014, between Vishay Europe GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Lori Lipcaman. Incorporated by reference to Exhibit 10.1 to our quarterly report on Form 10-Q for the fiscal quarter ended March 29, 2014.
10.16	†	Second Amendment to Compensation Matters Agreement, dated March 3, 2015, between Vishay Europe GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Lori Lipcaman. Incorporated by reference to Exhibit 10.2 to our quarterly report on Form 10-Q for the fiscal quarter ended April 4, 2015.
10.17	†	Employment Agreement, dated February 15, 2018, between Vishay Europe GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.), Vishay Intertechnology, Inc., and Lori Lipcaman. Incorporated by reference to Exhibit 10.1 to our current report on Form 8-K, filed on February 16, 2018.
10.18	†	Compensation Matters Agreement, dated November 11, 2011, between Vishay Intertechnology, Inc. and Dieter Wunderlich. Incorporated by reference to Exhibit 10.30 to our 2011 annual report on Form 10-K.
10.19	†	Amendment to Compensation Matters Agreement, dated March 4, 2014, between Vishay Electronic GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Dieter Wunderlich. Incorporated by reference to Exhibit 10.2 to our quarterly report on Form 10-Q for the fiscal quarter ended March 29, 2014.
10.20	†	Second Amendment to Compensation Matters Agreement, dated March 3, 2015, between Vishay Electronic GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Dieter Wunderlich. Incorporated by reference to Exhibit 10.3 to our quarterly report on Form 10-Q for the fiscal quarter ended April 4, 2015.
10.21	†	Termination Agreement, dated November 14, 2016, between Vishay Electronic GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.) and Dieter Wunderlich. Incorporated by reference to Exhibit 10.1 to our current report on Form 8-K filed November 16, 2016.
10.22	†	Amendment to Executive Officer Restricted Stock Unit Agreement, dated November 14, 2016, between Vishay Intertechnology, Inc. and Dieter Wunderlich. Incorporated by reference to Exhibit 10.2 to our current report on Form 8-K filed November 16, 2016.
10.23	†	Terms and Conditions of Johan Vandoorn Employment Agreement, dated January 16, 2012. Incorporated by reference to Exhibit 10.31 to our 2011 annual report on Form 10-K.
10.24	†	Amendment to Terms and Conditions of Johan Vandoorn Employment Agreement, dated March 4, 2014. Incorporated by reference to Exhibit 10.3 to our quarterly report on Form 10-Q for the fiscal quarter ended March 29, 2014.
10.25	†	Second Amendment to Terms and Conditions of Johan Vandoorn Employment Agreement, dated March 3, 2015. Incorporated by reference to Exhibit 10.4 to our quarterly report on Form 10-Q for the fiscal quarter ended April 4, 2015.
10.26	†	Third Amendment to Terms and Conditions of Johan Vandoorn Employment Agreement, dated February 15, 2018. Incorporated by reference to Exhibit 10.2 to our current report on Form 8-K, filed on February 16, 2018.
10.27	†	Employment Agreement between Vishay Americas, Inc. (a wholly owned subsidiary of Vishay Intertechnology, Inc.) and David Valletta dated November 21, 2011. Incorporated by reference to Exhibit 10.32 to our 2011 annual report on Form 10-K.
10.28	†	Amendment to Employment Agreement between Vishay Americas, Inc. (a wholly owned subsidiary of Vishay Intertechnology, Inc.) and David Valletta dated March 4, 2014. Incorporated by reference to Exhibit 10.4 to our quarterly report on Form 10-Q for the fiscal quarter ended March 29, 2014.
10.29	†	Second Amendment to Employment Agreement between Vishay Americas, Inc. (a wholly owned subsidiary of Vishay Intertechnology, Inc.) and David Valletta dated March 3, 2015. Incorporated by reference to Exhibit 10.5 to our quarterly report on Form 10-Q for the fiscal quarter ended April 4, 2015.
10.30	†	Employment Agreement, dated February 15, 2018, between Vishay Americas, Inc. (a wholly owned subsidiary of Vishay Intertechnology, Inc.), Vishay Intertechnology, Inc., and David Valletta. Incorporated by reference to Exhibit 10.3 to our current report on Form 8-K, filed on February 16, 2018.
10.31	†	

	Employment Agreement, dated February 15, 2018, between Vishay Singapore Pte. Ltd. (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.), Vishay Intertechnology, Inc., and Clarence Tse. Incorporated by reference to Exhibit 10.4 to our current report on Form 8-K, filed on February 16, 2018.
10.32*	Employment Agreement, dated February 15, 2018, between Vishay Americas, Inc. (a wholly owned subsidiary of Vishay Intertechnology, Inc.), Vishay Intertechnology, Inc., and Joel Smejkal. Incorporated by reference to Exhibit 10.5 to our current report on Form 8-K, filed on February 16, 2018.
10.33*	Employment Agreement, dated February 15, 2018, between Vishay Electronic GmbH (an indirect wholly owned subsidiary of Vishay Intertechnology, Inc.), Vishay Intertechnology, Inc., and Werner Gebhardt. Incorporated by reference to Exhibit 10.6 to our current report on Form 8-K, filed on February 16, 2018.
10.34*	Vishay Intertechnology, Inc. Key Employee Wealth Accumulation Plan (as amended and restated, effective January 1, 2017). Incorporated by reference to Exhibit 10.1 to our current report on Form 8-K filed December 23, 2016.
10.35	Technology License Agreement, dated as of April 1, 2007, by and between International Rectifier Corporation and Vishay Intertechnology, Inc. Incorporated by reference to Exhibit 99.1 to International Rectifier Corporation's current report on Form 8-K filed April 9, 2007.
10.36	Technology License Back Agreement, dated as of April 1, 2007, by and between Vishay Intertechnology, Inc. and International Rectifier Corporation. Incorporated by reference to Exhibit 99.2 to International Rectifier Corporation's current report on Form 8-K filed April 9, 2007.
10.37	Confidential Settlement Agreement and Release, Amendment No. 1 to Transition Buy Back Die Supply Agreement, Amendment No. 2 to Technology License Agreement, Amendment No. 7 to Master Purchase Agreement, and Amendment No. 3 to Asset Purchase Agreement, dated June 25, 2009, by and between Vishay Intertechnology, Inc. and International Rectifier Corporation. Incorporated by reference to Exhibit 10.1 to International Rectifier Corporation's current report on Form 8-K/A filed July 29, 2009.

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10.38	Master Separation and Distribution Agreement, dated June 22, 2010, by and among Vishay Intertechnology, Inc. and Vishay Precision Group, Inc. Incorporated by reference to Exhibit 10.1 to our current report on Form 8-K filed June 23, 2010.
10.39	Employee Matters Agreement, dated June 22, 2010, by and among Vishay Intertechnology, Inc. and Vishay Precision Group, Inc. Incorporated by reference to Exhibit 10.2 to our current report on Form 8-K filed June 23, 2010.
10.40	Tax Matters Agreement, dated July 6, 2010, between Vishay Precision Group, Inc. and Vishay Intertechnology, Inc. Incorporated by reference to Exhibit 10.1 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.41	Trademark License Agreement, dated July 6, 2010, between Vishay Precision Group, Inc. and Vishay Intertechnology, Inc. Incorporated by reference to Exhibit 10.2 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.42*	Supply Agreement, dated July 6, 2010, between Vishay Advanced Technology, Ltd. And Vishay Dale Electronics, Inc. Incorporated by reference to Exhibit 10.4 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.43*	Patent License Agreement, dated July 6, 2010, between Vishay Precision Group, Inc. and Vishay Dale Electronics, Inc. Incorporated by reference to Exhibit 10.6 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.44*	Supply Agreement, dated July 6, 2010, between Vishay Dale Electronics, Inc. and Vishay Advanced Technology, Ltd. Incorporated by reference to Exhibit 10.8 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.45*	Supply Agreement, dated July 6, 2010, between Vishay Measurements Group, Inc. and Vishay S.A. Incorporated by reference to Exhibit 10.9 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.46*	Manufacturing Agreement, dated July 6, 2010, between Vishay S.A. and Vishay Precision Foil GmbH. Incorporated by reference to Exhibit 10.10 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.47	Intellectual Property License Agreement, dated July 6, 2010, between Vishay S.A. and Vishay Precision Foil GmbH. Incorporated by reference to Exhibit 10.11 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.48*	Supply Agreement, dated July 6, 2010, between Vishay Precision Foil GmbH and Vishay S.A. Incorporated by reference to Exhibit 10.12 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.49*	Intellectual Property License Agreement, dated July 6, 2010, between Vishay S.A. and Vishay Measurements Group, Inc. Incorporated by reference to Exhibit 10.13 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.50	Lease Agreement between Vishay Alpha Electronics Corporation and Vishay Japan Co., Ltd. Incorporated by reference to Exhibit 10.14 to Vishay Precision Group, Inc.'s current report on Form 8-K filed July 7, 2010.
10.51	Credit Agreement, dated as of December 1, 2010, as amended and restated as of August 8, 2013, as further amended and restated December 10, 2015, among Vishay Intertechnology, Inc. and JPMorgan Chase Bank, N.A., as administrative agent and the lenders and other parties thereto. Incorporated by reference to Exhibit 10.1 to our current report on Form 8-K filed December 10, 2015.
10.52†	Vishay Intertechnology, Inc. Form of Executive Officer Restricted Stock Unit Agreement. Incorporated by reference to Exhibit 10.2 to our Current Report on Form 8-K, filed on May 21, 2014.
10.53†	Vishay Intertechnology, Inc. Form of Executive Officer Restricted Stock Unit Agreement. Incorporated by reference to Exhibit 10.1 to our current report on Form 8-K, filed on March 6, 2018.
10.54†	Vishay Intertechnology, Inc. Form of Restricted Stock Unit Agreement. Incorporated by reference to Exhibit 10.3 to our Current Report on Form 8-K, filed on May 21, 2014.
10.55†	Vishay Intertechnology, Inc. Form of Restricted Stock Unit Agreement. Incorporated by reference to Exhibit 10.2 to our current report on Form 8-K, filed on March 6, 2018.
10.56†	

	Vishay Intertechnology, Inc. Form of Executive Officer Phantom Stock Unit Agreement. Incorporated by reference to Exhibit 10.4 to our Current Report on Form 8-K, filed on May 21, 2014.
21**	Subsidiaries of the Registrant.
23.1**	Consent of Independent Registered Public Accounting Firm.
31.1**	Certification pursuant to Rules 13a-15(e) or 15d-15(e) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 – Chief Executive Officer.
31.2**	Certification pursuant to Rules 13a-15(e) or 15d-15(e) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 – Chief Financial Officer.
32.1**	Certification Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 – Chief Executive Officer.
32.2**	Certification Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 – Chief Financial Officer.
101**	Interactive Data File (Annual Report on Form 10-K, for the year ended December 31, 2018, furnished in XBRL (eXtensible Business Reporting Language)).

* Confidential treatment has been requested by, and accorded to, VPG with respect to certain portions of this Exhibit. Omitted portions have been filed separately by VPG with the Securities and Exchange Commission.
** Filed herewith.
† Denotes a management contract or compensatory plan, contract, or arrangement.

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Item 16. Form 10-K Summary

Not applicable.

SIGNATURES

Pursuant to the requirement 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.

VISHAY INTERTECHNOLOGY, INC.
By: /s/ Gerald Paul
Dr. Gerald Paul
President and Chief Executive Officer
February 15, 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 and in the capacities and on the dates indicated below.

Signature	Title	Date
Principal Executive Officer:		
/s/ Gerald Paul Dr. Gerald Paul	President, Chief Executive Officer, and Director	February 15, 2019
Principal Financial and Accounting Officer:		
/s/ Lori Lipcaman Lori Lipcaman	Executive Vice President and Chief Financial Officer	February 15, 2019
Board of Directors:		
/s/ Marc Zandman Marc Zandman	Executive Chairman of the Board of Directors	February 15, 2019
/s/ Michael Cody Michael Cody	Director	February 15, 2019
/s/ Abraham Ludomirski Dr. Abraham Ludomirski	Director	February 15, 2019
/s/ Frank D. Maier Frank D. Maier	Director	February 15, 2019
/s/ Ronald M. Ruzic Ronald M. Ruzic	Director	February 15, 2019
/s/ Ziv Shoshani Ziv Shoshani	Director	February 15, 2019
/s/ Timothy V. Talbert Timothy V. Talbert	Director	February 15, 2019

/s/ Thomas C. Wertheimer Thomas C. Wertheimer	Director	February 15, 2019
/s/ Ruta Zandman Ruta Zandman	Director	February 15, 2019
/s/ Raanan Zilberman Raanan Zilberman	Director	February 15, 2019

Vishay Intertechnology, Inc.

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Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Vishay Intertechnology, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Vishay Intertechnology, Inc. (the Company) as of December 31, 2018 and 2017, and the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2018, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the 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 issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 15, 2019 expressed an unqualified opinion thereon.

Basis for Opinion

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

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

/s/ Ernst & Young LLP

We have served as the Company's auditor since 1968
Philadelphia, Pennsylvania
February 15, 2019
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Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Vishay Intertechnology, Inc.

Opinion on Internal Control over Financial Reporting
We have audited Vishay Intertechnology, Inc.'s internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Vishay Intertechnology, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on the COSO criteria.

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, and the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2018, and the related notes and our report dated February 15, 2019 expressed an unqualified opinion thereon.

Basis for Opinion
The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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

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

/s/ Ernst & Young LLP

Philadelphia, Pennsylvania
February 15, 2019
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VISHAY INTERTECHNOLOGY, INC.
Consolidated Balance Sheets
(In thousands, except share amounts)

	December 31, 2018	December 31, 2017 (recast - see Note 1)
Assets		
Current assets:		
Cash and cash equivalents	$686,032	$748,032
Short-term investments	78,286	547,136
Accounts receivable, net of allowances for doubtful accounts of $4,269 and $2,008, respectively	397,020	340,027
Inventories:		
Finished goods	138,112	127,272
Work in process	190,982	170,319
Raw materials	150,566	132,068
Total inventories	479,660	429,659
Prepaid expenses and other current assets	142,888	130,336
Total current assets	1,783,886	2,195,190
Property and equipment, at cost:		
Land	87,622	92,285
Buildings and improvements	619,445	606,168
Machinery and equipment	2,510,001	2,415,769
Construction in progress	125,109	103,058
Allowance for depreciation	(2,373,176)	(2,311,522)
Property and equipment, net	969,001	905,758
Goodwill	147,480	142,742
Other intangible assets, net	65,688	69,754
Other assets	140,143	148,645
Total assets	$3,106,198	$3,462,089

Continues on following page.

VISHAY INTERTECHNOLOGY, INC.
Consolidated Balance Sheets (continued)
(In thousands, except share amounts)

	December 31, 2018	December 31, 2017 (recast - see Note 1)
Liabilities and equity		
Current liabilities:		
Notes payable to banks	$18	$4
Trade accounts payable	218,322	222,373
Payroll and related expenses	141,670	135,702
Other accrued expenses	229,660	154,230
Income taxes	54,436	50,226
Total current liabilities	644,106	562,535
Long-term debt, less current portion	494,509	370,470
U.S. transition tax payable	154,953	151,200
Deferred income taxes	85,471	336,465
Other liabilities	79,489	75,249
Accrued pension and other postretirement costs	260,984	281,701
Total liabilities	1,719,512	1,777,620
Commitments and contingencies		
Redeemable convertible debentures	2,016	252,070
Stockholders' equity:		
Preferred stock, par value $1.00 per share: authorized - 1,000,000 shares; none issued		
Common stock, par value $0.10 per share: authorized - 300,000,000 shares; 132,117,715 and 131,874,587 shares outstanding	13,212	13,188
Class B convertible common stock, par value $0.10 per share: authorized - 40,000,000 shares; 12,097,427 and 12,129,227 shares outstanding	1,210	1,213
Capital in excess of par value	1,436,011	1,752,506
(Accumulated deficit) retained earnings	(61,258)	(362,254)
Accumulated other comprehensive income (loss)	(6,791)	25,714
Total Vishay stockholders' equity	1,382,384	1,430,367
Noncontrolling interests	2,286	2,032
Total equity	1,384,670	1,432,399
Total liabilities, temporary equity, and equity	$3,106,198	$3,462,089

See accompanying notes.
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VISHAY INTERTECHNOLOGY, INC.
Consolidated Statements of Operations
(In thousands, except per share amounts)

	Years ended December 31, 2018	2017 (recast - see Note 1)	2016 (recast - see Note 1)
Net revenues	$3,034,689	$2,599,368	$2,317,328
Costs of products sold	2,146,165	1,896,259	1,743,506
Gross profit	888,524	703,109	573,822
Selling, general, and administrative expenses	403,404	367,831	356,006
Restructuring and severance costs	-	11,273	19,199
Impairment of intangible assets	-	-	1,559
Operating income	485,120	324,005	197,058
Other income (expense):			
Interest expense	(36,680)	(27,850)	(25,623)
Other components of net periodic pension cost	(13,118)	(12,417)	(16,020)
Other	8,037	1,738	4,716
Gain (loss) on early extinguishment of debt	(26,583)	-	4,597
Loss on disposal of equity affiliate	-	(6,112)	-
U.S. pension settlement charges	-	-	(79,321)
Gain related to Tianjin explosion	-	-	8,809
Total other income (expense)	(68,344)	(44,641)	(102,842)
Income before taxes	416,776	279,364	94,216
Income tax expense	70,239	298,924	44,843
Net earnings (loss)	346,537	(19,560)	49,373
Less: net earnings attributable to noncontrolling interests	779	784	581
Net earnings (loss) attributable to Vishay stockholders	$345,758	$(20,344)	$48,792
Basic earnings (loss) per share attributable to Vishay stockholders:	$2.39	$(0.14)	$0.33
Diluted earnings (loss) per share attributable to Vishay stockholders:	$2.24	$(0.14)	$0.32
Weighted average shares outstanding - basic	144,370	145,633	147,152
Weighted average shares outstanding - diluted	154,622	145,633	150,697
Cash dividends per share	$0.3225	$0.2550	$0.2500

See accompanying notes.

VISHAY INTERTECHNOLOGY, INC.
Consolidated Statements of Comprehensive Income
(In thousands)

	Years ended December 31,		
	2018	2017	2016
Net earnings (loss)	$346,537	$(19,560)	$49,373
Other comprehensive income (loss), net of tax			
Pension and other post-retirement actuarial items	10,750	(4,545)	71,926
Foreign currency translation adjustment	(41,454)	124,220	(35,863)
Unrealized gain (loss) on available-for-sale securities	-	691	612
Other comprehensive income (loss)	(30,704)	120,366	36,675
Comprehensive income	315,833	100,806	86,048
Less: comprehensive income attributable to noncontrolling interests	779	784	581
Comprehensive income attributable to Vishay stockholders	$315,054	$100,022	$85,467

See accompanying notes.

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VISHAY INTERTECHNOLOGY, INC.
Consolidated Statements of Cash Flows
(In thousands)

	Years ended December 31,		
	2018	2017	2016
Operating activities			
Net earnings (loss)	$346,537	$(19,560)	$49,373
Adjustments to reconcile net earnings (loss) to net cash provided by operating activities:			
Depreciation and amortization	161,863	163,146	159,363
(Gain) loss on disposal of property and equipment	(2,216)	(265)	(4,054)
Accretion of interest on convertible debt instruments	10,769	4,984	4,610
Inventory write-offs for obsolescence	23,872	17,771	22,619
Impairment of intangible assets	-	-	1,559
U.S. pension settlement charges	-	-	79,321
Pensions and other postretirement benefits, net of contributions	(1,549)	(2,425)	(3,282)
Loss on disposal of equity affiliate	-	6,112	-
Loss (gain) on early extinguishment of debt	26,583	-	(4,597)
Deferred income taxes	(55,206)	52,377	(2,519)
Other	21,194	13,044	(1,678)
U.S. transition tax	(14,757)	180,000	-
Repatriation taxes	(156,767)	-	-
Net change in operating assets and liabilities, net of effects of businesses acquired	(101,817)	(46,407)	(4,206)
Net cash provided by operating activities	258,506	368,777	296,509
Investing activities			
Capital expenditures	(229,899)	(170,432)	(134,635)
Proceeds from sale of property and equipment	55,561	1,685	5,701
Purchase of businesses, net of cash acquired	(14,880)	-	-
Purchase of short-term investments	(175,403)	(749,600)	(555,250)
Maturity of short-term investments	636,108	887,729	532,601
Other investing activities	(2,058)	(4,189)	2,942
Net cash provided by (used in) investing activities	269,429	(34,807)	(148,641)
Financing activities			
Proceeds from long-term borrowings	600,000	-	-
Issuance costs	(15,621)	-	-
Repurchase of convertible debentures	(960,995)	-	-
Principal payments on long-term debt	-	-	(34,044)
Net proceeds (payments) on revolving credit lines	(150,000)	7,000	(47,000)
Common stock repurchases	-	(39,944)	(23,159)
Dividends paid to common stockholders	(42,608)	(33,956)	(33,693)
Dividends paid to Class B common stockholders	(3,901)	(3,093)	(3,032)
Net changes in short-term borrowings	15	1	(723)
Distributions to noncontrolling interests	(525)	(1,140)	(707)
Acquisition of noncontrolling interests	-	(4,100)	-

Proceeds from stock options exercised	-	1,260	356
Cash withholding taxes paid when shares withheld for vested equity awards	(2,297)	(1,971)	(542)
Other financing activities	-	(1,255)	-
Net cash used in financing activities	(575,932)	(77,198)	(142,544)
Effect of exchange rate changes on cash and cash equivalents	(14,003)	19,479	(9,050)
Net increase (decrease) in cash and cash equivalents	(62,000)	276,251	(3,726)
Cash and cash equivalents at beginning of year	748,032	471,781	475,507
Cash and cash equivalents at end of year	$686,032	$748,032	$471,781

See accompanying notes

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VISHAY INTERTECHNOLOGY, INC.
Consolidated Statements of Stockholders' Equity
(In thousands, except share amounts)

	Common Stock	Class B Convertible Common Stock	Capital in Excess of Par Value	Retained Earnings (Accumulated Deficit)	Accumulated Other Comprehensive Income (Loss)	Total Vishay Stockholders' Equity	Noncontrolling Interests	Total Equity
Balance at December 31, 2015	$13,546	$1,213	$2,058,492	$(319,448)	$(131,327)	$1,622,476	$5,567	$1,628,043
Cumulative effect of accounting change for adoption of ASU 2014-09 (see Notes 1 and 2)	-	-	-	2,210	-	2,210	-	2,210
Net earnings	-	-	-	48,792	-	48,792	581	49,373
Other comprehensive income	-	-	-	-	36,675	36,675	-	36,675
Distributions to noncontrolling interests	-	-	-	-	-	-	(707)	(707)
Common stock repurchase (1,752,454 shares)	(175)	-	(22,984)	-	-	(23,159)	-	(23,159)
Temporary equity reclassifications	-	-	(88,659)	-	-	(88,659)	-	(88,659)
Issuance of stock and related tax withholdings for vested restricted stock units (110,825 shares)	11	-	(553)	-	-	(542)	-	(542)
Dividends declared ($0.2500 per share)	-	-	36	(36,761)	-	(36,725)	-	(36,725)
Stock compensation expense	-	-	6,380	-	-	6,380	-	6,380
Stock options exercised (27,619 shares)	3	-	353	-	-	356	-	356
Tax effects of stock plan	-	-	(77)	-	-	(77)	-	(77)
	$13,385	$1,213	$1,952,988	$(305,207)	$(94,652)	$1,567,727	$5,441	$1,573,168

Balance at December 31, 2016 (recast - See Note 1)								
Cumulative effect of accounting change for adoption of ASU 2016-09	-	-	-	386	-	386	-	386
Net earnings (loss)	-	-	-	(20,344)	-	(20,344)	784	(19,560)
Other comprehensive income	-	-	-	-	120,366	120,366	-	120,366
Distributions to noncontrolling interests	-	-	-	-	-	-	(1,140)	(1,140)
Acquisition of noncontrolling interests	-	-	(1,047)	-	-	(1,047)	(3,053)	(4,100)
Common stock repurchase (2,250,236 shares)	(225)	-	(39,719)	-	-	(39,944)	-	(39,944)
Temporary equity reclassification	-	-	(163,411)	-	-	(163,411)	-	(163,411)
Issuance of stock and related tax withholdings for vested restricted stock units (200,688 shares)	20	-	(1,991)	-	-	(1,971)	-	(1,971)
Dividends declared ($0.2550 per share)	-	-	40	(37,089)	-	(37,049)	-	(37,049)
Stock compensation expense	-	-	4,394	-	-	4,394	-	4,394
Stock options exercised 77,334 shares)	8	-	1,252	-	-	1,260	-	1,260
Balance at December 31, 2017 (recast - see Note 1)	$ 13,188	$ 1,213	$ 1,752,506	$ (362,254)	$ 25,714	$ 1,430,367	$ 2,032	$ 1,432,399
Cumulative effect of accounting change for adoption of ASU 2016-01 (see Notes 1 and 10)	-	-	-	1,801	(1,801)	-	-	-

Net earnings	-	-	-	345,758	-	345,758	779	346,537
Other comprehensive income	-	-	-	-	(30,704)	(30,704)	-	(30,704)
Conversion of Class B shares (31,800 shares)	3	(3)	-	-	-	-	-	-
Distributions to noncontrolling interests	-	-	-	-	-	-	(525)	(525)
Temporary equity reclassification	-	-	2,330	-	-	2,330	-	2,330
Issuance of stock and related tax withholdings for vested restricted stock units (211,328 shares)	21	-	(2,318)	-	-	(2,297)	-	(2,297)
Dividends declared ($0.3225 per share)	-	-	54	(46,563)	-	(46,509)	-	(46,509)
Stock compensation expense	-	-	4,817	-	-	4,817	-	4,817
Issuance of convertible notes due 2025	-	-	85,262	-	-	85,262	-	85,262
Repurchase of convertible debentures	-	-	(406,640)	-	-	(406,640)	-	(406,640)
Balance at December 31, 2018	$ 13,212	$ 1,210	$ 1,436,011	$ (61,258)	$ (6,791)	$ 1,382,384	$ 2,286	$ 1,384,670

See accompanying notes.

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Vishay Intertechnology, Inc. ("Vishay" or the "Company") is a global manufacturer and supplier of semiconductors and passive components, including power MOSFETs, power integrated circuits, transistors, diodes, optoelectronic components, resistors, capacitors, and inductors. Semiconductors and electronic components manufactured by the Company are used in virtually all types of electronic products, including those in the industrial, computing, automotive, consumer electronics products, telecommunications, power supplies, military/aerospace, and medical industries.

Note 1 – Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States ("GAAP") requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. Actual results could differ significantly from those estimates.

Principles of Consolidation

The consolidated financial statements include the accounts of Vishay and all of its subsidiaries in which a controlling financial interest is maintained. For those consolidated subsidiaries in which the Company's ownership is less than 100 percent, the outside stockholders' interests are shown as noncontrolling interest in the accompanying consolidated balance sheets. Investments in affiliates over which the Company has significant influence but not a controlling interest are carried on the equity basis. Investments in affiliates over which the Company does not have significant influence are accounted for by the cost method. All intercompany transactions, accounts, and profits are eliminated.

Revenue Recognition

The Company recognizes revenue from contracts with customers in accordance with Accounting Standards Update ("ASU") No. 2014-09, Revenue from Contracts with Customers (Topic 606). See Note 2.

Research and Development Expenses

Research and development costs are expensed as incurred. The amount charged to expense for research and development (exclusive of purchased in-process research and development) aggregated $72,885, $67,153, and $66,842, for the years ended December 31, 2018, 2017, and 2016, respectively. The Company spends additional amounts for the development of machinery and equipment for new processes and for cost reduction measures.

Income Taxes

The provision for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid. The provision for income taxes represents income taxes paid or payable for the current year plus the change in deferred taxes during the year. Deferred taxes result from differences between the financial and tax bases of the Company's assets and liabilities and are adjusted for changes in tax rates and tax laws when changes are enacted. Valuation allowances have been established for deferred tax assets which the Company believes do not meet GAAP criteria of "more likely than not" to be realized. This criterion requires a level of judgment regarding future taxable income, which may be revised due to changes in market conditions, tax laws, or other factors. If the Company's assumptions and estimates change in the future, valuation allowances established may be increased, resulting in increased tax expense. Conversely, if the Company is ultimately able to utilize all or a portion of the deferred tax assets for which a valuation allowance has been established, then the related portion of the valuation allowance can be released, resulting in decreased tax expense.

The Company and its subsidiaries are subject to income taxes in the U.S. and numerous foreign jurisdictions. Significant judgment is required in evaluating the Company's tax positions and determining its provision for income taxes. During the ordinary course of business, there are many transactions and calculations for which the ultimate tax determination is uncertain. The Company establishes reserves for tax-related uncertainties based on estimates of whether, and the extent to which, additional taxes will be due. These reserves are established when the Company believes that certain positions might be challenged despite the Company's belief that its tax return positions are fully supportable. The Company adjusts these reserves in light of changing facts and circumstances and the provision for income taxes includes the impact of reserve provisions and changes to reserves that are considered appropriate.

These accruals for tax-related uncertainties are based on management's best estimate of potential tax exposures. When particular matters arise, a number of years may elapse before such matters are audited by tax authorities and finally resolved. Favorable resolution of such matters could be recognized as a reduction to the Company's effective tax rate in the year of resolution. Unfavorable resolution of any particular issue could increase the effective tax rate and may require the use of cash in the year of resolution. The amount included in current liabilities on the accompanying consolidated balance sheets reflect only amounts expected to be settled in cash within one year.

See Note 5.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 1 – Summary of Significant Accounting Policies (continued)

Cash, Cash Equivalents, and Short-Term Investments

Cash and cash equivalents includes demand deposits and highly liquid investments with maturities of three months or less when purchased. Highly liquid investments with original maturities greater than three months, but less than one year are classified as short-term investments. At December 31, 2018 and 2017, the Company's short-term investments were comprised of time deposits with financial institutions whose original maturity exceeds three months, but less than one year.

Allowance for Doubtful Accounts

The Company maintains an allowance for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments. The allowance is determined through an analysis of the aging of accounts receivable and assessments of risk that are based on historical trends and an evaluation of the impact of current and projected economic conditions. The Company evaluates the past-due status of its trade receivables based on contractual terms of sale. 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. Bad debt expense was $2,570, $301, and $61 for the years ended December 31, 2018, 2017, and 2016, respectively.

Inventories

Inventories are stated at the lower of cost, determined by the first-in, first-out method, or net realizable value. Inventories are adjusted for estimated obsolescence and written down to net realizable value based upon estimates of future demand, technology developments, and market conditions.

Property and Equipment

Property and equipment is carried at cost and is depreciated principally by the straight-line method based upon the estimated useful lives of the assets. Machinery and equipment are being depreciated over useful lives of seven to ten years. Buildings and building improvements are being depreciated over useful lives of twenty to forty years. Construction in progress is not depreciated until the assets are placed in service. The estimated cost to complete construction in progress at December 31, 2018 was approximately $127,000. Depreciation of capital lease assets is included in total depreciation expense. Depreciation expense was $150,056, $148,883, and $144,521 for the years ended December 31, 2018, 2017, and 2016, respectively. Gains and losses on the disposal of assets which do not qualify for presentation as discontinued operations are included in the determination of operating margin (within selling, general, and administrative expenses). Individually material gains and losses on disposal are separately disclosed in the notes to the consolidated financial statements.

Goodwill and Other Intangible Assets

Goodwill represents the excess of the cost of a business acquired over the fair value of the related net assets at the date of acquisition. Certain of the Company's tradenames were assigned indefinite useful lives. Goodwill and indefinite-lived intangible assets are not amortized but rather are tested for impairment at least annually. These tests are performed more frequently whenever events or changes in circumstances indicate that the assets might be impaired. The Company's business segments (see Note 15) represent its reporting units for goodwill impairment testing purposes. See Note 20 for further information on the impairment test performed in 2016. At December 31, 2018 and 2017, respectively, the Company has no recorded indefinite-lived intangible assets.

Definite-lived intangible assets are amortized over their estimated useful lives. Patents and acquired technology are being amortized over useful lives of seven to twenty-five years. Capitalized software is amortized over periods of three to ten years, primarily included in costs of products sold on the consolidated statements of operations. Customer relationships are amortized over useful lives of five to twenty years. Noncompete agreements are amortized over periods of three to ten years. The Company continually evaluates the reasonableness of the useful lives of these assets.

GAAP prescribes a quantitative method for determining goodwill impairment. The Company has the option of performing a qualitative assessment before performing the quantitative impairment test. If it is determined, on the basis of qualitative factors, that the fair value of the reporting unit is not more likely than not less than the carrying amount, the quantitative impairment test is not required. If it is determined that the fair value of the reporting unit is more likely than not less than the carrying amount, the quantitative impairment test is required.

The Company determines the fair value of the reporting unit and compares that fair value to the net book value of the reporting unit. The fair value of the reporting unit is determined using various valuation techniques, including a comparable companies market multiple approach and a discounted cash flow analysis (an income approach). If the net book value of the reporting unit were to exceed the fair value, the Company would recognize an impairment charge.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 1 – Summary of Significant Accounting Policies (continued)

Impairment of Long-Lived Assets

The carrying value of long-lived assets held-and-used, other than goodwill and indefinite-lived intangible assets, is evaluated when events or changes in circumstances indicate the carrying value may not be recoverable or the useful life has changed. The carrying value of a long-lived asset group is considered impaired when the total projected undiscounted cash flows from such asset group are separately identifiable and are less than the carrying value. In that event, a loss is recognized based on the amount by which the carrying value exceeds the fair market value of the long-lived asset group. Fair market value is determined primarily using present value techniques based on projected cash flows from the asset group. Losses on long-lived assets held-for-sale, other than goodwill and indefinite-lived intangible assets, are determined in a similar manner, except that fair market values are reduced for anticipated disposal costs.

Available-for-Sale Securities

Short-term investments and other assets reported on the accompanying consolidated balance sheets include time deposits with financial institutions whose original maturity exceeds three months, but less than one year and investments in marketable securities which are classified as available-for-sale. These assets include assets that are held in trust related to the Company's non-qualified pension and deferred compensation plans (see Note 11) and assets that are intended to fund a portion of the Company's other postretirement benefit obligations outside of the U.S. These assets are reported at fair value, based on quoted market prices as of the end of the reporting period. Beginning in 2018, unrealized gains and losses are reported, net of their related tax consequences, as Other Income (Expense) on the consolidated statements of operations. See "Recently Adopted Accounting Guidance" below. At the time of sale, the assets that are held in trust related to the Company's non-qualified pension and deferred compensation plans, any gains (losses) calculated by the specific identification method are recognized as a reduction (increase) to benefits expense, within selling, general, and administrative expenses.

Financial Instruments

The Company uses financial instruments in the normal course of its business, including from time to time, derivative financial instruments. Additionally, from time to time, the Company enters into contracts that are not considered derivative financial instruments in their entirety, but that include embedded derivative features. The convertible senior debentures due 2040, due 2041, and due 2042 contain embedded derivatives that are recorded at fair value on a recurring basis. At December 31, 2018 and 2017, outstanding derivative instruments were not material.

The Company reports derivative instruments on the accompanying consolidated balance sheet at their fair values. The accounting for changes in fair value depends upon the purpose of the derivative instrument and whether it is designated and qualifies for hedge accounting. For instruments designated as hedges, the effective portion of gains or losses is reported in other comprehensive income (loss) and the ineffective portion, if any, is reported in current period net earnings (loss). Changes in the fair values of derivative instruments that are not designated as hedges, including embedded derivatives, are recorded in current period net earnings (loss).

The Company has in the past used interest rate swap agreements to modify variable rate obligations to fixed rate obligations, thereby reducing exposure to market rate fluctuations. The Company uses financial instruments such as forward exchange contracts to mitigate a portion, but not all, of the risk associated with its firm commitments denominated in foreign currencies. The purpose of the Company's foreign currency management is to minimize the effect of exchange rate changes on actual cash flows from foreign currency denominated transactions.

Other financial instruments include cash and cash equivalents, held-to-maturity short-term investments, accounts receivable, and notes payable. The carrying amounts of these financial instruments reported on the accompanying consolidated balance sheets approximate their fair values due to the short-term nature of these assets and liabilities.

Stock-Based Compensation

Compensation costs related to stock-based payment transactions are recognized in the consolidated financial statements. The amount of compensation cost is measured based on the grant-date fair value of the equity (or liability) instruments issued. Compensation cost is recognized over the period that an officer, employee, or non-employee director is required to provide service in exchange for the award. For awards subject to graded vesting, the Company recognizes expense over the service period for each separately vesting portion of the award as if the award was, in-substance, multiple awards. The Company recognizes compensation cost for restricted stock units ("RSUs") that are expected to vest and records cumulative adjustments in the period that the expectation changes.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 1 – Summary of Significant Accounting Policies (continued)

Foreign Currency Translation

The Company has significant operations outside of the United States. The Company finances its operations in Europe and certain locations in Asia in local currencies, and accordingly, these subsidiaries utilize the local currency as their functional currency. The Company's operations in Israel and most significant locations in Asia are largely financed in U.S. dollars, and accordingly, these subsidiaries utilize the U.S. dollar as their functional currency.

For those subsidiaries where the local currency is the functional currency, assets and liabilities on the accompanying consolidated balance sheets have been translated at the rate of exchange as of the balance sheet date. Translation adjustments do not impact the consolidated results of operations and are reported as a separate component of stockholders' equity. Revenues and expenses are translated at the average exchange rate for the year. While the translation of revenues and expenses into U.S. dollars does not directly impact the statement of operations, the translation effectively increases or decreases the U.S. dollar equivalent of revenues generated and expenses incurred in those foreign currencies.

For those foreign subsidiaries where the U.S. dollar is the functional currency, all foreign currency financial statement amounts are remeasured into U.S. dollars. Exchange gains and losses arising from remeasurement of foreign currency-denominated monetary assets and liabilities are included in the consolidated results of operations.

Commitments and Contingencies

Liabilities for loss contingencies, including environmental remediation costs, arising from claims, assessments, litigation, fines, penalties, and other sources are recorded when it is probable that a liability has been incurred and the amount of the assessment and/or remediation can be reasonably estimated. The costs for a specific environmental remediation site are discounted if the aggregate amount of the obligation and the amount and timing of the cash payments for that site are fixed or reliably determinable based upon information derived from the remediation plan for that site. Accrued liabilities for environmental matters recorded at December 31, 2018 and 2017 do not include claims against third parties.

Restructuring and Severance Costs

Restructuring and severance costs reflect charges resulting from cost reduction programs implemented by the Company. Restructuring and severance costs include exit costs, severance benefits pursuant to an on-going arrangement, voluntary termination compensation under a defined program, and any related pension curtailment and settlement charges.

The Company recognizes expense for one-time benefits only after management has committed to a plan, the plan is sufficiently detailed to provide the number, classification, and location of employees to be terminated as well as the expected completion date, the plan has been sufficiently communicated to employees such that they are able to determine the type and amount of benefits they will receive if terminated, and it is unlikely that the plan will be significantly changed or withdrawn. If an employee is not required to render service beyond a minimum retention period, the Company recognizes expense once the aforementioned criteria have been met. If an employee is required to render service beyond a minimum retention period, the Company recognizes expense over the period that the employee is required to render future service.

The Company recognizes expense for on-going benefit arrangements when the liability is reasonably estimable and considered probable.

The Company recognizes expense for voluntary separation / early retirement when the employee delivers an irrevocable voluntary termination notice pursuant to a defined company program.

The Company recognizes other exit costs as incurred.

Self-Insurance Programs

The Company uses a combination of insurance and self-insurance mechanisms to provide for the potential liabilities for workers' compensation, general liability, property damage, director and officers' liability, and vehicle liability.

As part of its self-insurance program for certain risks, the Company created a wholly-owned captive insurance entity in 2007. At December 31, 2018, the captive insurance entity provides only property and general liability insurance, although it is licensed to also provide casualty and directors' and officers' insurance. The captive insurance entity had no amounts accrued for outstanding claims at December 31, 2018 and $560 accrued for outstanding claims at December 31, 2017.

Certain investments held by the captive insurance entity are restricted primarily for the purpose of potential insurance claims. Such amounts are recorded in other noncurrent assets and total $11,046 and $9,438 at December 31, 2018 and 2017, respectively, representing required statutory reserves of the captive insurance entity.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 1 – Summary of Significant Accounting Policies (continued)

Convertible Debt Instruments

The Company separately accounts for the liability and equity components of convertible debt instruments that may be settled in cash in a manner that reflects the Company's nonconvertible debt borrowing rate. The liability component at issuance is recognized at fair value, based on the fair value of a similar instrument that does not have a conversion feature. A discount is recorded if debt instruments are issued at a coupon rate which is below the rate of a similar instrument that did not have a conversion feature at issuance. The equity component is based on the excess of the principal amount of the debt instruments over the fair value of the liability component, after adjusting for an allocation of debt issuance costs and the deferred tax impact, and is recorded as capital in excess of par. Debt discounts are amortized as additional non-cash interest expense over the expected life of the debt.

Recent Accounting Pronouncements

Recent Accounting Guidance Not Yet Adopted

In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2016-02, Leases (Topic 842). The ASU is the result of a project between the FASB and the International Accounting Standards Board to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and disclosing key information about leasing arrangements. Upon adoption of the ASU, the Company will recognize lease assets and liabilities for its operating leases which are not currently reported on its consolidated balance sheets. The ASU is effective for the Company for interim and annual periods beginning on or after January 1, 2019. The Company will adopt the ASU effective January 1, 2019 and provide comparative disclosures for the years ended December 31, 2017 and 2018 using the existing guidance in ASC Topic 840, Leases. Based on work performed to date, the Company expects to recognize right of use assets and lease liabilities between $90,000 and $100,000 as of January 1, 2019. The Company continues to evaluate the effect of the ASU on the sale-leaseback transaction of its former manufacturing facility in Santa Clara, California. The adoption of the ASU is not expected to have a material impact on the Company's results of operations.

In June 2016, the FASB issued ASU No. 2016-13, Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments. The ASU replaces the incurred loss impairment methodology in current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. The ASU is effective for the Company for interim and annual periods beginning on or after January 1, 2020, with the ability to early adopt for interim and annual periods beginning on or after January 1, 2019. The Company plans to adopt the ASU effective January 1, 2020. The Company is currently evaluating the effect of the ASU on its financial assets measured at amortized cost.

Recent Accounting Guidance Adopted

In May 2014, the Financial Accounting Standards Board ("FASB") issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606). The ASU is the result of a convergence project between the FASB and the International Accounting Standards Board to clarify the principles for recognizing revenue and to develop a common revenue standard for GAAP and International Financial Reporting Standards. The ASU removes inconsistencies and weaknesses in revenue requirements; provides a more robust framework for addressing revenue issues; improves comparability of revenue recognition practices across entities, industries, jurisdictions, and capital markets; provides more useful information to users of financial statements through expanded disclosure requirements; and simplifies the preparation of financial statements by reducing the number of requirements to which an entity must refer. The

Company retrospectively adopted the ASU on January 1, 2018. The adoption of the ASU did not have a material impact on the Company's results of operations. See Note 2 and "Changes in Accounting Policies" below.

In January 2016, the FASB issued ASU No. 2016-01, Financial Instruments - Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities. The ASU enhances the reporting model for financial instruments by addressing certain aspects, including requiring equity investments to be measured at fair value with changes in fair value recognized in net income; simplifying the impairment assessment of equity investments without readily determinable fair values; eliminating the requirement to disclose the method and significant assumptions used to estimate the disclosed fair value of financial instruments measured at amortized cost; and requiring the use of the exit price notion for fair value measurements of financial instruments for disclosure purposes. The Company adopted the ASU on January 1, 2018. The Company recognized a cumulative-effect adjustment to January 1, 2018 retained earnings (accumulated deficit) of $1,801 for the cumulative change in fair value of available-for-sale equity investments previously recognized in other comprehensive income. The adoption of the ASU did not have a material impact on the Company's results of operations.

In March 2017, the FASB issued ASU No. 2017-07, Compensation - Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost. The ASU amends the income statement presentation requirements of net periodic benefit cost of defined benefit pension and other postretirement plans. The Company retrospectively adopted the ASU on January 1, 2018. The adoption of the ASU did not have a material impact on the Company's results of operations. See "Changes in Accounting Policies" below.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 1 – Summary of Significant Accounting Policies (continued)

Changes in Accounting Policies

Except for the changes described in "Recent Accounting Guidance Adopted" above and in this section below, the Company has consistently applied the accounting policies described in its Note 1 to its audited consolidated financial statements included in its annual report on Form 10-K.

Revenue Recognition

The Company adopted ASU 2014-09 as of January 1, 2018 using the full retrospective method. As a result, the Company has changed its accounting policy for revenue recognition. The details of significant changes and quantitative impact of the changes are disclosed below.

Service-type warranty performance obligations

ASU 2014-09 introduces the concept of service-type warranties, which represent separate performance obligations. Upon adoption of ASU 2014-09, the Company considers its warranty obligations as service-type warranties and allocates a portion of the estimated consideration to be received from the related contract to the service-type warranty performance obligation and recognizes the related revenue over the warranty period. The impact of accounting for service-type warranties as separate performance obligations was not significant in the retrospective adoption period and is included in the tables below. See further discussion of the warranty obligations in Note 2.

Custom products

The Company previously recognized revenue when the sales process was completed, which generally occurred when the product was delivered and risk of loss was transferred to the customer. Upon adoption of ASU 2014-09, the Company analyzes its contractual arrangements to determine whether the promise in the contract to construct and transfer goods to the customer is a performance obligation that will be satisfied over time or at a point in time. When the Company's performance does not create an asset with an alternative use to the Company and the Company has an enforceable right to payment for performance completed to date, the Company transfers control of a good or service over time and, therefore, satisfies a performance obligation and recognizes revenue over time. The Company has a limited number of contracts for custom products that meet the criteria to recognize revenue over time. The dollar amount of these custom products did not materially change during the retrospective adoption period. The Company recorded a cumulative-effect adjustment of $2,210 to January 1, 2016 retained earnings (accumulated deficit) and recorded adjustments to its consolidated balance sheets due to the impact of recognizing revenue for certain custom products over time rather than at a point in time.

ASU 2014-09 provides several transition practical expedients. The Company has not restated completed contracts that begin and end in the same annual reporting period; used the transaction price at the date the contract was completed rather than estimating variable consideration amounts in the comparative reporting periods; has not disclosed the amount of the transaction price allocated to the remaining performance obligations and an explanation of when the Company expects to recognize the amount as revenue for the reporting periods presented prior to January 1, 2016; and has not retrospectively restated the contract for modifications made prior to January 1, 2016 and instead reflected the aggregate effect of all modifications when identifying the satisfied and unsatisfied performance obligations, determining the transaction price and allocating the transaction price pursuant to the transition practical expedients available.

Pension and Other Postretirement Benefits

The Company retrospectively adopted ASU No. 2017-07 as of January 1, 2018. As a result, the Company has changed its accounting policy for pension and other postretirement benefits costs as detailed below.

ASU 2017-07 amends the income statement presentation requirements of net periodic benefit cost of defined benefit pension and other postretirement plans. The service cost component of net periodic pension cost is recorded in the same line item or items as other compensation costs arising from services rendered by the pertinent employees during the period, and other components of net periodic pension cost are included on a separate line within other income (expense). The Company reclassified net benefit costs other than the current service component previously reported as cost of goods sold and selling, general, and administrative expenses to other expenses for each quarter in the retrospective adoption period in the table below. The Company also reclassified the $79,321 U.S. pension settlement charges recorded for the year ended December 31, 2016 to other expenses. See the impact of this change in the tables below.

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 1 – Summary of Significant Accounting Policies (continued)

The retrospective adoption of ASUs 2014-09 and 2017-07 did not impact net earnings (loss) attributed to Vishay stockholders. See the combined impact of the retrospective adoption for the 2017 fiscal quarters in Note 21 and for the years ended December 31, 2017 and 2016 in the table below:

	Years ended December 31, 2016			December 31, 2017		
	As Reported	Adjustments	Recast	As Reported	Adjustments	Recast
Net revenues	$2,323,431	$ (6,103)	$2,317,328	$2,603,522	$ (4,154)	$2,599,368
Costs of products sold	1,753,648	(10,142)	1,743,506	1,903,910	(7,651)	1,896,259
Gross profit	569,783	4,039	573,822	699,612	3,497	703,109
Operating income	101,717	95,341	197,058	311,588	12,417	324,005
Total other income (expense)	(7,501)	(95,341)	(102,842)	(32,224)	(12,417)	(44,641)
Income before taxes	94,216	-	94,216	279,364	-	279,364
Income tax expense	44,843	-	44,843	298,924	-	298,924
Net earnings (loss)	49,373	-	49,373	(19,560)	-	(19,560)
Less: net earnings attributable to noncontrolling interests	581	-	581	784	-	784
Net earnings (loss) attributable to Vishay stockholders	$48,792	$ -	$48,792	$(20,344)	$ -	$(20,344)

Reclassifications

In addition to the changes due to retrospective adoption of new accounting guidance described above, certain prior year amounts have been reclassified. Such reclassifications had no effect on reported net earnings (loss) attributable to Vishay stockholders, total assets, stockholders' equity, or the statements of cash flows.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 2 – Revenue Recognition

As of January 1, 2018, the Company recognizes revenue from contracts with customers in accordance with ASU 2014-09. The Company has framework agreements with many of its customers that contain the terms and conditions of future sales, but do not create enforceable rights or obligations. Per ASU 2014-09, the Company's contracts are the combined purchase orders and the terms and conditions contained within such framework agreements.

Payment terms for the Company's sales are generally less than sixty days. Substantially all of the Company's receivables are collected within twelve months of the transfer of products to the customer and the Company expects this to continue going forward. The Company applies the practical expedient within ASU 2014-09 to all of its contracts with payment terms less than or equal to twelve months and does not recognize a financing component of the transaction price.

Revenue is measured based on the consideration specified in contracts with customers, and excludes any sales incentives and amounts collected on behalf of third parties. The Company recognizes revenue when it satisfies its performance obligations.

The Company's contracts contain two performance obligations: delivery of products and warranty protection. The Company does not sell separate, enhanced, or extended warranty coverage, but through its customary business practices, the Company has created implied service-type warranties, which are accounted for as separate performance obligations. Revenue is allocated between these two performance obligations and recognized as the obligations are satisfied. The allocation of revenue to warranty protection is based on an estimate of expected cost plus margin. The delivery of products performance obligation is satisfied and product sales revenue is recognized when the customer takes control of the products. Warranty revenue is deferred and the warranty protection performance obligation is satisfied and revenue is recognized over the warranty period, which is typically less than twenty-four months from sale to end customer. The warranty deferred revenue liability is recorded within Other Accrued Expenses and Other Liabilities on the accompanying consolidated balance sheets. The deferred revenue balance associated with the service-type warranty performance obligations and the components that comprise the change in the deferred revenue balance are not significant.

The Company has a broad line of products that it sells to original equipment manufacturers ("OEMs"), electronic manufacturing services ("EMS") companies, which manufacture for OEMs on an outsourcing basis, and independent distributors that maintain large inventories of electronic components for resale to OEMs and EMS companies.

The Company has and will continue to recognize revenue on sales to distributors when the distributor takes control of the products ("sold-to" model). The Company has agreements with distributors that allow distributors a limited credit for unsaleable products, which it terms a "scrap allowance." Consistent with industry practice, the Company also has a "stock, ship and debit" program whereby it considers requests by distributors for credits on previously purchased products that remain in distributors' inventory, to enable the distributors to offer more competitive pricing. In addition, the Company has contractual arrangements whereby it provides distributors with protection against price reductions initiated by the Company after product is sold by the Company to the distributor and prior to resale by the distributor.

The Company recognizes the estimated variable consideration to be received as revenue and records a related accrued expense for the consideration not expected to be received, based upon its estimate of product returns, scrap allowances, "stock, ship and debit" credits, and price protection credits that will be attributable to sales recorded through the end of the period. The Company makes these estimates based upon sales levels to its distributors during the period, inventory levels at the distributors, current and projected market conditions, and historical experience under the programs. While the Company utilizes a number of different methodologies to estimate the accruals, all of the methodologies take into account sales levels to distributors during the relevant period, inventory levels at the distributors, current and projected market trends and conditions, recent and historical activity under the relevant programs, changes in program policies, and open requests for credits. These procedures require the exercise of significant judgments. The Company believes that it has a reasonable basis to estimate future credits under the programs.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Notes 2 - Revenue Recognition (continued)

Sales returns and allowances accrual activity is shown below:

	Years Ended December 31,		
	2018	2017	2016
Beginning balance	$36,680	$34,479	$32,487
Sales allowances	102,026	89,009	86,896
Credits issued	(95,521)	(87,403)	(85,341)
Foreign currency	(522)	595	437
Ending balance	$42,663	$36,680	$34,479

The Company pays commissions to external sales representatives on a per-sale basis. The Company applies the practical expedient available within ASU 2014-09 to all commissions paid as the future amortization period of the asset that the Company otherwise would have recognized is one year or less. Accordingly, these commissions are expensed as incurred. Internal staff are not paid commissions.

The Company has elected to account for shipping and handling as activities to fulfill the promise to transfer the product even if the shipping and handling activities are performed after the customer obtains control. The Company does not evaluate whether shipping and handling activities are promised services to its customers. If control transfers and revenue is recognized for the related products before the shipping and handling activities occur, the related costs of those shipping and handling activities is accrued. The Company applies this accounting policy election consistently to similar types of transactions.

See disaggregated revenue information in Note 15.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 3 - Acquisition and Divestiture Activities

As part of its growth strategy, the Company seeks to expand through targeted acquisitions of other manufacturers of electronic components that have established positions in major markets, reputations for product quality and reliability, and product lines with which the Company has substantial marketing and technical expertise.

Year ended December 31, 2018

On February 8, 2018, the Company acquired substantially all of the assets and liabilities of Ultrasource, Inc. ("UltraSource"), a U.S.-based, privately-held thin film circuit and thin film interconnect manufacturer, for $13,596. Based on an estimate of their fair values, the Company allocated $6,500 of the purchase price to definite-lived intangible assets. After allocating the purchase price to the assets acquired and liabilities assumed based on an estimation of their fair values at the date of acquisition, the Company recorded goodwill of $4,227 related to this acquisition. The results and operations of this acquisition have been included in the Resistors & Inductors segment since February 8, 2018. The inclusion of this acquisition did not have a material impact on the Company's consolidated results for the year ended December 31, 2018. The goodwill related to this acquisition is included in the Resistors & Inductors reporting unit for goodwill impairment testing.

On June 11, 2018, the Company acquired EuroPower Holdings Ltd. ("EuroPower") for $2,939, net of cash acquired. EuroPower is a distributor of electronic components in the United Kingdom. The inclusion of this business did not have a material impact on the Company's consolidated results for the year ended December 31, 2018. After allocating the purchase price to the assets acquired and liabilities assumed based on an estimation of their fair values at the date of acquisition, the Company recorded goodwill of $1,068 related to this acquisition. The goodwill related to this acquisition is included in the Resistors & Inductors reporting unit for goodwill impairment testing.

Prior years

In the fourth fiscal quarter of 2015, the Company deposited the $6,750 purchase price of Sonntag Electronic GmbH ("Sonntag"). The purchase price, net of cash acquired was $5,450. The acquisition was effective January 1, 2016. Sonntag is a distributor of electronic components in Germany. The inclusion of this business did not have a material impact on the Company's consolidated results for the year ended December 31, 2016. After allocating the purchase price to the assets acquired and liabilities assumed based on an estimation of their fair values at the date of acquisition, the Company recorded goodwill of $3,485 related to this acquisition. The goodwill related to this acquisition is included in the Resistors & Inductors reporting unit for goodwill impairment testing.

Had these acquisitions occurred as of the beginning of the periods presented in these consolidated financial statements, the pro forma statements of operations would not be materially different than the consolidated statements of operations presented.

Subsequent Events

On January 3, 2019, the Company acquired substantially all of the assets of Bi-Metallix, Inc. ("Bi-Metallix"), a U.S.-based, privately-held provider of electron beam continuous strip welding services for $12,000, subject to customary post-closing adjustments. The Company was a major customer of Bi-Metallix, and the acquired business will be vertically integrated into the Company's Resistors & Inductors segment.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 4 – Restructuring and Related Activities

The Company places a strong emphasis on controlling its costs and combats general price inflation by continuously improving its efficiency and operating performance. When the ongoing cost containment activities are not adequate, the Company takes actions to maintain its cost competitiveness.

The Company incurred significant restructuring costs in its past to reduce its cost structure. Historically, the Company's primary cost reduction technique was through the transfer of production from high-labor-cost countries to lower-labor-cost countries. Since 2013, the Company's cost reduction programs have primarily focused on reducing fixed costs, including selling, general, and administrative expenses. As of December 31, 2017, the Company's restructuring programs were substantially completed.

The following table summarizes restructuring and related expenses which were recognized and reported on a separate line in the accompanying consolidated statements of operations:

	Years ended December 31,	
	2017	2016
MOSFETs Enhanced Competitiveness Program	$3,204	$9,744
Global Cost Reduction Programs	8,069	9,918
Modules Production Transfer	-	(463)
Total	$11,273	$19,199

MOSFETs Enhanced Competitiveness Program

Over a period of approximately 2 years and in a period of discrete steps, the manufacture of wafers for a substantial share of products was transferred into a more cost-efficient fab. As a consequence, certain other manufacturing previously occurring in-house was transferred to third-party foundries. This transfer of production was substantially completed by the end of the first fiscal quarter of 2016.

As a result of a review of the financial results and outlook for the Company's MOSFETs segment following the completion of the aforementioned production transfers, in November 2016, the Company determined to implement further cost reductions for the MOSFETs segment. In November 2016, the Company announced an extension of the MOSFETs Enhanced Competitiveness Program. The revised program included various cost reduction initiatives, primarily the transfer of all remaining manufacturing operations at its Santa Clara, California facility to other Vishay facilities or third-party subcontractors.

The following table summarizes the activity to date related to this program:

Expense recorded in 2013	$2,328
Cash paid	(267)
Balance at December 31, 2013	$2,061
Expense recorded in 2014	6,025
Cash paid	(856)
Balance at December 31, 2014	$7,230
Expense recorded in 2015	5,367
Cash paid	(426)
Foreign currency translation	1

Balance at December 31, 2015	$12,172
Expense recorded in 2016	9,744
Cash paid	(15,686)
Foreign currency translation	2
Balance at December 31, 2016	$6,232
Expense recorded in 2017	3,204
Cash paid	(7,173)
Balance at December 31, 2017	$2,263
Cash paid	(2,055)
Balance at December 31, 2018	$208

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 4 – Restructuring and Related Activities (continued)

Severance benefits are generally paid in a lump sum at cessation of employment. Other exit costs of $958 and $5,763 are included in the expenses incurred in 2017 and 2016, respectively, in the table above. The entire amount of the liability is considered current and is included in other accrued expenses on the accompanying consolidated balance sheets.

Sale of Vacated Property

On December 20, 2018, the Company entered into a transaction to sell the site of its former manufacturing facility in Santa Clara, California to a third-party buyer. On December 20, 2018, the Company received sale proceeds of $45,500 and concurrently leased-back the property under a short-term arrangement, to raze the buildings on the property.

Due to the short-term lease-back, obligation to raze the buildings, and other factors, the transaction is not considered a completed sale under U.S. GAAP. The cash received is included in other accrued expenses on the accompanying consolidated balance sheet, and included in proceeds from sale of property and equipment on the accompanying consolidated statement of cash flows. The short-term lease-back will expire on the earlier of 15 days after the completion of demolition or June 30, 2019.

The Company continues to evaluate the effect of ASU No. 2016-02 on the transaction.

Modules Production Transfer

In an effort to reduce costs and streamline production of its module products within its Diodes segment, the Company committed to two smaller cost reduction programs related to the transferring of production of certain of its products.

The Company recorded restructuring and severance costs of $2,080 for the year ended December 31, 2014 and an adjustment of $(463) during the year ended December 31, 2016 related to these production transfer programs. Substantially all amounts related to these programs were paid as of December 31, 2016.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 4 – Restructuring and Related Activities (continued)

Global Cost Reduction Programs

The global cost reduction programs announced in 2015 included a plan to reduce selling, general, and administrative costs company-wide, and targeted streamlining and consolidation of production for certain product lines within its Capacitors and Resistors & Inductors segments. These programs were substantially completed as of December 31, 2017.

The following table summarizes the activity to date related to this program:

Expense recorded in 2015	$13,753
Cash paid	(986)
Foreign currency translation	(150)
Balance at December 31, 2015	$12,617
Expense recorded in 2016	9,918
Cash paid	(16,237)
Foreign currency translation	(34)
Balance at December 31, 2016	$6,264
Expense recorded in 2017	8,069
Cash paid	(7,168)
Foreign currency translation	500
Balance at December 31, 2017	$7,665
Cash paid	(3,903)
Foreign currency translation	(117)
Balance at December 31, 2018	$3,645

The following table summarizes the expense recognized by segment related to this program:

	Years ended December 31,	
	2017	2016
Diodes	$428	$788
Optoelectronic Components	437	936
Resistors & Inductors	4,981	5,173
Capacitors	434	687
Unallocated Selling, General, and Administrative Expenses	1,789	2,334
Total	$8,069	$9,918

Severance benefits are generally paid in a lump sum at cessation of employment. Other exit costs of $577 are included in the expenses incurred in 2017 in the tables above. The current portion of the liability is $2,330 and is included in other accrued expenses on the accompanying consolidated balance sheet. The non-current portion of the liability is included in other liabilities on the accompanying consolidated balance sheet.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 5 – Income Taxes

U.S. Tax Reform: Tax Cuts and Jobs Act

On December 22, 2017, the Tax Cuts and Jobs Act (the "TCJA") was enacted in the United States. The TCJA represents sweeping changes in U.S. tax law. Among the numerous changes in tax law, the TCJA permanently reduced the U.S. corporate income tax rate to 21% beginning in 2018; imposed a one-time transition tax on deferred foreign earnings; established a partial territorial tax system by allowing a 100% dividends received deduction on qualifying dividends paid by foreign subsidiaries; limited deductions for net interest expense; expanded the U.S. taxation of foreign earned income to include "global intangible low-taxed income" ("GILTI") of foreign subsidiaries; and imposed a base erosion and anti-abuse minimum tax ("BEAT").

As permitted by SAB No. 118, the tax expense recorded in the fourth fiscal quarter of 2017 due to the enactment of the TCJA was considered "provisional," based on reasonable estimates. As further described below, after additional analysis was completed in 2018, the Company identified additional amounts available to be repatriated to the U.S. and additional information regarding the foreign taxes payable and recorded additional provisional tax expense to accrue the incremental foreign income taxes and withholding taxes payable to foreign jurisdiction. The Company collected and analyzed detailed information about the earnings and profits of its non-U.S. subsidiaries, the related taxes paid, the amounts which could be repatriated, the foreign taxes which may be incurred on repatriation, and the associated impact of these items under the TCJA, including under regulatory guidance issued in 2018, throughout the measurement period. As of December 31, 2018, the measurement period has ended and the tax expense is no longer considered provisional.

The amount of net tax expense recorded provisionally by the Company in the fourth fiscal quarter of 2017 and adjustments recorded during the measurement period in 2018 that are directly and indirectly related to the TCJA are summarized as follows:

		Years ended December 31,	
	Total	2018	2017
Remeasurement of net deferred tax liabilities	$(76,027)	$(1,211)	$(74,816)
Transition tax on unremitted foreign earnings	222,983	7,425	215,558
Incremental foreign taxes on assumed repatriation	232,282	19,282	213,000
Reversal of deferred taxes due to cancellation of 2015 repatriation plan	(118,887)	-	(118,887)
Total tax expense related to the enactment of the TCJA	$260,351	$25,496	$234,855

As a result of the TCJA, the Company recognized a tax benefit of $76,027 to remeasure its net deferred tax liabilities at the lower, 21% rate.

The TCJA transitioned the U.S. from a worldwide tax system to a territorial tax system. Under previous law, companies could indefinitely defer U.S. income taxation on unremitted foreign earnings. The TCJA imposed a one-time transition tax on deferred foreign earnings of 15.5% for liquid assets and 8% for illiquid assets, payable in defined increments over eight years. As a result of this requirement, the Company recognized provisional tax expense of $215,558 in 2017, and provisionally expected to pay $180,000, net of estimated applicable foreign tax credits, and after utilization of net operating loss and R&D and FTC Credit carryforwards. As a result of additional analysis completed during the measurement period, the Company accrued additional tax expense of $7,425 in 2018 and now expects to pay $184,467. The first installment of $14,757 was paid in 2018. These previously deferred foreign earnings may now be repatriated to the United States without additional U.S. federal taxation. However, any such repatriation could incur withholding and other foreign taxes in the source and intervening foreign jurisdictions, and certain U.S. state taxes.

Due to the changes in taxation of dividends received from foreign subsidiaries, and also because of the need to finance the payment of the transition tax, the Company made the determination during the fourth fiscal quarter of 2017 that certain unremitted foreign earnings in Israel, Germany, Austria, and France are no longer permanently reinvested, and recorded provisional tax expense of $213,000 to accrue the incremental foreign income taxes and withholding taxes payable to foreign jurisdictions assuming the repatriation to the United States of these approximately $1,100,000 of available foreign earnings. As a result of additional analysis completed during the measurement period, the Company adjusted the amount of foreign unremitted earnings available from Israel, Germany, Austria, and France to approximately $1,200,000, identified additional information regarding foreign taxes payable, and accrued additional tax expense of $19,282.

The Company repatriated approximately $724,000 to the United States, and paid withholding and foreign taxes of $156,767 in 2018. Substantially all of the amounts repatriated were used to reduce the outstanding balance of the credit facility (see Note 6), to repay certain intercompany indebtedness, and to fund the repurchase of convertible senior debentures in the fourth fiscal quarter of 2018 (see Note 6).

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 5 – Income Taxes (continued)

After completing these phases of cash repatriation, there is approximately $300,000 of unremitted foreign earnings that the Company has deemed not permanently reinvested and thus has accrued foreign withholding and other taxes. The Company expects to repatriate these remaining amounts at a measured pace over several years, and may decide to ultimately not repatriate some of these amounts.

There are additional amounts of unremitted foreign earnings in other countries, which continue to be reinvested indefinitely, and the Company has made no provision for incremental foreign income taxes and withholding taxes payable to foreign jurisdictions related to these amounts. Determination of the amount of the unrecognized deferred foreign tax liability for these amounts is not practicable because of the complexities associated with its hypothetical calculation.

During the fourth fiscal quarter of 2015, the Company recognized income tax, including U.S. federal and state income taxes, incremental foreign income taxes, and withholding taxes payable to foreign jurisdictions, on $300,000 of foreign earnings. This tax expense was recognized in 2015 following an evaluation of the Company's anticipated domestic cash needs over the next several years and the Company's most efficient use of liquidity, and with consideration of the amount of cash that could be repatriated to the U.S. efficiently with lesser withholding taxes in foreign jurisdictions. The Company repatriated $38,000 and $46,000 pursuant to this program in 2017 and 2016, respectively. Prior to the enactment of the TCJA, the related deferred tax liability for the 2015 repatriation plan was $118,887. The Company terminated the 2015 cash repatriation plan and recorded a provisional income tax benefit to reverse this deferred tax liability, which was replaced by the liability for the transition tax and foreign income and withholding taxes described above.

The deferred tax liability related to these unremitted foreign earnings is based on the available sources of cash, applicable tax rates, foreign currency exchange rates, and other factors and circumstances, as of each balance sheet date. Changes in these underlying facts and circumstances result in changes in the deferred tax liability balance, which are recorded as tax benefit or expense.

Certain provisions of the TCJA had a significant impact on the Company's effective tax rate for the year ended December 31, 2018, and are expected to have a significant impact in future periods. Because the various provisions of the TCJA are interrelated, and because of changes in the Company's operations and changes in the capital structure in response to the TCJA, the impact of any specific provision of the TCJA cannot be isolated. The Company recognized a significant amount of GILTI income in 2018, but was able to utilize related foreign tax credits to reduce the impact on the effective tax rate. The Company has elected to account for GILTI tax in the period in which it is incurred and, therefore, does not provide any deferred taxes in the consolidated financial statements at December 31, 2018 or 2017. The inclusion of significant GILTI income was a contributing factor in allowing the Company to avoid a limitation on the deductibility of its U.S. interest expense in 2018. The Company was not subject to the BEAT minimum tax in 2018, but BEAT could increase the Company's future tax by disallowing certain otherwise deductible payments from the U.S. to non-U.S. subsidiaries and imposing a minimum tax if greater than the regular tax.

The Company's repurchase of outstanding convertible debentures in 2018 (see Note 6) reduced the Company's 2018 tax rate.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 5 – Income Taxes (continued)

Income (loss) from continuing operations before taxes and noncontrolling interests consists of the following components:

	Years ended December 31,		
	2018	2017	2016
Domestic	$(39,861)	$(40,171)	$(135,953)
Foreign	456,637	319,535	230,169
	$416,776	$279,364	$94,216

Significant components of income taxes are as follows:

	Years ended December 31,		
	2018	2017	2016
Current:			
Federal	$18,756	$180,873	$358
State and local	209	108	5
Foreign	263,247	65,566	46,999
	282,212	246,547	47,362
Deferred:			
Federal	(58,386)	(101,896)	6,163
State and local	(3,117)	1,538	(3,039)
Foreign	(150,470)	152,735	(5,643)
	(211,973)	52,377	(2,519)
Total income tax expense	$70,239	$298,924	$44,843

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 5 – Income Taxes (continued)

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts for income tax purposes. Significant components of the Company's deferred tax assets and liabilities are as follows:

	December 31, 2018	2017
Deferred tax assets:		
Pension and other retiree obligations	$43,238	$43,536
Inventories	9,795	9,658
Property and equipment	5,888	3,798
Net operating loss carryforwards	128,177	136,599
Tax credit carryforwards	72,708	13,328
Other accruals and reserves	19,645	22,930
Total gross deferred tax assets	279,451	229,849
Less valuation allowance	(200,809)	(149,070)
	78,642	80,779
Deferred tax liabilities:		
Earnings not permanently reinvested	(65,537)	(213,000)
Convertible debentures	(32,488)	(135,576)
Other - net	(7,370)	(6,125)
Total gross deferred tax liabilities	(105,395)	(354,701)
Net deferred tax assets (liabilities)	$(26,753)	$(273,922)

The Company makes significant judgments regarding the realizability of its deferred tax assets (principally net operating losses and tax credits). The carrying value of deferred tax assets is based on the Company's assessment that it is more likely than not that the Company will realize these assets after consideration of all available positive and negative evidence. During the year-ended December 31, 2018, the Company generated an excess U.S. foreign tax credit of $57,900. Because the Company does not anticipate sufficient U.S. foreign source income during the carryforward period, the Company has not recognized the benefit of the carryforward as of December 31, 2018.

A reconciliation of income tax expense at the U.S. federal statutory income tax rate to actual income tax provision is as follows:

	Years ended December 31, 2018	2017	2016
Tax at statutory rate	$87,523	$97,777	$32,976
State income taxes, net of U.S. federal tax benefit	(2,298)	1,070	(1,972)
Effect of foreign operations	5,736	(54,807)	(26,551)
Tax on earnings not permanently reinvested	9,304	88,311	(3,553)
Unrecognized tax benefits	2,669	5,887	(8,453)
Repurchase of senior convertible debentures	(52,312)	-	-
TCJA - remeasurement of net deferred tax liabilities	(1,211)	(74,816)	-
TCJA - transition tax on unremitted foreign earnings	7,425	215,558	-

Foreign income taxable in the U.S.	15,055	20,436	18,442
Termination of U.S. pension	-	-	34,853
Other	(1,652)	(492)	(899)
Total income tax expense	$70,239	$298,924	$44,843

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 5 – Income Taxes (continued)

Income tax expense for the years ended December 31, 2018, 2017, and 2016 includes certain discrete tax items for changes in uncertain tax positions, valuation allowances, tax rates, and other related items. These items total $39,428 (tax benefit), $230,618, and $22,596 in 2018, 2017, and 2016, respectively.

For the year ended December 31, 2018, the discrete items include $25,496 related to the enactment of the TCJA, as previously described, a tax benefit of $54,877 resulting from the early extinguishment of convertible senior debentures, reflecting the reduction in deferred tax liabilities related to the special tax attributes of the debentures, and $10,047 (tax benefit) for the periodic remeasurement of the deferred tax liability recorded for the foreign taxes associated with the cash repatriation program described above.

For the year ended December 31, 2017, the discrete items include $234,855 related to the enactment of the TCJA, as previously described; $5,802 (tax benefit) for the periodic remeasurement of the deferred tax liability related to the 2015 cash repatriation program described below, and $1,565 of net tax expense for changes in uncertain tax positions. The 2015 cash repatriation program was expected to occur over several years, and the deferred tax liability is based on the available sources of cash, applicable tax rates, and other factors and circumstances, as of each respective balance sheet date. Changes in the underlying facts and circumstances result in changes in the deferred tax liability balance, which are recorded as tax benefit or expense.

For the year ended December 31, 2016, the discrete items include $34,853 of additional tax expense related to the termination and settlement of the Vishay Retirement Plan (see Notes 10 and 11), $8,704 (tax benefit) for changes in uncertain tax positions related largely to statute expiration, and $3,553 (tax benefit) for periodic remeasurement of the deferred tax liability related to the 2015 cash repatriation program described below.

At December 31, 2018, the Company had the following significant net operating loss carryforwards for tax purposes:

		Expires
Austria	$15,763	No expiration
Belgium	162,787	No expiration
Brazil	11,774	No expiration
Israel	10,707	No expiration
Japan	5,052	2020 - 2026
Netherlands	12,216	2019 - 2026
The Republic of China (Taiwan)	18,833	2024 - 2028
California	53,377	2026 - 2038
Pennsylvania	688,932	2019 - 2038

At December 31, 2018, the Company had the following significant tax credit carryforwards available:

		Expires

U.S. Foreign Tax Credit	$57,852	2028
California Research Credit	14,856	No expiration

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 5 – Income Taxes (continued)

Net income taxes paid were $248,958, $76,900, and $58,788 for the years ended December 31, 2018, 2017, and 2016, respectively. Net income taxes paid for the year ended December 31, 2018 includes $156,767 for repatriation activity and $14,757 for the TCJA transition tax.

See Note 19 for a discussion of the tax-related uncertainties for the pre-spin-off period of Vishay Precision Group, Inc. ("VPG"), which was spun off on July 6, 2010.

The following table summarizes changes in the liabilities associated with unrecognized tax benefits:

	Years ended December 31,		
	2018	2017	2016
Balance at beginning of year	$17,056	$16,805	$23,527
Addition based on tax positions related to the current year	4,332	3,911	1,553
Addition based on tax positions related to prior years	2,066	1,837	1,047
Currency translation adjustments	(984)	915	(96)
Reduction based on tax positions related to prior years	-	(1,473)	-
Reduction for settlements	(1,229)	(4,077)	(1,210)
Reduction for lapses of statute of limitation	-	(862)	(8,016)
Balance at end of year	$21,241	$17,056	$16,805

All of the unrecognized tax benefits of $21,241 and $17,056, as of December 31, 2018 and 2017, respectively, would reduce the effective tax rate if recognized.

The Company recognizes interest and penalties related to unrecognized tax benefits in income tax expense. At December 31, 2018 and 2017, the Company had accrued interest and penalties related to the unrecognized tax benefits of $2,887 and $2,845, respectively. During the years ended December 31, 2018, 2017, and 2016, the Company recognized $1,470, $2,479, and $542, respectively, in interest and penalties.

The Company and its subsidiaries file U.S. federal income tax returns, as well as tax returns in multiple states and foreign jurisdictions. The Company's U.S. federal tax returns are open to examination for all years after 2012. During the years ended December 31, 2018, 2017, and 2016, certain tax examinations were concluded and certain statutes of limitations lapsed. The tax provision for those years includes adjustments related to the resolution of these matters, as reflected in the table above. The tax returns of significant non-U.S. subsidiaries which are currently under examination include India (2004 through 2014), Italy (2012 through 2016), Germany (2013 through 2016), Israel (2016), and Taiwan (2016). The Company and its subsidiaries also file income tax returns in other taxing jurisdictions in the U.S. and around the world, many of which are still open to examination.

The timing of the resolution of income tax examinations is highly uncertain, as are the amounts and timing of tax payments that result from such examinations. These events could cause large fluctuations in the balance sheet classification of current and non-current unrecognized tax benefits. The Company believes that in the next 12 months it is reasonably possible that certain income tax examinations will conclude or the statutes of limitation on certain income tax periods open to examination will expire, or both. Given the uncertainties described above, the Company can only determine an estimate of potential decreases in unrecognized tax benefits ranging from $818 to $5,713.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 6 – Long-Term Debt

Long-term debt consists of the following:

	December 31, 2018	December 31, 2017
Credit facility	$ -	$ 150,000
Convertible senior notes, due 2025	495,203	-
Convertible senior debentures, due 2040	539	110,412
Convertible senior debentures, due 2041	12,812	56,641
Convertible senior debentures, due 2042	923	62,518
Deferred financing costs	(14,968)	(9,101)
	494,509	370,470
Less current portion	-	-
	$ 494,509	$ 370,470

Credit Facility

The Company maintains a credit facility with a consortium of banks led by JPMorgan Chase Bank, N.A., as administrative agent (the "Credit Facility"). The Credit Facility, as amended and restated, provides an aggregate commitment of $640,000 of revolving loans available until December 10, 2020, and also provides for the ability of Vishay to request up to $50,000 of incremental revolving commitments, subject to the satisfaction of certain conditions.

Borrowings under the Credit Facility bear interest at LIBOR plus an interest margin. The applicable interest margin is based on Vishay's leverage ratio. Based on Vishay's current leverage ratio, borrowings bear interest at LIBOR plus 1.50%. Vishay also pays a fee, also based on its leverage ratio, on undrawn amounts. The undrawn commitment fee, based on Vishay's current leverage ratio, is 0.30% per annum.

The Credit Facility allows an unlimited amount of defined "Restricted Payments," which include cash dividends and share repurchases, provided the Company's pro forma leverage ratio is less than 2.25 to 1. If the Company's leverage ratio is greater than 2.25 to 1, the Credit Facility allows such payments up to $75,000 per annum (subject to a cap of $225,000 for the term of the facility).

The borrowings under the Credit Facility are secured by a lien on substantially all assets, including accounts receivable, inventory, machinery and equipment, and general intangibles (but excluding real estate, intellectual property registered or licensed for use in, or arising under the laws of, any country other than the United States, assets located outside of the United States and deposit and securities accounts), of Vishay and certain significant subsidiaries located in the United States, and pledges of stock in certain significant domestic and foreign subsidiaries; and are guaranteed by certain significant subsidiaries. Certain of the Company's subsidiaries are permitted to borrow under the Credit Facility, subject to the satisfaction of specified conditions. Any borrowings by these subsidiaries under the Credit Facility are guaranteed by Vishay and certain subsidiaries. The Credit Facility also limits or restricts the Company and its subsidiaries, from, among other things, incurring indebtedness, incurring liens on its respective assets, making investments and acquisitions, making asset sales, and making other restricted payments (assuming the Company's leverage ratio is greater than 2.25 to 1), and requires the Company to comply with other covenants, including the maintenance of specific financial ratios.

The Credit Facility also contains customary events of default, including, but not limited to, failure to pay principal or interest, failure to pay or default under other material debt, material misrepresentation or breach of warranty, violation of certain covenants, a change of control, the commencement of bankruptcy proceedings, the insolvency of Vishay or certain of its significant subsidiaries, and the rendering of a judgment in excess of $25,000 against Vishay or certain of its significant subsidiaries. Upon the occurrence of an event of default under the Credit Facility, the Company's obligations under the credit facility may be accelerated and the lending commitments under the credit facility terminated.

At December 31, 2018 and 2017, there was $636,211 and $486,211, respectively, available under the Credit Facility. Letters of credit totaling $3,789 were outstanding at both December 31, 2018 and 2017.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 6 – Long-Term Debt (continued)

Convertible Senior Notes due 2025

In June 2018, the Company issued $600,000 aggregate principal amount of 2.25% convertible senior notes due 2025 to qualified institutional investors. The Company used the net proceeds from this offering to repurchase $220,000 and $69,060 principal amounts of convertible senior debentures due 2040 and 2042, respectively, as further described below.

GAAP requires an issuer to separately account for the liability and equity components of the instrument in a manner that reflects the issuer's nonconvertible debt borrowing rate when interest costs are recognized in subsequent periods. The resulting discount on the debt is amortized as non-cash interest expense in future periods.

The carrying values of the liability and equity components of the convertible notes are reflected in the Company's consolidated balance sheets as follows:

	Principal amount of the notes	Unamortized discount	Carrying value of liability component	Equity component (including temporary equity) - net carrying value
December 31, 2018	$600,000	(104,797)	$ 495,203	$ 85,262

Interest is payable on the convertible notes due 2025 semi-annually in arrears on June 15 and December 15 of each year, beginning December 15, 2018, at a rate of 2.25% per annum; however, the remaining debt discount is being amortized as additional non-cash interest expense using an effective annual interest rate of 5.50% based on the Company's estimated nonconvertible debt borrowing rate.

Interest expense for the year ended December 31, 2018 related to the convertible notes due 2025 is reflected on the consolidated statement of operations as follows:

Contractual coupon interest	Non-cash amortization of debt discount	Non-cash amortization of deferred financing costs	Total interest expense related to the notes
$ 7,463	7,240	1,059	$ 15,762

The convertible notes due 2025 will mature on June 15, 2025, unless earlier repurchased or converted. Prior to December 15, 2024, such conversion is subject to the satisfaction of certain conditions set forth below. The convertible notes due 2025 are not redeemable by the Company before the maturity date.

Prior to December 15, 2024, the holders may only convert their notes under the following circumstances: (1) during any fiscal quarter after the fiscal quarter ending September 29, 2018, if the sale price of Vishay common stock reaches 130% of the conversion price for a specified period (initially $40.94); (2) the trading price of the notes falls below 98% of the product of the sale price of Vishay's common stock and the conversion rate for a specified period; or (3) upon the occurrence of specified corporate transactions.

The convertible notes due 2025 are initially convertible into cash, shares of Vishay common stock, or a combination thereof, at the Company's option, at a conversion rate of 31.7536 shares of common stock per $1,000 principal amount of notes. This initial conversion price represents a premium of 27.5% to the closing price of Vishay's common stock on June 8, 2018, which was $24.70 per share. The conversion rate of the convertible notes is not adjusted for quarterly cash dividends equal to or less than $0.085 per share of common stock. This represents an initial effective conversion price of approximately $31.49 per share. At the direction of its Board of Directors, Vishay intends, upon conversion, to repay the principal amount of the notes in cash and settle any additional amounts in shares. Vishay must provide additional shares upon conversion if there is a "fundamental change" in the business as defined in the indenture governing the notes.
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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 6 – Long-Term Debt (continued)

Convertible Senior Debentures

Vishay currently has three issuances of convertible senior debentures outstanding with generally congruent terms.

The Company used substantially all of the net proceeds of the June 2018 issuance of convertible senior notes due 2025 to repurchase $220,000 and $69,060 principal amounts of convertible senior debentures due 2040 and due 2042, respectively. The net carrying value of the debentures repurchased were $89,276 and $29,037, respectively. In accordance with the authoritative accounting guidance for convertible debentures, the aggregate repurchase payment of $584,991 was allocated between the liability ($133,647) and equity (including temporary equity, $451,344) components of the convertible debentures, using the Company's nonconvertible debt borrowing rate at the time of the repurchases. As a result, the Company recognized a loss on extinguishment of convertible debentures of $17,309, including the write-off of a portion of unamortized debt issuance costs.

The Company used a substantial portion of the cash repatriated to the United States in the third fiscal quarter of 2018 (see Note 5) to repurchase $53,690, $116,922, and $78,772 principal amounts of convertible senior debentures due 2040, due 2041, and due 2042, respectively. The net carrying value of the debentures repurchased were $22,018, $45,157, and $33,466, respectively. In accordance with the authoritative accounting guidance for convertible debentures, the aggregate repurchase payment of $376,004 was allocated between the liability ($108,059) and equity (including temporary equity, $267,945) components of the convertible debentures, using the Company's nonconvertible debt borrowing rate at the time of the repurchases. As a result, the Company recognized a loss on extinguishment of convertible debentures of $9,274, including the write-off of a portion of unamortized debt issuance costs.

The quarterly cash dividend program of the Company results in adjustments to the conversion rate and effective conversion price for each issuance of the Company's convertible senior debentures effective as of the ex-dividend date of each cash dividend.

The following table summarizes some key facts and terms regarding the three series of outstanding convertible senior debentures following the adjustment made to the conversion rate of the debentures on the ex-dividend date of the December 20, 2018 dividend payment:

	Due 2040	Due 2041	Due 2042
Issuance date	November 9, 2010	May 13, 2011	May 31, 2012
Maturity date	November 15, 2040	May 15, 2041	June 1, 2042
Principal amount	$1,310	$33,078	$2,168
Cash coupon rate (per annum)	2.25 %	2.25 %	2.25 %
Nonconvertible debt borrowing rate at issuance (per annum)	8.00 %	8.375 %	7.50 %
Conversion rate effective December 5, 2018 (per $1 principal amount)	78.3806	57.1981	92.1569
Effective conversion price effective December 5, 2018 (per share)	$12.76	$17.48	$10.85
130% of the conversion price (per share)	$16.59	$22.72	$14.11
Call date	November 20, 2020	May 20, 2021	June 7, 2022

Prior to three months before the maturity date, the holders may only convert their debentures under the following circumstances: (1) during any fiscal quarter after the first full quarter subsequent to issuance, if the sale price of Vishay common stock reaches 130% of the conversion price for a specified period; (2) the trading price of the debentures falls below 98% of the product of the sale price of Vishay's common stock and the conversion rate for a specified period; (3) Vishay calls any or all of the debentures for redemption, at any time prior to the close of business on the third scheduled trading day immediately preceding the redemption date; or (4) upon the occurrence of specified corporate events.

The convertible debentures due 2042 became convertible subsequent to the December 31, 2016 evaluation of the conversion criteria, and have remained convertible for each subsequent quarterly evaluation through the December 31, 2018 evaluation, due to the sale price of Vishay's common stock exceeding 130% of the conversion price for the applicable periods. The convertible debentures due 2040 became convertible subsequent to the September 30, 2017 evaluation of the conversion criteria, and have remained convertible for each subsequent quarterly evaluation through the December 31, 2018 evaluation, due to the sale price of Vishay's common stock exceeding 130% of the conversion price for the applicable periods. The debentures due 2040 and due 2042 will remain convertible until December 31, 2018, at which time the conversion criteria will be reevaluated. At the direction of its Board of Directors, the Company intends, upon future conversion of any of the convertible senior debentures, to repay the principal amounts of the convertible senior debentures in cash and settle any additional amounts in shares of Vishay common stock. The excess of the amount that the Company would pay to the holders of the debentures due 2040 and due 2042 upon conversion over the carrying value of the liability component of the debentures currently convertible has been reclassified as temporary equity on the consolidated financial statements. The Company intends to finance the principal amount of any converted debentures using borrowings under its credit facility. Accordingly, the debt component of the convertible debentures due 2040 and due 2042 continues to be classified as a non-current liability on the consolidated balance sheets.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 6 – Long-Term Debt (continued)

Vishay must provide additional shares upon conversion if there is a "fundamental change" in the business as defined in the indenture governing the debentures.

Vishay may not redeem the debentures prior to the respective call dates. On or after the call date and prior to the maturity date, Vishay may redeem for cash all or part of the debentures at a redemption price equal to 100% of the principal amount of the debentures to be redeemed, plus accrued and unpaid interest to, but excluding, the redemption date, if the last reported sale price of Vishay's common stock has been at least 150% of the conversion price then in effect for at least 20 trading days during any 30 consecutive trading day period prior to the date on which Vishay provides notice of redemption.

GAAP requires an issuer to separately account for the liability and equity components of the instrument in a manner that reflects the issuer's nonconvertible debt borrowing rate when interest costs are recognized in subsequent periods. The resulting discount on the debt is amortized as non-cash interest expense in future periods.

The carrying values of the liability and equity components of the convertible debentures are reflected in the Company's accompanying consolidated balance sheets as follows:

	Principal amount of the debentures	Unamortized discount	Embedded derivative	Carrying value of liability component	Equity component (including temporary equity) - net carrying value
December 31, 2018					
Due 2040	$ 1,310	(772)	1	$ 539	$ 528
Due 2041	$ 33,078	(20,333)	67	$ 12,812	$ 13,725
Due 2042	$ 2,168	(1,247)	2	$ 923	$ 839
Total	$ 36,556	$ (22,352)	$ 70	$ 14,274	$ 15,092
December 31, 2017					
Due 2040	$ 275,000	(164,794)	206	$ 110,412	$ 110,094
Due 2041	$ 150,000	(93,573)	214	$ 56,641	$ 62,246
Due 2042	$ 150,000	(87,600)	118	$ 62,518	$ 57,874
Total	$ 575,000	$ (345,967)	$ 538	$ 229,571	$ 230,214

Interest is payable on the debentures semi-annually at the cash coupon rate; however, the remaining debt discount is being amortized as additional non-cash interest expense using an effective annual interest rate equal to the Company's estimated nonconvertible debt borrowing rate at the time of issuance. In addition to ordinary interest, contingent interest will accrue in certain circumstances relating to the trading price of the debentures and under certain other circumstances beginning ten years subsequent to issuance.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 6 – Long-Term Debt (continued)

Interest expense related to the debentures is reflected on the accompanying consolidated statements of operations for the years ended December 31:

	Contractual coupon interest	Non-cash amortization of debt discount	Non-cash amortization of deferred financing costs	Non-cash change in value of derivative liability	Total interest expense related to the debentures
2018					
Due 2040	$ 3,150	1,340	45	81	$ 4,616
Due 2041	$ 3,156	1,285	45	43	$ 4,529
Due 2042	$ 2,321	904	36	4	$ 3,265
Total	$ 8,627	$ 3,529	$ 126	$ 128	$ 12,410
2017					
Due 2040	$ 6,188	2,479	88	(187)	$ 8,568
Due 2041	$ 3,375	1,270	47	(71)	$ 4,621
Due 2042	$ 3,375	1,235	54	(58)	$ 4,606
Total	$ 12,938	$ 4,984	$ 189	$ (316)	$ 17,795
2016					
Due 2040	$ 6,188	2,292	88	(183)	$ 8,385
Due 2041	$ 3,375	1,171	47	(153)	$ 4,440
Due 2042	$ 3,375	1,147	54	(126)	$ 4,450
Total	$ 12,938	$ 4,610	$ 189	$ (462)	$ 17,275

Exchangeable Unsecured Notes, due 2102

In 2016, the Company acquired from holders the remaining $38,642 principal amount of the Company's floating rate exchangeable unsecured notes due 2102 in two separate transactions. The aggregate purchase price for the privately negotiated transactions was $34,045. Vishay recognized gains on early extinguishment of debt of $4,597 presented as a separate line item in the accompanying consolidated statement of operations for the year ended December 31, 2016. There are no exchangeable unsecured notes outstanding.

Other Borrowings Information
Aggregate annual maturities of long-term debt, based on the terms stated in the respective agreements, are as follows:

2019	$-
2020	-
2021	-
2022	-
2023	-
Thereafter	636,556

The annual maturities of long-term debt are based on the amount required to settle the obligation. Accordingly, the discounts associated with the convertible debt instruments are excluded from the calculation of the annual maturities of long-term debt in the table above.

At December 31, 2018, the Company had committed and uncommitted short-term credit lines with various U.S. and foreign banks aggregating approximately $7,000, with substantially no amounts borrowed. At December 31, 2017, the Company had committed and uncommitted short-term credit lines with various U.S. and foreign banks aggregating approximately $15,000, with substantially no amounts borrowed.

Interest paid was $23,859, $21,216, and $19,316 for the years ended December 31, 2018, 2017, and 2016, respectively.

See Note 18 for further discussion on the fair value of the Company's long-term debt.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 7 – Stockholders' Equity
The Company's Class B common stock carries 10 votes per share while the common stock carries 1 vote per share. Class B shares are transferable only to certain permitted transferees while the common stock is freely transferable. Class B shares are convertible on a one-for-one basis at any time into shares of common stock. Transfers of Class B shares other than to permitted transferees result in the automatic conversion of the Class B shares into common stock.

The Board of Directors may only declare dividends or other distributions with respect to the common stock or the Class B common stock if it grants such dividends or distributions in the same amount per share with respect to the other class of stock. Stock dividends or distributions on any class of stock are payable only in shares of stock of that class. Shares of either common stock or Class B common stock cannot be split, divided, or combined unless the other is also split, divided, or combined equally.

In 2014, the Company's Board of Directors approved the initiation of a quarterly cash dividend program. Cash dividends were paid quarterly in 2018 and 2017 as follows:

Record date	Payment date	Amount (per share)	Record date	Payment date	Amount (per share)
March 14, 2018	March 29, 2018	$0.0675	March 14, 2017	March 29, 2017	$0.0625
June 13, 2018	June 28, 2018	$0.0850	June 15, 2017	June 29, 2017	$0.0625
September 14, 2018	September 27, 2018	$0.0850	September 15, 2017	September 28, 2017	$0.0625
December 6, 2018	December 20, 2018	$0.0850	December 7, 2017	December 21, 2017	$0.0675

The Credit Facility allows an unlimited amount of defined "Restricted Payments," which include cash dividends and share repurchases, provided the Company's pro forma leverage ratio is less than 2.25 to 1. If the Company's leverage ratio is greater than 2.25 to 1, the Amended and Restated Credit Facility allows such payments up to $75,000 per annum (subject to a cap of $225,000 for the term of the facility). The amount and timing of any future stock repurchases or cash dividends remains subject to authorization of the Company's Board of Directors.

At December 31, 2018, the Company had reserved shares of common stock for future issuance as follows:

Restricted stock units outstanding	904,000
Phantom stock units outstanding	170,000
2007 Stock Incentive Program - available to grant	2,894,000
Convertible senior debentures, due 2040*	115,513
Convertible senior debentures, due 2041*	2,128,497
Convertible senior debentures, due 2042*	227,268
Convertible senior notes, due 2025*	24,291,480
Conversion of Class B common stock	12,097,427
	42,828,185

*At December 31, 2018, the convertible senior debentures due 2040, due 2041, and due 2042 are convertible into 102,679, 1,891,999, and 199,796 shares, respectively, of Vishay common stock. The convertible senior notes due 2025 are convertible into 19,052,160 shares of Vishay common stock. The Company has reserved adequate shares to ensure it could issue the maximum amount of shares to be delivered upon a make-whole fundamental change as defined in the indentures governing the convertible debt instruments.
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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 8 – Other Income (Expense)

The caption "Other" on the accompanying consolidated statements of operations consists of the following:

	Years ended December 31,		
	2018	2017	2016
Foreign exchange gain (loss)	$(1,991)	$(4,536)	$292
Interest income	11,940	6,482	4,264
Investment income (expense)†	(1,646)	-	-
Other	(266)	(208)	160
	$8,037	$1,738	$4,716

† Recognized in "Other" subsequent to the prospective adoption of ASU 2016-01. Previously recorded in accumulated other comprehensive income until realized. See Note 1.

In 2018, we issued $600 million principal amount of 2.25% senior convertible notes due 2025 to qualified institutional investors. We used the net proceeds from this offering and cash repatriated to the United States (see Note 5) to repurchase $273,690, $116,922, and $147,832 principal amounts of convertible senior debentures due 2040, due 2041, and 2042, respectively, for $960,995. We recognized a $26,583 loss on early extinguishment of the repurchased convertible debentures in 2018.

In 2017, the Company sold its 50% interest in an investment accounted for using the equity method, and recorded a loss aggregating to $6,112. The $7,060 loss recorded in March 2017 included Vishay's proportionate share of the investee's accumulated other comprehensive loss of $1,110, recognized upon discontinuation of the equity investment, and the estimated cost of certain contingencies pending resolution related to the investee. In December 2017, the remaining contingencies related to the investee were favorably resolved and the Company reduced the loss by $948. The loss on disposal is not deductible for income tax purposes.

On August 12, 2015, a major explosion occurred in the port of Tianjin, China. Vishay owns and operates a diodes manufacturing facility in Tianjin near the port. The shockwave of the explosion resulted in some damage to the facility and caused a temporary shutdown. The Company's insurance coverage generally provides for replacement cost of damaged items. Any amount received in excess of the book value is treated as a gain. The Company also had business interruption claims under its insurance policies. During 2016, the Company received proceeds totaling $13,406 under its various insurance policies, of which $4,911 is classified as proceeds from the sale of property and equipment on the accompanying consolidated statement of cash flows, and the remainder is considered cash flows from operating activities. The Company recorded, as a separate line on the accompanying consolidated statement of operations for the year ended December 31, 2016, a gain of $8,809, equal to the proceeds received less the costs incurred for inventory, property, and equipment damage (at net book value) and related repair and clean-up costs.

Note 9 – Other Accrued Expenses

Other accrued expenses consist of the following:

	December 31,	
	2018	2017**
Sales returns and allowances	$42,663	$36,680

Goods received, not yet invoiced	39,713	39,221
Accrued restructuring	2,538	7,352
Deferred proceeds - property sale (see Note 4)	45,500	-
Other	99,246	70,977
	$229,660	$154,230

**Recast for the retrospective adoption of ASU 2017-07. See Note 1.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 10 – Accumulated Other Comprehensive Income (Loss)

The cumulative balance of each component of other comprehensive income (loss) and the income tax effects allocated to each component are as follows:

	Pension and other post-retirement actuarial items	Currency translation adjustment	Unrealized gain (loss) on available-for-sale securities	Total
Balance at January 1, 2016	$ (136,422)	$ 4,597	$ 498	$ (131,327)
Other comprehensive income before reclassifications	(32,398)	(35,863)	941	$ (67,320)
Tax effect	9,815	-	(329)	$ 9,486
Other comprehensive income before reclassifications, net of tax	(22,583)	(35,863)	612	$ (57,834)
Amounts reclassified out of AOCI	91,014	-	-	$ 91,014
Tax effect	3,495	-	-	$ 3,495
Amounts reclassified out of AOCI, net of tax	94,509	-	-	$ 94,509
Net comprehensive income (loss)	$ 71,926	$ (35,863)	$ 612	$ 36,675
Balance at December 31, 2016	$ (64,496)	$ (31,266)	$ 1,110	$ (94,652)
Other comprehensive income before reclassifications	(15,671)	124,220	1,881	$ 110,430
Tax effect	4,373	-	(659)	$ 3,714
Other comprehensive income before reclassifications, net of tax	(11,298)	124,220	1,222	$ 114,144
Amounts reclassified out of AOCI	9,147	-	(817)	$ 8,330
Tax effect	(2,394)	-	286	$ (2,108)
Amounts reclassified out of AOCI, net of tax	6,753	-	(531)	$ 6,222
Net comprehensive income (loss)	$ (4,545)	$ 124,220	$ 691	$ 120,366
Balance at December 31, 2017	$ (69,041)	$ 92,954	$ 1,801	$ 25,714
Cumulative effect of accounting for adoption of ASU 2016-01	-	-	(1,801)	(1,801)
Other comprehensive income before reclassifications	5,617	(41,454)	-	$ (35,837)
Tax effect	(1,032)	-	-	$ (1,032)
Other comprehensive income before reclassifications, net of tax	4,585	(41,454)	-	$ (36,869)
Amounts reclassified out of AOCI	8,343	-	-	$ 8,343
Tax effect	(2,178)	-	-	$ (2,178)
Amounts reclassified out of AOCI, net of tax	6,165	-	-	$ 6,165
Net comprehensive income (loss)	$ 10,750	$ (41,454)	$ -	$ (30,704)
Balance at December 31, 2018	$ (58,291)	$ 51,500	$ -	$ (6,791)

The Company recognized a cumulative-effect adjustment to retained earnings (accumulated deficit) of $1,801 for the cumulative change in fair value of available-for-sale equity investments previously recognized in other comprehensive income due to the adoption of ASU 2016-01. See Note 1 for further information.

The amount of unrealized gains (losses) on available-for-sale securities reclassified out of AOCI as a result of sales of securities held by the Company's rabbi trust used to fund a deferred compensation plan was $817 and $0 for the years ended December 31, 2017 and 2016, respectively. These reclassifications are recorded as a component of compensation expense within Selling, General, and Administrative expenses on the accompanying consolidated statements of operations. The pre-tax amount of unrealized gains (losses) on available-for-sale securities reclassified out of AOCI as a result of sales of available-for-sale securities was $0 for the years ended December 31, 2017 and 2016. These reclassifications are recorded as a component of Other Income on the accompanying consolidated statements of operations. The tax effect of the reclassifications of unrealized gains (losses) on available-for-sale securities is recorded as a component of Income Tax Expense on the accompanying consolidated statements of operations.

Reclassifications of pension and other post-retirement actuarial items out of AOCI, including the recognition of the settlement charge for the termination of the Vishay Retirement Plan in 2016, are included in the computation of net periodic benefit cost (see Note 11). Historically, valuation allowances were recorded against the deferred taxes associated with certain unrecognized pension and other postretirement actuarial items. Changes in estimates related to these valuation allowances are recorded in the statement of operations and do not affect accumulated other comprehensive income until the underlying pension or other postretirement benefit plan is extinguished. As a result of the termination and settlement of the Vishay Retirement Plan, the Company recorded $34,853 of additional income tax expense and the related reclassification adjustment in 2016 within accumulated other comprehensive income related to changes in estimates recorded in 2010.

Other comprehensive income (loss) includes Vishay's proportionate share of other comprehensive income (loss) of nonconsolidated subsidiaries accounted for under the equity method.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits

The Company maintains various retirement benefit plans. GAAP requires employers to recognize the funded status of a benefit plan, measured as the difference between plan assets at fair value and the benefit obligation, in its balance sheet. The recognition of the funded status on the balance sheet requires employers to recognize actuarial items (such as actuarial gains and losses, prior service costs, and transition obligations) as a component of other comprehensive income, net of tax.

The following table summarizes amounts recorded on the accompanying consolidated balance sheets associated with these various retirement benefit plans:

	December 31, 2018	December 31, 2017
Included in "Other assets":		
Non-U.S. pension plans	$356	$347
Total included in other assets	$356	$347
Included in "Payroll and related expenses":		
U.S. pension plans	$(35)	$(37)
Non-U.S. pension plans	(7,228)	(7,308)
U.S. other postretirement plans	(703)	(705)
Non-U.S. other postretirement plans	(181)	(453)
Total included in payroll and related expenses	$(8,147)	$(8,503)
Accrued pension and other postretirement costs:		
U.S. pension plans	$(38,134)	$(39,880)
Non-U.S. pension plans	(194,266)	(213,596)
U.S. other postretirement plans	(6,291)	(6,928)
Non-U.S. other postretirement plans	(7,772)	(7,445)
Other retirement obligations	(14,521)	(13,852)
Total accrued pension and other postretirement costs	$(260,984)	$(281,701)
Accumulated other comprehensive loss:		
U.S. pension plans	$5,501	$7,731
Non-U.S. pension plans	76,698	88,398
U.S. other postretirement plans	(1,257)	(1,101)
Non-U.S. other postretirement plans	2,044	1,916
Total accumulated other comprehensive loss*	$82,986	$96,944

* - Amounts included in accumulated other comprehensive loss are presented in this table pre-tax.

Defined Benefit Pension Plans

U.S. Pension Plans

The Company maintained several defined benefit pension plans which covered most full-time U.S. employees. These included pension plans which are "qualified" under the Employee Retirement Income Security Act of 1974 ("ERISA") and the Internal Revenue Code, and "non-qualified" pension plans which provide defined benefits primarily to U.S. employees whose benefits under the qualified pension plan would be limited by ERISA and the Internal Revenue Code. Pension benefits earned are generally based on years of service and compensation during active employment.

The Society of Actuaries Retirement Plans Experience Committee issued updated mortality improvement scales in 2018 and 2017, which did not have a material effect on the Company's projected benefit obligations or future net periodic pension cost.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits (continued)

Qualified U.S. Pension Plans

The qualified U.S. pension plans historically included both contributory and non-contributory plans. The Company's principal qualified U.S. pension plan (the Vishay Retirement Plan) was funded through Company and participant contributions to an irrevocable trust fund. The Company's other qualified U.S. pension plans, which were assumed as a result of past acquisitions, were funded only through Company contributions.

In 2008, the Company adopted amendments to the Vishay Retirement Plan such that effective January 1, 2009, the plan was frozen. Pursuant to these amendments, no new employees could participate in the plan, no further participant contributions were required or permitted, and no further benefits accrued after December 31, 2008. The Company's other qualified U.S. pension plans had all been effectively frozen in prior years. All of the Company's qualified U.S. pension plans were merged into the Vishay Retirement Plan.

In the second fiscal quarter of 2015, the Company began the process of terminating the Vishay Retirement Plan. During the third fiscal quarter of 2016, the Company received a favorable determination letter from the U.S. Internal Revenue Service ("IRS"), and met all other applicable IRS and Pension Benefit Guarantee Corporation requirements. The termination and settlement occurred in December 2016. Plan participants had their benefits either converted into a lump sum cash payment or an annuity contract placed with an insurance carrier. The settlement resulted in a non-cash charge of $79,321 to recognize the unrecognized actuarial items related to the Vishay Retirement Plan recorded in 2016 in accumulated other comprehensive income. These non-cash charges are presented on a separate line in the accompanying consolidated statements of operations. The termination and settlement required no additional cash contributions. Excess plan assets were transferred to a qualified defined contribution retirement plan, and are presented on the accompanying reconciliation as a negative Company contribution.

A final reconciliation of participant data subject to the settlement annuity contract was completed during 2017. The final annuity pricing adjustment and related items did not have a material impact on the Company's financial results.

Non-qualified U.S. Pension Plans

The Company's principal non-qualified U.S. pension plan (the Vishay Non-qualified Retirement Plan) was a contributory pension plan designed to provide similar defined benefits to covered U.S. employees whose benefits under the Vishay Retirement Plan would be limited by ERISA and the Internal Revenue Code. The Vishay Non-qualified Retirement Plan was identical in construction to the Vishay Retirement Plan, except that the plan is not qualified under ERISA.

The Vishay Non-qualified Retirement Plan, like all non-qualified plans, is considered to be unfunded. The Company maintains a non-qualified trust, referred to as a "rabbi" trust, to fund benefit payments under this plan. Rabbi trust assets are subject to creditor claims under certain conditions and are not the property of employees. Therefore, they are accounted for as other noncurrent assets. Assets held in trust related to the non-qualified pension plan were $22,409 and $24,505 at December 31, 2018 and 2017, respectively.

In 2008, the Company adopted amendments to the Vishay Non-Qualified Retirement Plan such that effective January 1, 2009, the plan was frozen. Pursuant to these amendments, no new employees may participate in the plans, no further participant contributions were required or permitted, and no further benefits shall accrue after December 31, 2008. Benefits accumulated as of December 31, 2008 will be paid to employees upon retirement, and the Company will likely need to make additional cash contributions to the rabbi trust to fund this accumulated benefit obligation.

To mitigate the loss in benefits of these employees, effective January 1, 2009, the Company increased the Company-match portion of its 401(k) defined contribution savings plan for employees impacted by the pension freeze.

The Company also maintains other pension plans which provide supplemental defined benefits primarily to former U.S. employees whose benefits under qualified pension plans were limited by ERISA. These non-qualified plans are all non-contributory plans, and are considered to be unfunded.

In 2004, the Company entered into an employment agreement with Dr. Felix Zandman, its Executive Chairman and then-Chief Executive Officer. Pursuant to this agreement, the Company is providing an annual retirement benefit of approximately $614 to his surviving spouse. The Company maintains a non-qualified trust, referred to as a "rabbi" trust, to fund benefit payments under this plan. Rabbi trust assets are subject to creditor claims under certain conditions and are not the property of employees. Therefore, they are accounted for as other noncurrent assets. Assets held in trust related to this non-qualified pension plan were $1,199 and $1,789 at December 31, 2018 and 2017, respectively.

Non-U.S. Pension Plans

The Company provides pension and similar benefits to employees of certain non-U.S. subsidiaries consistent with local practices. Pension benefits earned are generally based on years of service and compensation during active employment.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits (continued)

The following table sets forth a reconciliation of the benefit obligation, plan assets, and funded status related to U.S. and non-U.S. pension plans:

	December 31, 2018		December 31, 2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Change in benefit obligation:				
Benefit obligation at beginning of year	$39,917	$291,162	$38,914	$266,427
Service cost	-	3,822	-	3,725
Interest cost	1,484	4,793	1,643	4,866
Plan amendments	-	125	-	686
Actuarial (gains) losses	(1,431)	(1,311)	1,149	3,019
Benefits paid	(1,801)	(14,397)	(1,789)	(17,921)
Currency translation	-	(12,236)	-	30,360
Benefit obligation at end of year	$38,169	$271,958	$39,917	$291,162
Change in plan assets:				
Fair value of plan assets at beginning of year	$-	$70,605	$-	66,090
Actual return on plan assets	-	1,412	-	1,608
Company contributions	1,801	16,105	1,789	16,120
Benefits paid	(1,801)	(14,397)	(1,789)	(17,921)
Currency translation	-	(2,905)	-	4,708
Fair value of plan assets at end of year	$-	$70,820	$-	$70,605
Funded status at end of year	$(38,169)	$(201,138)	$(39,917)	$(220,557)

The plan assets are stated at fair value. See Note 18 for further discussion of the valuation of the plan assets.

Amounts recognized on the accompanying consolidated balance sheets consist of the following:

	December 31, 2018		December 31, 2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Other assets	$-	$356	$-	$347
Accrued benefit liability - current	(35)	(7,228)	(37)	(7,308)
Accrued benefit liability - non-current	(38,134)	(194,266)	(39,880)	(213,596)
Accumulated other comprehensive loss	5,501	76,698	7,731	88,398
	$(32,668)	$(124,440)	$(32,186)	$(132,159)

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits (continued)

Actuarial items consist of the following:

	December 31, 2018		December 31, 2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Unrecognized net actuarial loss	$4,717	$ 76,254	$6,804	$ 87,896
Unamortized prior service cost	784	444	927	502
	$5,501	$ 76,698	$7,731	$ 88,398

The following table sets forth additional information regarding the projected and accumulated benefit obligations:

	December 31, 2018		December 31, 2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Accumulated benefit obligation, all plans	$38,169	$258,244	$39,917	$270,914
Plans for which the accumulated benefit obligation exceeds plan assets:				
Projected benefit obligation	$38,169	$247,066	$39,917	$277,615
Accumulated benefit obligation	38,169	235,167	39,917	262,779
Fair value of plan assets	-	45,818	-	57,727

The following table sets forth the components of net periodic pension cost:

	Years ended December 31, 2018		2017		2016	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Service cost net of employee contributions	$-	$ 3,822	$-	$ 3,725	$-	$ 3,291
Interest cost	1,484	4,793	1,643	4,866	11,788	5,475
Expected return on plan assets	-	(1,889)	-	(2,072)	(11,302)	(2,117)
Amortization of actuarial losses	656	6,196	587	6,179	6,513	4,733
Amortization of prior service cost (credit)	144	318	144	150	144	261
Curtailment and settlement losses	-	1,111	-	1,360	79,321	841
Net periodic pension cost	$2,284	$ 14,351	$2,374	$ 14,208	$86,464	$ 12,484

Net periodic benefit cost in 2018 and 2017 was significantly impacted by the termination and settlement of the Company's qualified U.S. pension plan in December 2016. The settlement resulted in the immediate recognition of previously unrecognized actuarial items related to the plan in 2016 that were recorded in accumulated other comprehensive income and were being amortized into net periodic pension cost.

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits (continued)

See Note 10 for the pretax, tax effect and after tax amounts included in other comprehensive income during the years ended December 31, 2018, 2017, and 2016. The estimated actuarial items for the defined benefit pensions plans that will be amortized from accumulated other comprehensive loss into net periodic pension cost during 2019 is $6,300.

The following weighted average assumptions were used to determine benefit obligations at December 31 of the respective years:

	2018		2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Discount rate	4.50%	1.96 %	3.75%	1.80 %
Rate of compensation increase	0.00%	2.17 %	0.00%	2.10 %

The following weighted average assumptions were used to determine the net periodic pension costs:

	Years ended December 31,			
	2018		2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Discount rate	3.75%	1.80 %	4.25%	1.76 %
Rate of compensation increase	0.00%	2.10 %	0.00%	2.12 %
Expected return on plan assets	0.00%	2.95 %	0.00%	2.90 %

The plans' expected return on assets is based on management's expectations of long-term average rates of return to be achieved by the underlying investment portfolios. In establishing this assumption, management considers historical and expected returns for the asset classes in which the plans are invested, advice from pension consultants and investment advisors, and current economic and capital market conditions.

The investment mix between equity securities and fixed income securities is based upon achieving a desired return, balancing higher return, more volatile equity securities, and lower return, less volatile fixed income securities and is adjusted for the expected duration of the obligation and the funded status of the plan. Investment allocations are made across a range of securities, maturities and credit quality. The Company's non-U.S. defined benefit plan investments are based on local laws and customs. Most plans invest in cash and local government fixed income securities, although plans in certain countries have investments in equity securities. The plans do not invest in securities of Vishay or its subsidiaries. Negative investment returns could ultimately affect the funded status of the plans, requiring additional cash contributions. See Note 18 for further information on the fair value of the plan assets by asset category.

Estimated future benefit payments are as follows:

	U.S. Plans	Non-U.S. Plans
2019	$1,859	$ 18,612
2020	1,829	15,113
2021	8,364	15,319

2022	3,153	17,300
2023	3,159	16,327
2024-2028	17,122	81,505

The Company's anticipated 2019 contributions for defined benefit pension plans will approximate the expected benefit payments disclosed above.
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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits (continued)

Other Postretirement Benefits

In the U.S., the Company maintains unfunded non-pension postretirement plans, including medical benefits for certain executives and their surviving spouses, which are funded as costs are incurred. The Company also maintains two unfunded non-pension postretirement plans at two European subsidiaries.

The following table sets forth a reconciliation of the benefit obligation, plan assets, and accrued benefit cost related to U.S. and non-U.S. non-pension defined benefit postretirement plans:

	December 31, 2018		December 31, 2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Change in benefit obligation:				
Benefit obligation at beginning of year	$7,633	$7,898	$7,647	$6,625
Service cost	137	288	131	273
Interest cost	273	114	311	103
Actuarial (gains) losses	(344)	327	257	312
Benefits paid	(705)	(303)	(713)	(349)
Currency translation	-	(371)	-	934
Benefit obligation at end of year	$6,994	$7,953	$7,633	$7,898
Fair value of plan assets at end of year	$-	$-	$-	$-
Funded status at end of year	$(6,994)	$(7,953)	$(7,633)	$(7,898)

Amounts recognized on the accompanying consolidated balance sheets consist of the following:

	December 31, 2018		December 31, 2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Accrued benefit liability - current	$(703)	$(181)	$(705)	$(453)
Accrued benefit liability - non-current	(6,291)	(7,772)	(6,928)	(7,445)
Accumulated other comprehensive income	(1,257)	2,044	(1,101)	1,916
	$(8,251)	$(5,909)	$(8,734)	$(5,982)

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits (continued)

Actuarial items consist of the following:

	December 31, 2018		December 31, 2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Unrecognized net actuarial loss (gain)	$(1,257)	$ 2,044	$(953)	$ 1,916
Unamortized prior service (credit) cost	-	-	(148)	-
	$(1,257)	$ 2,044	$(1,101)	$ 1,916

The following table sets forth the components of net periodic benefit cost:

	Years ended December 31,					
	2018		2017		2016	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Service cost	$137	$ 288	$131	$ 273	$126	$ 268
Interest cost	273	114	311	103	340	143
Amortization of actuarial (gains) losses	(39)	105	(93)	76	(30)	68
Amortization of prior service credit	(148)	-	(837)	-	(837)	-
Net periodic benefit cost (benefit)	$223	$ 507	$(488)	$ 452	$(401)	$ 479

The estimated actuarial items for the other postretirement benefit plans that will be amortized from accumulated other comprehensive loss into net periodic benefit cost during 2019 are not material.

The following weighted average assumptions were used to determine benefit obligations at December 31 of the respective years:

	2018		2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Discount rate	4.50%	1.60 %	3.75%	1.50 %
Rate of compensation increase	0.00%	3.18 %	0.00%	2.88 %

The following weighted average assumptions were used to determine the net periodic benefit costs:

	Years ended December 31,			
	2018		2017	
	U.S. Plans	Non-U.S. Plans	U.S. Plans	Non-U.S. Plans
Discount rate	3.75%	1.50 %	4.25%	1.50 %
Rate of compensation increase	0.00%	2.88 %	0.00%	2.58 %

The impact of a one-percentage-point change in assumed health care cost trend rates on the net periodic benefit cost and postretirement benefit obligation is not material.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 11 – Pensions and Other Postretirement Benefits (continued)

Estimated future benefit payments are as follows:

	U.S. Plans	Non-U.S. Plans
2019	$703	$ 181
2020	671	387
2021	661	337
2022	633	776
2023	294	281
2024-2028	2,244	3,183

As the plans are unfunded, the Company's anticipated contributions for 2019 are equal to its estimated benefits payments.

Other Retirement Obligations

The Company participates in various other defined contribution and government-mandated retirement plans based on local law or custom. The Company periodically makes required contributions for certain of these plans, whereas other plans are unfunded retirement bonus plans which will be paid at the employee's retirement date. At December 31, 2018 and 2017, the accompanying consolidated balance sheets include $14,521 and $13,852, respectively, within accrued pension and other postretirement costs related to these plans.

The Company's U.S. employees are eligible to participate in a 401(k) savings plan, which provides for Company matching contributions. The Company's matching expense for the plans was $6,353, $5,843, and $5,039 for the years ended December 31, 2018, 2017, and 2016, respectively. No material amounts are included in the accompanying consolidated balance sheets at December 31, 2018 and 2017 related to unfunded 401(k) contributions.

Certain key employees participate in a deferred compensation plan. During the years ended December 31, 2018, 2017, and 2016, these employees could defer a portion of their compensation until retirement, or elect shorter deferral periods. The Company maintains a liability within other noncurrent liabilities on its consolidated balance sheets related to these deferrals. The Company maintains a non-qualified trust, referred to as a "rabbi" trust, to fund payments under this plan. Rabbi trust assets are subject to creditor claims under certain conditions and are not the property of employees. Therefore, they are accounted for as other noncurrent assets. Assets held in trust related to the deferred compensation plan at December 31, 2018 and 2017 were approximately $18,162 and $18,958, respectively.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 12 – Stock-Based Compensation

The Company has various stockholder-approved programs which allow for the grant of share-based compensation to officers, employees, and non-employee directors.

The amount of compensation cost related to stock-based payment transactions is measured based on the grant-date fair value of the equity instruments issued. The fair value of each option award is estimated on the date of grant using the Black-Scholes option-pricing model. The Company determines compensation cost for restricted stock units ("RSUs"), phantom stock units, and restricted stock based on the grant-date fair value of the underlying common stock adjusted for expected dividends paid over the required vesting period for non-participating awards. Compensation cost is recognized over the period that an officer, employee, or non-employee director provides service in exchange for the award.

The following table summarizes share-based compensation expense recognized:

	Years ended December 31,		
	2018	2017	2016
Restricted stock units	$4,603	$4,231	$6,263
Phantom stock units	214	163	117
Total	$4,817	$4,394	$6,380

The Company recognizes compensation cost for RSUs that are expected to vest and records cumulative adjustments in the period that the expectation changes.

The following table summarizes unrecognized compensation cost and the weighted average remaining amortization periods at December 31, 2018 (amortization periods in years):

	Unrecognized Compensation Cost	Weighted Average Remaining Amortization Periods
Restricted stock units	$ 3,060	0.8
Phantom stock units	-	0.0
Total	$ 3,060	

The Company currently expects all performance-based RSUs to vest and all of the associated unrecognized compensation cost for performance-based RSUs presented in the table above to be recognized.
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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 12 – Stock-Based Compensation (continued)

2007 Stock Incentive Program

The Company's 2007 Stock Incentive Program (the "2007 Program"), as amended and restated, was approved by Vishay's stockholders at Vishay's Annual Meeting of Stockholders on May 20, 2014. The 2007 Program permits the grant of up to 6,500,000 shares of restricted stock, unrestricted stock, RSUs, stock options, and phantom stock units, to officers, employees, and non-employee directors of the Company. Such instruments are available for grant until May 20, 2024.

At December 31, 2018, the Company has reserved 2,894,000 shares of common stock for future grants of equity awards pursuant to the 2007 Program. If any outstanding awards are forfeited by the holder or cancelled by the Company, the underlying shares would be available for regrant to others.

Restricted Stock Units

Each RSU entitles the recipient to receive a share of common stock when the RSU vests.

RSU activity is presented below (number of RSUs in thousands):

	Years ended December 31,					
	2018		2017		2016	
	Number of RSUs	Weighted Average Grant-date Fair Value	Number of RSUs	Weighted Average Grant-date Fair Value	Number of RSUs	Weighted Average Grant-date Fair Value
Outstanding:						
Beginning of year	986	$ 13.34	1,004	$ 12.74	1,028	$ 13.24
Granted	252	18.90	304	15.52	353	11.35
Vested*	(334)	13.67	(322)	13.54	(155)	12.27
Cancelled or forfeited	-	-	-	-	(222)	13.19
End of year	904	$ 14.77	986	$ 13.34	1,004	$ 12.74
Expected to vest	904		986		1,004	

* The number of RSUs vested includes shares that the Company withheld on behalf of employees to satisfy statutory tax withholding requirements.

The number of performance-based RSUs scheduled to vest increases ratably based on the achievement of defined performance criteria between the established target and maximum levels. RSUs with performance-based vesting criteria are expected to vest as follows (number of RSUs in thousands):

Vesting Date	Expected to Vest	Not Expected to Vest	Total
January 1, 2019**	213	-	213
January 1, 2020	167	-	167

January 1, 2021	141	-	141

** The performance vesting criteria for the performance-based RSUs with a vesting date of January 1, 2019 were achieved.

In the event of (i) any termination (other than for cause) after attaining retirement age (as defined in the respective executive's employment arrangement), the executive's outstanding RSUs shall immediately vest and the outstanding performance-based RSUs shall vest on their normal vesting date to the extent applicable performance criteria are realized; and (ii) a change of control of Vishay, all of such executive's outstanding RSUs and performance-based RSUs shall immediately vest. In the event of voluntary termination by the executive prior to attaining retirement age or termination for cause, the executive's outstanding RSUs and performance-based RSUs will be forfeited.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 12 – Stock-Based Compensation (continued)

Phantom Stock Units

The 2007 Program authorizes the grant of phantom stock units to the extent provided for in the Company's employment agreements with certain executives. Each phantom stock unit entitles the recipient to receive a share of common stock at the individual's termination of employment or any other future date specified in the applicable employment agreement. Phantom stock units participate in dividend distribution on the same basis as the Company's common stock and Class B common stock. Dividend equivalents are issued in the form of additional units of phantom stock. The phantom stock units are fully vested at all times.

The following table summarizes the Company's phantom stock units activity (number of phantom stock units in thousands):

	Years ended December 31,					
	2018		2017		2016	
	Number of Phantom Stock Units	Grant-date Fair Value per Unit	Number of Phantom Stock Units	Grant-date Fair Value per Unit	Number of Phantom Stock Units	Grant-date Fair Value per Unit
Outstanding:						
Beginning of year	157		145		132	
Granted	10	$21.35	10	$16.25	10	$11.71
Dividend equivalents issued	3		2		3	
Redeemed for common stock	-		-		-	
End of year	170		157		145	

Stock Options

During the periods presented, the Company had stock options outstanding under the 2007 Program and previous stockholder-approved stock option programs.

Since December 31, 2013, all outstanding options had vested and were exercisable. As of December 31, 2016, approximately 77,000 options were outstanding with a weighted average exercise price of $16.29. As of December 31, 2017, there were no stock options outstanding.

There were no options granted in 2018, 2017, or 2016.

During the years ended December 31, 2017 and 2016, approximately 77,000 and 28,000 options were exercised, respectively. The total intrinsic value of options exercised during the years ended December 31, 2017 and 2016 was $20 and $85, respectively.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 13 – Commitments and Contingencies

Leases

The Company uses various leased facilities and equipment in its operations. In the normal course of business, operating leases are generally renewed or replaced by other leases. Certain operating leases include escalation clauses.

Total rental expense under operating leases was $22,658, $29,039, and $27,431 for the years ended December 31, 2018, 2017, and 2016, respectively.

Future minimum lease payments for operating leases with initial or remaining noncancelable lease terms in excess of one year are as follows:

2019	$18,911
2020	14,955
2021	10,972
2022	8,790
2023	7,490
Thereafter	23,155

Environmental Matters

The Company is subject to various federal, state, local, and foreign laws and regulations governing environmental matters, including the use, discharge, and disposal of hazardous materials. The Company's manufacturing facilities are believed to be in substantial compliance with current laws and regulations. Complying with current laws and regulations has not had a material adverse effect on the Company's financial condition.

The Company has engaged environmental consultants and attorneys to assist management in evaluating potential liabilities related to environmental matters. Management assesses the input from these consultants along with other information known to the Company in its effort to continually monitor these potential liabilities. Management assesses its environmental exposure on a site-by-site basis, including those sites where the Company has been named as a "potentially responsible party." Such assessments include the Company's share of remediation costs, information known to the Company concerning the size of the hazardous waste sites, their years of operation, and the number of past users and their financial viability.

The Company has accrued environmental liabilities of $12,190, of which $5,438 is included in other accrued liabilities on the accompanying consolidated balance sheet, and $6,752 is included in other noncurrent liabilities on the accompanying consolidated balance sheet.

While the ultimate outcome of these matters cannot be determined, management does not believe that the final disposition of these matters will have a material adverse effect on the Company's consolidated financial position, results of operations, or cash flows. The Company's present and past facilities have been in operation for many years. These facilities have used substances and have generated and disposed of wastes which are or might be considered hazardous. Therefore, it is possible that additional environmental issues may arise in the future, which the Company cannot now predict.

Litigation

The Company is a party to various claims and lawsuits arising in the normal course of business. The Company is of the opinion that these litigations or claims will not have a material negative effect on its consolidated financial position, results of operations, or cash flows.

Semiconductor Foundry Agreements

The Company's Siliconix subsidiary maintains long-term foundry agreements with subcontractors to ensure access to external front-end capacity.

Since 2004, Siliconix has maintained long-term foundry arrangements for semiconductor manufacturing with Tower Semiconductor, pursuant to which Siliconix transferred certain technology to Tower Semiconductor and committed to purchase a minimum amount of semiconductor wafers. The Company has minimum purchase commitments pursuant to the current arrangement of $40,697 and $16,792 for 2019 and 2020, respectively. The minimum purchase commitments are based on a 18-month rolling forecast and, accordingly, the 2020 minimum purchase commitments will likely increase. The Company has the option to purchase wafers in addition to the minimum commitment and, accordingly, actual purchases may be different than the amounts disclosed above. The Company's 2018 purchases pursuant to the arrangement exceeded the minimum purchase commitment.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 13 – Commitments and Contingencies (continued)

Product Quality Claims

The Company is a party to various product quality claims in the normal course of business. See Note 2 for further information on the Company's warranty obligations.

Executive Employment Agreements

The Company has employment agreements with certain of its senior executives. These employment agreements provide incremental compensation in the event of termination. The Company does not provide any severance or other benefits specifically upon a change in control.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 14 – Current Vulnerability Due to Certain Concentrations

Market Concentrations

The Company's largest customer, TTI, Inc., an electronics distributor, represented 10.4% of consolidated net revenues in 2018. The loss of this customer could have a material effect on the results of operations of the Company. No other customers represented greater than 10% of consolidated net revenue in 2018 and no customers represented greater than 10% of consolidated net revenues in 2017 or 2016.

A material portion of the Company's revenues are derived from the worldwide industrial, automotive, telecommunications, and computing markets. These markets have historically experienced wide variations in demand for end products. If demand for these end products should decrease, the producers thereof could reduce their purchases of the Company's products, which could have an adverse effect on the Company's results of operations and financial position.

Certain subsidiaries and product lines have customers which comprise greater than 10% of the subsidiary's or product line's net revenues. The loss of one of these customers could have a material effect on the results of operations of the subsidiary or product line and financial position of the subsidiary, which could result in an impairment charge which could be material to the Company's consolidated financial statements.

Credit Risk Concentrations

Financial instruments with potential credit risk consist principally of cash and cash equivalents, short-term investments, accounts receivable, and notes receivable. Concentrations of credit risk with respect to receivables are generally limited due to the Company's large number of customers and their dispersion across many countries and industries. As of December 31, 2018, one customer comprised 15.9% of the Company's accounts receivable balance. This customer comprised 16.1% of the Company's accounts receivable balance as of December 31, 2017. No other customer comprised greater than 10% of the Company's accounts receivable balance as of December 31, 2018 or December 31, 2017. The Company continually monitors the credit risks associated with its accounts receivable and adjusts the allowance for uncollectible accounts accordingly. The credit risk exposure associated with the accounts receivable is limited by the allowance and is not considered material to the financial statements.

The Company maintains cash and cash equivalents and short-term investments with various major financial institutions. The Company is exposed to credit risk related to the potential inability to access liquidity in financial institutions where its cash and cash equivalents and short-term investments are concentrated. As of December 31, 2018, the following financial institutions held over 10% of the Company's combined cash and cash equivalents and short-term investments balance:

MUFG Bank Ltd.	18.5%
JPMorgan*	11.7%
HSBC*	12.5%

*Participant in Credit Facility

Sources of Supplies

Many of the Company's products require the use of raw materials that are produced in only a limited number of regions around the world or are available from only a limited number of suppliers. The Company's consolidated results of operations may be materially and adversely affected if there are significant price increases for these raw materials, the Company has difficulty obtaining these raw materials, or the quality of available raw materials deteriorates. For periods in which the prices of these raw materials are rising, the Company may be unable to pass on the increased cost to the Company's customers, which would result in decreased margins for the products in which they are used. For periods in which the prices are declining, the Company may be required to write down its inventory carrying cost of these raw materials which, depending on the extent of the difference between market price and its carrying cost, could have a material adverse effect on the Company's net earnings.

Vishay is a major consumer of the world's annual production of tantalum. Tantalum, a metal purchased in powder or wire form, is the principal material used in the manufacture of tantalum capacitors. There are few suppliers that process tantalum ore into capacitor grade tantalum powder.

From time to time, there have been short-term market shortages of raw materials utilized by the Company. While these shortages have not historically adversely affected the Company's ability to increase production of products containing these raw materials, they have historically resulted in higher raw material costs for the Company. The Company cannot assure that any of these market shortages in the future would not adversely affect the Company's ability to increase production, particularly during periods of growing demand for the Company's products.
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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 14 – Current Vulnerability Due to Certain Concentrations (continued)

Certain raw materials used in the manufacture of the Company's products, such as gold, copper, palladium, and other metals, are traded on active markets and can be subject to significant price volatility. To ensure adequate supply and to provide cost certainty, the Company's policy is to enter into short-term commitments to purchase defined portions of annual consumption of the raw materials utilized by the Company if market prices decline below budget. If after entering into these commitments, the market prices for these raw materials decline, the Company must recognize losses on these adverse purchase commitments.

Recently enacted rules in the U.S. on conflict minerals, which include tantalum, tungsten, tin, and gold, all of which are used in the Company's products, could result in increased prices and decreased supply of conflict minerals, which could negatively affect the Company's consolidated results of operations.

Geographic Concentration

The Company has operations outside the United States, and approximately 75% of revenues earned during 2018 were derived from sales to customers outside the United States. Additionally, as of December 31, 2018, $686,284 of the Company's cash and cash equivalents and short-term investments were held by subsidiaries outside of the United States. Some of the Company's products are produced and cash and cash equivalents and short-term investments are held in countries which are subject to risks of political, economic, and military instability. This instability could result in wars, riots, nationalization of industry, currency fluctuations, and labor unrest. These conditions could have an adverse impact on the Company's ability to operate in these regions and, depending on the extent and severity of these conditions, could materially and adversely affect the Company's overall financial condition, operating results, and ability to access its liquidity when needed.

As of December 31, 2018 the Company's cash and cash equivalents and short-term investments were concentrated in the following countries:

Germany	20.6%
Singapore	20.4%
Israel	16.4%
United States	14.9%
The Republic of China (Taiwan)	11.0%
People's Republic of China	9.9 %
Other Asia	3.0 %
Other Europe	2.4 %
Other	1.4 %

Certain of the Company's non-U.S. subsidiaries have cash and cash equivalents and short-term investments deposited in U.S. financial institutions.

Vishay has been in operation in Israel for 48 years. The Company has never experienced any material interruption in its operations attributable to these factors, in spite of several Middle East crises, including wars.
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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 15 – Segment and Geographic Data

Vishay is a global manufacturer and supplier of electronic components. Vishay operates, and its chief operating decision maker makes strategic and operating decisions with regards to assessing performance and allocating resources based on, five reporting segments: MOSFETs, Diodes, Optoelectronic Components, Resistors & Inductors, and Capacitors. These segments represent groupings of product lines based on their functionality:

Metal oxide semiconductor field effect transistors ("MOSFETs") function as solid state switches to control power.
Diodes route, regulate, and block radio frequency, analog, and power signals; protect systems from surges or electrostatic discharge damage; or provide electromagnetic interference filtering.
Optoelectronic components emit light, detect light, or do both.
Resistors and inductors both impede electric current. Resistors are basic components used in all forms of electronic circuitry to adjust and regulate levels of voltage and current. Inductors use an internal magnetic field to change alternating current phase and resist alternating current.
Capacitors store energy and discharge it when needed.

Vishay's reporting segments generate substantially all of their revenue from product sales to the industrial, automotive, telecommunications, computing, consumer products, power supplies, military and aerospace, and medical end markets. An immaterial portion of revenues are from royalties.

The Company evaluates business segment performance on operating income, exclusive of certain items ("segment operating income"). Only dedicated, direct selling, general, and administrative expenses of the segments are included in the calculation of segment operating income. The Company's calculation of segment operating income excludes such selling, general, and administrative costs as global operations, sales and marketing, information systems, finance and administration groups, as well as restructuring and severance costs, goodwill and long-lived asset impairment charges, and other items. Management believes that evaluating segment performance excluding such items is meaningful because it provides insight with respect to intrinsic operating results of the Company. These items represent reconciling items between segment operating income and consolidated operating income. Business segment assets are the owned or allocated assets used by each business.

The Company also regularly evaluates gross profit by segment to assist in the analysis of consolidated gross profit. The Company considers segment operating income to be the more important metric because it more fully captures the business operations of the segments.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 15 – Segment and Geographic Data (continued)

The following tables set forth business segment information:

	MOSFETs	Diodes	Optoelectronic Components	Resistors & Inductors	Capacitors	Corporate / Other	Total
Year ended December 31, 2018:							
Net revenues	$547,643	$712,936	$ 289,727	$1,018,286	$466,097	$-	$3,034,689
Gross Profit	145,923	196,702	100,219	337,268	108,412	-	$888,524
Segment Operating Income	106,955	175,752	82,681	303,571	86,929	-	$755,888
Depreciation expense	32,104	38,197	16,612	37,708	17,745	7,690	$150,056
Capital expenditures	49,557	57,756	19,935	80,862	12,200	9,589	$229,899
Total Assets as of December 31, 2018:	$444,356	$804,784	$ 342,656	$874,835	$487,540	$152,027	$3,106,198
Year ended December 31, 2017:*							
Net revenues	$467,476	$619,958	$ 284,429	$843,529	$383,976	$-	$2,599,368
Gross Profit	109,603	165,176	98,000	251,905	78,425	-	$703,109
Segment Operating Income	74,174	145,645	80,499	222,878	58,544	-	$581,740
Depreciation expense	34,731	37,396	16,871	34,083	17,736	8,066	$148,883
Capital expenditures	33,475	38,681	16,115	67,007	11,135	4,019	$170,432
Total Assets as of December 31, 2017:	$412,598	$792,610	$ 332,228	$994,639	$568,113	$361,901	$3,462,089
Year ended December 31, 2016:*							
Net revenues	$405,949	$552,766	$ 269,162	$753,524	$335,927	$-	$2,317,328
Gross Profit	58,431	136,580	87,516	224,352	66,943	-	$573,822
Segment Operating Income	22,536	115,873	68,246	193,241	46,414	-	$446,310
Depreciation expense	34,531	35,335	15,549	32,240	17,817	9,049	$144,521
Capital expenditures	22,430	29,860	18,276	47,006	14,410	2,653	$134,635
Total Assets as of December 31, 2016:	$389,482	$714,898	$ 312,423	$907,995	$495,925	$259,978	$3,080,701

*Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1.

	Years ended December 31, 2018	2017**	2016**
Reconciliation:			
Segment Operating Income	$755,888	$581,740	$446,310
Restructuring and Severance Costs	-	(11,273)	(19,199)
Impairment of Intangible Assets	-	-	(1,559)
Unallocated Selling, General, and Administrative Expenses	(270,768)	(246,462)	(228,494)
Consolidated Operating Income (Loss)	$485,120	$324,005	$197,058

Unallocated Other Income (Expense)	(68,344)	(44,641)	(102,842)
Consolidated Income Before Taxes	$416,776	$279,364	$94,216

**Recast for the retrospective adoption of ASU 2017-07. See Note 1.

See Note 4 for restructuring and severance costs segment information.

The Company has a broad line of products that it sells to OEMs, EMS companies, and independent distributors. The distribution of sales by customer type is shown below:

	Years Ended December 31,		
	2018	2017	2016
Distributors	$1,742,262	$1,484,276	$1,280,060
OEMs	1,085,292	931,291	861,322
EMS companies	207,135	183,801	175,946
Total Revenue	$3,034,689	$2,599,368	$2,317,328

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 15 – Segment and Geographic Data (continued)

Net revenues were attributable to customers in the following regions:

	Years Ended December 31, 2018	2017	2016
Asia	$1,193,827	$1,091,107	$948,195
Europe	1,081,073	902,357	810,543
Americas	759,789	605,904	558,590
Total Revenue	$3,034,689	$2,599,368	$2,317,328

The Company generates substantially all of its revenue from product sales to end customers in the industrial, automotive, telecommunications, computing, consumer products, power supplies, military and aerospace, and medical end markets. Sales by end market are presented below:

	Years Ended December 31, 2018	2017	2016
Industrial	$1,139,880	$934,631	$796,031
Automotive	861,436	727,220	640,767
Telecommunications	200,379	190,682	193,456
Computing	228,831	198,850	172,481
Consumer Products	168,884	145,243	150,741
Power Supplies	144,433	160,038	132,555
Military and Aerospace	162,921	132,898	128,523
Medical	127,925	109,806	102,774
Total Revenue	$3,034,689	$2,599,368	$2,317,328

The following table summarizes net revenues based on revenues generated by subsidiaries located within the identified geographic area:

	Years ended December 31, 2018	2017**	2016**
United States	$743,647	$590,839	$541,106
Germany	982,082	837,258	743,500
Other Europe	123,846	99,636	83,532
Israel	13,299	11,075	10,046
Asia	1,171,815	1,060,560	939,144
	$3,034,689	$2,599,368	$2,317,328

**Recast for the retrospective adoption of ASU 2017-07. See Note 1.

The following table summarizes property and equipment based on physical location:

December 31, 2018	2017

United States	$117,138	$99,993
Germany	169,941	154,874
Other Europe	121,964	130,523
Israel	103,675	102,890
People's Republic of China	217,681	192,521
Republic of China (Taiwan)	145,644	122,080
Other Asia	88,864	99,493
Other	4,094	3,384
	$969,001	$905,758

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 16 – Earnings Per Share

Basic earnings per share is computed using the weighted average number of common shares outstanding during the periods presented. Diluted earnings per share is computed using the weighted average number of common shares outstanding adjusted to include the potentially dilutive effect of stock options and restricted stock units (see Note 12), convertible debt instruments (see Note 6), and other potentially dilutive securities.

The following table sets forth the computation of basic and diluted earnings per share attributable to Vishay stockholders (shares in thousands):

	Years ended December 31,		
	2018	2017	2016
Numerator:			
Numerator for basic earnings (loss) per share:			
Net earnings (loss) attributable to Vishay stockholders	$345,758	$(20,344)	$48,792
Interest savings assuming conversion of dilutive convertible and exchangeable notes, net of tax	-	-	38
Numerator for diluted earnings (loss) per share:			
Net earnings (loss) attributed to Vishay stockholders - diluted	$345,758	$(20,344)	$48,830
Denominator:			
Denominator for basic earnings (loss) per share:			
Weighted average shares	144,202	145,478	147,009
Outstanding phantom stock units	168	155	143
Adjusted weighted average shares - basic	144,370	145,633	147,152
Effect of dilutive securities:			
Convertible and exchangeable debt instruments	9,707	-	3,219
Restricted stock units	545	-	323
Other	-	-	3
Dilutive potential common shares	10,252	-	3,545
Denominator for diluted earnings (loss) per share:			
Adjusted weighted average shares - diluted	154,622	145,633	150,697
Basic earnings (loss) per share attributable to Vishay stockholders	$2.39	$(0.14)	$0.33
Diluted earnings (loss) per share attributable to Vishay stockholders	$2.24	$(0.14)	$0.32

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
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Note 16 – Earnings Per Share (continued)

Diluted earnings per share for the years presented do not reflect the following weighted average potential common shares, as the effect would be antidilutive (in thousands):

	Years ended December 31,		
	2018	2017	2016
Convertible and exchangeable notes:			
Convertible Senior Debentures, due 2040	-	21,184	10,312
Convertible Senior Debentures, due 2041	-	8,432	8,249
Convertible Senior Debentures, due 2042	-	13,586	-
Convertible Senior Notes, due 2025	10,468	-	-
Weighted average employee stock options	-	26	91
Weighted average other	266	981	512

In periods in which they are dilutive, if the potential common shares related to the exchangeable notes are included in the computation, the related interest savings, net of tax, assuming conversion/exchange is added to the net earnings used to compute earnings per share.

The Company's convertible debt instruments are only convertible for specified periods upon the occurrence of certain events. The convertible debentures due 2042 became convertible subsequent to the December 31, 2016 evaluation of the conversion criteria, and have remained convertible for each subsequent quarterly evaluation through the December 31, 2018 evaluation. The convertible debentures due 2040 became convertible subsequent to the September 30, 2017 evaluation of the conversion criteria, and have remained convertible for each subsequent quarterly evaluation through the December 31, 2018 evaluation. In periods that the debentures are not convertible, the certain conditions which could trigger conversion of the remaining debentures have been deemed to be non-substantive, and accordingly, the Company assumes the conversion of these instruments in its diluted earnings per share computation during periods in which they are dilutive.

At the direction of its Board of Directors, the Company intends, upon conversion, to repay the principal amounts of the convertible senior debentures, due 2040, due 2041, and due 2042, in cash and settle any additional amounts in shares of Vishay common stock. Accordingly, the debentures are included in the diluted earnings per share computation using the "treasury stock method" (similar to options and warrants) rather than the "if converted method" otherwise required for convertible debt. Under the "treasury stock method," Vishay calculates the number of shares issuable under the terms of the debentures based on the average market price of Vishay common stock during the period, and that number is included in the total diluted shares figure for the period. If the average market price is less than $12.76, no shares are included in the diluted earnings per share computation for the convertible senior debentures due 2040, if the average market price is less than $17.48, no shares are included in the diluted earnings per share computation for the convertible senior debentures due 2041, if the average market price is less than $10.85, no shares are included in the diluted earnings per share computation for the convertible senior debentures due 2042, and if the average market price is less than $31.49, no shares are included in the diluted earnings per share computation for the convertible senior notes due 2025.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 17 – Additional Cash Flow Information

Changes in operating assets and liabilities, net of effects of businesses acquired consist of the following:

	Years ended December 31,		
	2018	2017	2016
Accounts receivable	$(62,433)	$(51,152)	$(4,120)
Inventories	(80,182)	(55,062)	13,760
Prepaid expenses and other current assets	(11,670)	(3,668)	(12,180)
Accounts payable	(2,277)	42,291	17,839
Other current liabilities	54,745	21,184	(19,505)
Net change in operating assets and liabilities	$(101,817)	$(46,407)	$(4,206)

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
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Note 18 – Fair Value Measurements

The fair value measurement accounting guidance establishes a valuation hierarchy of the inputs used to measure fair value. This hierarchy prioritizes the inputs to valuation techniques used to measure fair value into three broad levels. The following is a brief description of those three levels:

Level 1: Observable inputs such as quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2: Inputs other than quoted prices that are observable for the asset or liability, either directly or indirectly. These include quoted prices for similar assets or liabilities in active markets and quoted prices for identical or similar assets or liabilities in markets that are not active.

Level 3: Unobservable inputs that reflect the Company's own assumptions.

An asset or liability's classification within the hierarchy is determined based on the lowest level input that is significant to the fair value measurement.

The following table provides the financial assets and liabilities carried at fair value measured on a recurring basis:

	Total Fair Value	Level 1	Level 2	Level 3
December 31, 2018				
Assets:				
Assets held in rabbi trusts	$41,770	$26,278	$15,492	$-
Available for sale securities	$4,309	4,309	-	-
Non - U.S. Defined Benefit Pension Plan Assets:				
Equity securities	$9,344	9,344	-	-
Fixed income securities	$13,572	13,572	-	-
Cash	$47,904	47,904	-	-
	$116,899	$101,407	$15,492	$-
Liabilities:				
Embedded derivative - convertible debentures due 2040	$(1)	-	-	(1)
Embedded derivative - convertible debentures due 2041	$(67)	-	-	(67)
Embedded derivative - convertible debentures due 2042	$(2)	-	-	(2)
	$(70)	$-	$-	$(70)
December 31, 2017				
Assets:				
Assets held in rabbi trusts	$45,252	$28,589	$16,663	$-
Available for sale securities	$4,621	4,621	-	-
Non - U.S. Defined Benefit Pension Plan Assets:				
Equity securities	$8,793	8,793	-	-
Fixed income securities	$12,793	12,793	-	-
Cash	$49,019	49,019	-	-
	$120,478	$103,815	$16,663	$-
Liabilities:				

Embedded derivative - convertible debentures due 2040	$(206)	-	-	(206)
Embedded derivative - convertible debentures due 2041	$(214)	-	-	(214)
Embedded derivative - convertible debentures due 2042	$(118)	-	-	(118)
	$(538)	$-	$-	$(538)

As described in Note 6, the Company allocated the aggregate repurchase payment of convertible senior debentures between the associated liability and equity components of the repurchased convertible senior debentures based on a nonrecurring fair value measurement of the convertible senior debentures immediately prior to the repurchases. The nonrecurring fair value measurements are considered Level 3 measurements. See Note 6 for further information on the measurements and inputs.

In accordance with ASC Subtopic 350-20, and as described in Note 20, the Company performed nonrecurring fair value measurements of its indefinite-lived Siliconix tradenames as of the last day of its third fiscal quarter of 2016. As a result of the fair value measurements, the Siliconix tradenames with a carrying value of $20,359 were written down to their fair value of $18,800, resulting in an impairment charge of $1,559, recorded in the accompanying consolidated statements of operations for the year ended December 31, 2016.

The Company's nonrecurring fair value measurement of its Siliconix tradenames is considered Level 3 measurements. See Note 20 for further information on the measurements and inputs.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
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Note 18 – Fair Value Measurements (continued)

The Company maintains non-qualified trusts, referred to as "rabbi" trusts, to fund payments under deferred compensation and non-qualified pension plans. Rabbi trust assets consist primarily of marketable securities, classified as available-for-sale, and company-owned life insurance assets. The marketable securities held in the rabbi trusts are valued using quoted market prices on the last business day of the year. The company-owned life insurance assets are valued in consultation with the Company's insurance brokers using the value of underlying assets of the insurance contracts. The fair value measurement of the marketable securities held in the rabbi trust is considered a Level 1 measurement and the measurement of the company-owned life insurance assets is considered a Level 2 measurement within the fair value hierarchy.

The Company maintains defined benefit retirement plans in certain of its non-U.S. subsidiaries. The assets of the plans are measured at fair value.

Equity securities held by the non-U.S. defined benefit retirement plans consist of equity securities that are valued based on quoted market prices on the last business day of the year. The fair value measurement of the equity securities is considered a Level 1 measurement within the fair value hierarchy.

Fixed income securities held by the non-U.S. defined benefit retirement plans consist of government bonds in the Philippines and India and corporate notes that are valued based on quoted market prices on the last business day of the year. The fair value measurement of the fixed income securities is considered a Level 1 measurement within the fair value hierarchy.

Cash held by the non-U.S. defined benefit retirement plans consists of demand deposits on account in various financial institutions to fund current benefit payments. The carrying amount of the cash approximates its fair value.

The Company holds investments in debt securities that are intended to fund a portion of its pension and other postretirement benefit obligations outside of the U.S. The investments are valued based on quoted market prices on the last business day of the year. The fair value measurement of the investments is considered a Level 1 measurement within the fair value hierarchy.

The convertible senior debentures, due 2040, due 2041, and due 2042, issued by the Company on November 9, 2010, May 13, 2011, and May 31, 2012, respectively, contain embedded derivative features that GAAP requires to be bifurcated and remeasured each reporting period. Each quarter, the change in the fair value of the embedded derivative features, if any, is recorded in the consolidated statements of operations. The Company uses a derivative valuation model to derive the value of the embedded derivative features. Key inputs into this valuation model are the Company's current stock price, risk-free interest rates, the stock dividend yield, the stock volatility, and the debentures' credit spread over London Interbank Offered Rate (LIBOR). The first three aforementioned inputs are based on observable market data and are considered Level 2 inputs while the last two aforementioned inputs are unobservable and thus require management's judgment and are considered Level 3 inputs. The fair value measurement is considered a Level 3 measurement within the fair value hierarchy.

The Company has entered into forward contracts with highly-rated financial institutions to mitigate the foreign currency risk associated with intercompany loans denominated in a currency other than the legal entity's functional currency. The notional amount of the forward contracts was $100,000 as of December 31, 2017. There were no such contracts outstanding as of December 31, 2018. The forward contracts were short-term in nature and were renewed at the Company's discretion until the intercompany loans were repaid. We did not designate the forward contracts as hedges for accounting purposes, and as such the changes in the fair value of the contracts were recognized in the accompanying consolidated statements of operations as a component of other income (expense). The Company estimated the fair value of the forward contracts based on applicable and commonly used pricing models using current market information and is considered a Level 2 measurement within the fair value hierarchy. The value of the forward contracts were immaterial as of December 31, 2017. The Company does not utilize derivatives or other financial instruments for trading or other speculative purposes.

The fair value of the long-term debt, excluding the derivative liability and capitalized deferred financing costs, at December 31, 2018 and 2017 is approximately $577,200 and $1,071,200, respectively, compared to its carrying value, excluding the derivative liability and capitalized deferred financing costs, of $509,407 and $379,033, respectively. The Company estimates the fair value of its long-term debt using a combination of quoted market prices for similar financing arrangements and expected future payments discounted at risk-adjusted rates, which are considered level 2 inputs.

At December 31, 2018 and 2017, the Company's short-term investments were comprised of time deposits with financial institutions that have maturities that exceed 90 days from the date of acquisition; however they all mature within one year from the respective balance sheet dates. The Company's short-term investments are accounted for as held-to-maturity debt instruments, at amortized cost, which approximates their fair value. The investments are funded with excess cash not expected to be needed for operations prior to maturity; therefore, the Company believes it has the intent and ability to hold the short-term investments until maturity. At each reporting date, the Company performs an evaluation to determine if any unrealized losses are other-than-temporary. No other-than-temporary impairments have been recognized on these securities, and there are no unrecognized holding gains or losses for these securities during the periods presented. There have been no transfers to or from the held-to-maturity classification. All decreases in the account balance are due to returns of principal at the securities' maturity dates. Interest on the securities is recognized as interest income when earned.

At December 31, 2018 and 2017, the Company's cash and cash equivalents were comprised of demand deposits, time deposits with maturities of three months or less when purchased, and money market funds. The Company estimates the fair value of its cash, cash equivalents, and short-term investments using level 2 inputs. Based on the current interest rates for similar investments with comparable credit risk and time to maturity, the fair value of the Company's cash, cash equivalents, and held-to-maturity short-term investments approximate the carrying amounts reported in the accompanying consolidated balance sheets.

The Company's financial instruments also include accounts receivable, short-term notes payable, and accounts payable. The carrying amounts for these financial instruments reported in the accompanying consolidated balance sheets approximate their fair values.

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Note 19 – Related Party Transactions

Vishay Precision Group, Inc.

On July 6, 2010, Vishay completed the spin-off of its measurements and foil resistors businesses into an independent, publicly-traded company, Vishay Precision Group, Inc. Vishay's common stockholders received 1 share of VPG common stock for every 14 shares of Vishay common stock they held on the record date, June 25, 2010, and Vishay's Class B common stockholders received 1 share of VPG Class B common stock for every 14 shares of Vishay Class B common stock they held on the record date.

Following the spin-off, VPG is an independent company and Vishay retains no ownership interest.

Relationship with VPG after Spin-off

Following the spin-off, VPG and Vishay operate separately, each as independent public companies. Vishay has no ownership interest in VPG. However, Ruta Zandman solely or on a shared basis with Marc Zandman and Ziv Shoshani, all of whom are members of Vishay's Board of Directors, control a large portion of the voting power of both Vishay and VPG. Marc Zandman, Vishay's Executive Chairman of the Board and an executive officer of Vishay, serves as the Chairman of VPG. Ziv Shoshani, CEO of VPG, serves as a director of Vishay. Additionally, Timothy V. Talbert, a member of Vishay's Board of Directors is also a member of the Board of Directors of VPG.

In connection with the completion of the spin-off, Vishay and its subsidiaries entered into several agreements with VPG and its subsidiaries that govern the relationship of the parties following the spin-off. Among the agreements entered into with VPG and its subsidiaries were a transition services agreement, several lease agreements, and supply agreements. None of the agreements have had nor are expected to have a material impact on Vishay's financial position, results of operations, or liquidity. Some of these agreements have expired and have not been renewed.

Vishay also entered into a trademark license agreement with VPG pursuant to which Vishay granted VPG the license to use certain trademarks, service marks, logos, trade names, entity names, and domain names which include the term "Vishay." The license granted VPG the limited, exclusive, royalty-free right and license to use certain marks and names incorporating the term "Vishay" in connection with the design, development, manufacture, marketing, provision and performance of certain VPG products that do not compete with any products within Vishay's product range as constituted immediately following the separation and certain services provided in connection with the products. The license cannot be terminated except as a result of willful misconduct or liquidation bankruptcy of VPG.

Until the spin-off, VPG was included in Vishay's consolidated federal income tax returns and with Vishay and/or certain of Vishay's subsidiaries in applicable combined or unitary state and local income tax returns. In conjunction with the spin-off, Vishay and VPG entered a tax matters agreement under which Vishay generally will be liable for all U.S. federal, state, local, and foreign income taxes attributable to VPG with respect to taxable periods ending on or before the distribution date except to the extent that VPG has a liability for such taxes on its books at the time of the spin-off. Vishay is also principally responsible for managing any income tax audits by the various tax jurisdictions for pre-spin-off periods. Vishay has fully indemnified VPG of tax exposures arising prior to the spin-off.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 20 – Goodwill and Other Intangible Assets

As a result of a review of the financial results and outlook for the MOSFETs segment following the completion of production transfers, Vishay determined that an interim indefinite-lived intangible asset impairment test was required for its Siliconix tradenames as of the end of the third fiscal quarter of 2016.

As a result of this analysis, the Company determined that its Siliconix tradenames, with a carrying value of $20,359, were impaired. The Company recorded an impairment charge of $1,559 to write-down the tradenames to their fair value. The tradenames are no longer considered indefinite-lived and the remaining value is being amortized over 10 years, which was the estimated remaining useful life.

The fair value of indefinite-lived trademarks is measured as the discounted cash flow savings realized from owning such tradenames and not having to pay a royalty for their use. The evaluation of the fair value of indefinite-lived trademarks requires us to make significant estimates and assumptions. These estimates and assumptions primarily include, but are not limited to: the assumed market-royalty rate; the discount rate; terminal growth rates; and forecasts of revenue.

Due to the inherent uncertainty involved in making these estimates, actual financial results could differ from those estimates. Changes in assumptions concerning future financial results or other underlying assumptions could have a significant impact on the conclusion that an indefinite-lived asset is not impaired, or the determination of any impairment charge if it was determined that the asset values were indeed impaired.

The Company performs its annual goodwill and indefinite-lived impairment tests as of the first day of the fiscal fourth quarter. The interim impairment test performed as the last day of the third fiscal quarter of 2016, was effectively the annual impairment test for 2016. No impairment was identified as a result of the Company's annual impairment tests for 2018 and 2017. The Company has no remaining indefinite-lived intangible assets.

The recorded impairment charges are noncash in nature and do not affect Vishay's liquidity, cash flows from operating activities, or debt covenants, and will not have a material impact on future operations.

NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 20 – Goodwill and Other Intangible Assets (continued)

The changes in the carrying amount of goodwill by segment for the years ended December 31, 2018 and 2017 were as follows:

	Optoelectronic Components	Resistors & Inductors	Total
Balance at January 1, 2017	$ 96,849	$ 44,558	$ 141,407
Exchange rate effects	-	1,335	1,335
Balance at December 31, 2017	$ 96,849	45,893	142,742
UltraSource acquisition	-	4,227	4,227
EuroPower acquisition	-	1,068	1,068
Exchange rate effects	-	(557)	(557)
Balance at December 31, 2018	$ 96,849	$ 50,631	$ 147,480

Other intangible assets are as follows:

	December 31, 2018	December 31, 2017
Intangible assets subject to amortization:		
Patents and acquired technology	$ 32,854	$ 71,596
Capitalized software	53,218	54,325
Customer relationships	59,119	63,655
Tradenames	23,041	55,272
Non-competition agreements	-	606
	168,232	245,454
Accumulated amortization:		
Patents and acquired technology	(26,469)	(63,868)
Capitalized software	(49,288)	(50,246)
Customer relationships	(19,958)	(26,622)
Tradenames	(6,829)	(34,378)
Non-competition agreements	-	(586)
	(102,544)	(175,700)
Net Intangible Assets Subject to Amortization	$ 65,688	$ 69,754

Amortization expense (excluding capitalized software) was $11,807, $14,263, and $14,842, for the years ended December 31, 2018, 2017, and 2016, respectively.

Estimated annual amortization expense of intangible assets on the balance sheet at December 31, 2018 for each of the next five years is as follows:

2019	$ 8,424
2020	7,433
2021	6,543
2022	5,891

2023 5,668

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 21 – Summary of Quarterly Financial Information (Unaudited)

	2018 First	Second	Third	Fourth	2017* First	Second	Third	Fourth
Statement of Operations data:								
Net revenues	$716,795	$761,030	$780,972	$775,892	$604,801	$643,164	$677,941	$673,462
Gross profit	205,300	227,238	236,296	219,690	161,749	173,837	190,147	177,376
Operating income (loss)	104,062	123,293	138,098	119,667	67,578	85,005	95,416	76,006
Net earnings (loss)	62,545	103,262	78,071	102,659	36,949	56,409	64,583	(177,501)
Net earnings (loss) attributable to noncontrolling interests	179	165	195	240	230	219	179	156
Net earnings (loss) attributable to Vishay stockholders	62,366	103,097	77,876	102,419	36,719	56,190	64,404	(177,657)
Per Share data:								
Basic earnings (loss) per share attributable to Vishay stockholders (a)	$0.43	$0.71	$0.54	$0.71	$0.25	$0.38	$0.44	$(1.23)
Diluted earnings (loss) per share attributable to Vishay stockholders (a)	$0.39	$0.65	$0.51	$0.69	$0.24	$0.36	$0.41	$(1.23)
Certain Items Recorded during the Quarters:								
Operating income (loss):								
Restructuring and severance costs	$-	$-	$-	$-	$1,469	$481	$3,244	$6,079
Other income (expense):								
Loss on disposal of equity affiliate	$-	$-	$-	$-	$(7,060)	$-	$-	$948
Loss on early extinguishment of debt	-	(17,309)	-	(9,274)	-	-	-	-
Income tax expense:								
Enactment of TCJA	$-	$12,000	$13,496	$-	$-	$-	$-	$234,855
	-	(33,963)	-	(20,914)	-	-	-	-

Change in deferred taxes due to early extinguishment of debt								
Tax effects of cash repatriation program	1,316	(9,006)	680	(3,037)	(968)	(1,240)	(892)	(2,702)
Tax effects of changes in uncertain tax positions	-	-	-	-	-	-	(804)	2,369
Quarter end date (b)	March 31	June 30	September 29	December 31	April 1	July 1	September 30	December 31

* Recast for the retrospective adoption of ASUs 2014-09 and 2017-07. See Note 1.
(a) May not add due to differences in weighted average share counts.
(b) The Company reports interim financial information for 13-week periods beginning on a Sunday and ending on a Saturday, except for the first fiscal quarter, which always begins on January 1, and the fourth fiscal quarter, which always ends on December 31.

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NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(dollars in thousands, except per share amounts)

Note 21 – Summary of Quarterly Financial Information (Unaudited) (continued)

The retrospective adoption of ASUs 2014-09 and 2017-07 did not impact net earnings (loss) attributed to Vishay stockholders. See the combined impact of the retrospective adoption in the tables below:

	Fiscal quarters ended									
	April 1, 2017			July 1, 2017			September 30, 2017			December
	As Reported	Adjustments	Recast	As Reported	Adjustments	Recast	As Reported	Adjustments	Recast	As Reported
Net revenues	$606,258	$(1,457)	$604,801	$644,892	$(1,728)	$643,164	$677,883	$58	$677,941	$674,489
Costs of products sold	445,383	(2,331)	443,052	471,929	(2,602)	469,327	488,610	(816)	487,794	497,988
Gross profit	160,875	874	161,749	172,963	874	173,837	189,273	874	190,147	176,501
Operating income	64,688	2,890	67,578	82,036	2,969	85,005	92,328	3,088	95,416	72,536
Total other income (expense)	(14,246)	(2,890)	(17,136)	(6,327)	(2,969)	(9,296)	(6,140)	(3,088)	(9,228)	(5,511
Income before taxes	50,442	-	50,442	75,709	-	75,709	86,188	-	86,188	67,025
Income tax expense	13,493	-	13,493	19,300	-	19,300	21,605	-	21,605	244,526
Net earnings (loss)	36,949	-	36,949	56,409	-	56,409	64,583	-	64,583	(177,501
Less: net earnings attributable to noncontrolling interests	230	-	230	219	-	219	179	-	179	156
Net earnings (loss) attributable to Vishay stockholders	$36,719	$-	$36,719	$56,190	$-	$56,190	$64,404	$-	$64,404	$(177,657