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Advanced Emissions Solutions, Inc.  
Form 10-K  
March 13, 2017  
United States  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

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FORM 10-K

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ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934  
For the fiscal year ended December 31, 2016

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

Commission File Number: 001-37822

Advanced Emissions Solutions, Inc.  
(Name of registrant as specified in its charter)

Delaware 27-5472457  
(State of incorporation) (IRS Employer  
Identification No.)

640 Plaza Drive, Suite 270, Highlands Ranch CO, 80129  
(Address of principal executive offices) (Zip Code)  
(Registrant's telephone number, including area code): (720) 598-3500

Securities registered under Section 12(b) of the Act:

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

Securities registered under Section 12(g) of the Act: None

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

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

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

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

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

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

Large accelerated filer  Accelerated filer

Non-accelerated filer  Smaller Reporting Company

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

The aggregate market value of the voting stock held by non-affiliates of the registrant was approximately \$106.1 million based on the last reported bid price of the Common Stock on the OTC Pink® Marketplace - Limited Information Tier on June 30, 2016. The number of shares outstanding of the registrant's Common Stock, par value \$0.001 per share, as of March 8, 2017 was 22,022,683.

Indicate the number of shares outstanding of each of the registrant's classes of common stock, as of the latest practicable date.

Documents Incorporated By Reference

None

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ADVANCED EMISSIONS SOLUTIONS, INC.  
ANNUAL REPORT ON FORM 10-K  
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2016

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## PART I

### Item 1. Business

#### General

ADA-ES, Inc. ("ADA"), a Colorado corporation, was incorporated in 1997. Pursuant to an Agreement and Plan of Merger ("Reorganization"), effective July 1, 2013, Advanced Emissions Solutions, Inc. ("ADES"), a Delaware company incorporated in 2011, replaced ADA as the publicly-held corporation and ADA became a wholly-owned subsidiary of ADES. Each outstanding share of ADA's common stock automatically converted into one share of common stock of ADES and the shareholders of ADA became stockholders of ADES on a one-for-one basis, holding the same number of shares in and the same ownership percentage of ADES after the reorganization as they held in and of ADA prior to the reorganization. ADES's common stock became listed on the NASDAQ Capital Market under the symbol, "ADES," ADA's previous symbol, and ADA's stock ceased trading on the NASDAQ Capital Market on July 1, 2013. From March 30, 2015 through July 6, 2016, ADES's common stock was traded on the OTC Pink® Marketplace - Limited Information Tier under the trading symbol "ADES." Effective, July 7, 2016 ADES's common stock began trading on the NASDAQ Global Market under the symbol, ADES. This Annual Report on Form 10-K is referred to as the "Form 10-K" or the "Report."

Except as otherwise noted in this Report, ADES and its subsidiaries have continued to conduct business in substantially the same manner as conducted prior to the reorganization.

As this filing pertains to the year ended December 31, 2016, the terms the "Company," "we," "us" and "our" means ADA and its consolidated subsidiaries for the periods through and including the period ended June 30, 2013 and ADES and its consolidated subsidiaries for the dates or periods after July 1, 2013.

We are also an equity investor in Tinium Group, LLC ("Tinium Group"), formerly known as Clean Coal Solutions, LLC, and Tinium Services, LLC ("Tinium Services"), formerly known as Clean Coal Solutions Services, LLC. As of December 31, 2016 and 2015, we held equity interests of 42.50% and 50.00% in Tinium Group and Tinium Services, respectively, and each of their operations significantly impacted our financial position and results of operations for the years ended December 31, 2016, 2015 and 2014. These equity interests are accounted for under the equity method of accounting. On March 3, 2016, we sold our 24.95% equity interest in RCM6, LLC ("RCM6"), which had been accounted for under the equity method of accounting from inception until its disposition.

#### Business Purpose and Strategy

ADES is the holding entity for a family of companies that provide emissions solutions to customers in the coal-fired power generation and industrial boiler processes. Through our subsidiaries and joint ventures, we are a leader in emissions control ("EC") technologies and associated equipment, chemicals and services. Our proprietary environmental technologies enable our customers to reduce emissions of mercury and other pollutants, maximize utilization levels and improve operating efficiencies to meet the challenges of existing and pending EC regulations. Our major activities include:

- Development and sale of technology to reduce emissions and improve operations of coal-fired boilers used for power generation and industrial processes;

- Development and sale of equipment, specialty chemicals, consulting services and other products designed to reduce emissions of mercury, acid gases, metals and other pollutants, and the providing of technology services in support of our customers' emissions compliance strategies;

- Through Tinium Group, an unconsolidated entity, reduction of mercury and nitrogen oxide ("NO<sub>x</sub>") emissions at select coal-fired power generators through the burning of Refined Coal ("RC") produced by RC facilities placed in service by Tinium Group. We benefit from Tinium Group's production and sale of RC, which generates tax credits, as well as the revenue from selling or leasing RC facilities to tax equity investors. See the separately filed financial statements of Tinium Group included in Item 15 of this Report; and

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Research and development of technologies and other solutions to advance cleaner energy and to help our customers meet existing and future regulatory and business challenges, including technologies designed to address regulated environmental impacts related to power generation or industrial processes.

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### Markets for Our Products and Services

We provide environmental control equipment, chemicals and technologies to our primary market that consists of approximately 680 coal-fired electrical generation units located in the United States.

The share of coal-fired power generation as a percentage of U.S. electricity generation is expected to continue to decrease over the coming years due to low projected natural gas prices, increasingly stringent environmental regulations and increased deployment of renewable power generating assets. However, we believe that coal-fired power generation will remain a significant component of the U.S. power generation mix for many years given coal's abundance, affordability, reliability and availability as a domestic fuel source. In its Annual Energy Outlook for 2017, the Energy Information Administration ("EIA") projects that coal will provide 22% of electricity generation in 2040 if the Clean Power Plan ("CPP") of the U.S. Environmental Protection Agency ("EPA"), addressing limiting greenhouse gas emissions, is implemented. If the CPP is not implemented, the EIA projects that coal will provide 31% of power generated. The primary drivers for many of our products and services are environmental laws and regulations impacting the electric power generation industry and other coal users. These regulations include the Mercury and Air Toxics Standards ("MATS"), a federal regulation that requires all of the existing fleet and all new coal-fired plants to control mercury emissions, acid gases, and particulate matter, as well as various state regulations and permitting requirements for coal-fired power plants. In addition to the federal MATS rule, certain states have their own mercury rules that are similar to, or more stringent than MATS, and many plants around the country have agreed to consent decrees, which require pollution controls that, in some cases, are more restrictive than the existing regulations. We continue to believe the MATS rule as well as certain state regulations create a large market for RC and EC products. Additionally, the proposed, pending, and future rules relating to carbon dioxide (CO<sub>2</sub>) or other greenhouse gas emissions, effluent discharge, coal combustion residuals and other pollutants are driving, and we expect will continue to drive, future markets for which we may develop products and solutions.

In general, coal is a low cost, stable and reliable source of domestic energy that, unlike many other forms of energy, can be easily stored in large quantities. We believe coal is critical to ensuring the U.S. has a secure and stable source of energy. With current environmental regulations, we believe it is unlikely that any new coal plants will be financed or constructed, which suggests that the average plant age in 2040 will be 64 years old. With the continued retirement of the less efficient and generally smaller coal plants switching of fuel sources from coal to other fuels such as natural gas, and the influx of intermittent generation such as solar and wind, we believe coal-fired generation will be seen as a complement to the other fuel sources in providing electricity to users and supporting the electric grid. This belief is reflected in the CPP, published in October 2015 by the EPA. Continued pressure from renewable energy sources and natural gas combined with uncertainty regarding regulations on CO<sub>2</sub> emissions will likely push coal-fired generators to increase their focus on maintaining regulatory compliance in the most efficient and cost effective manner, while also responding to intermittent generating sources. As coal plants age and they are dispatched with more variability rather than at base-load levels for which they were designed, we expect that increased support will be required to assure reliable operation and continued compliance with environmental regulations. We expect that plants and owners will require additional support as their aging workforce retires and on-site expertise is no longer as available, and as utilities allocate resources elsewhere in their power generation fleets.

While the future is uncertain, we expect this uncertainty will continue to drive a shift in utilities' purchasing desires towards variable cost products and integrated solutions with low capital expenditure requirements and away from large capital equipment and other fixed cost solutions that are less likely to have costs recovered given the uncertain operating life of many coal plants. We also expect to see a continued trend towards outsourcing various aspects of plant operations to third-party vendors and away from having integrated plant staff.

We believe it is likely that many U.S. coal mines, coal-fired power generators, coal-centric large equipment providers and other coal-related businesses will have difficulty in adapting to industry changes expected in the coming years. However, we see opportunities for companies that can offer their customers creative and cost effective solutions that help the U.S. coal-related businesses meet regulatory compliance, improve efficiency, lower costs and maintain

reliability.

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As of December 31, 2016, our products, services and RC technology licenses available to coal-fired electrical generators requiring solutions to assist with compliance with emissions standards included:

**Equipment:**

Low capital expenditure mercury control technologies and systems such as Activated Carbon Injection ("ACI") systems, that effectively reduce mercury emissions over a broad range of plant configurations and coal types; and Dry Sorbent Injection systems ("DSI") that reduce emissions of Sulfur Dioxide ("SO<sub>2</sub>") and other acid gases such as Sulfur Trioxide ("SO<sub>3</sub>") and Hydrogen Chloride ("HCl"); and Our patented ADAir™ Mixer in-duct technology that alters flue gas flow to improve mixing and optimize particle dispersion to reduce sorbent consumption for ACI and DSI systems.

**RC technology licenses:**

Our patented CyClean™ technology, a pre-combustion coal treatment process that provides electric power generators the ability to enhance combustion and reduce emissions of NO<sub>x</sub> and mercury from coals burned in cyclone boilers; and

Our patented M-45™ and patent pending M-45-PC™ technologies, which are proprietary pre-combustion coal treatment technologies used to control emission from circulating fluidized bed boilers and pulverized coal boilers, respectively.

**Chemicals:**

Our patented M-Prove™ technology, which is also incorporated in our RC technologies, that provides a cost effective alternative to other halogen-based, oxidation chemicals used to enhance removal of mercury emissions.

M-Prove™ technology mitigates coal treatment corrosion risks to minimize maintenance and repair costs to enhance system reliability and risks associated with bromine discharge from plant wastewater; and

Our RESPond® liquid chemical additive that is a highly effective ash resistivity modifier for power plants operating cold-side electrostatic precipitators. Unlike SO<sub>3</sub> solutions, the incumbent chemical being used to modify ash resistivity, the RESPond® additive does not interfere with or reduce the effectiveness of activated carbon injected into the flue gas for purposes of reducing mercury emissions.

**Consulting services and other:**

We provide general consulting services as requested by our customers related to emissions control.

Additionally, as of December 31, 2011, Tinum Group, an unconsolidated entity in which we own a 42.5% equity interest, built and placed into service a total of 28 RC facilities designed to produce RC for sale to coal-fired power plants. Coal-fired power plants use RC as one of a portfolio of tools to help comply with MATS and other environmental regulations. These RC facilities produce RC that qualifies for tax credits under the Internal Revenue Code ("IRC") Section 45 - Production Tax Credit ("Section 45 tax credits"), including meeting the "placed in service" requirements (hereafter referred to as "placed in service"). The law that provides for Section 45 tax credits substantially expires in December 2019 for two of Tinum Group's RC facilities placed in service in 2009 and in the fourth quarter of 2021 for 26 RC facilities built and placed in service in 2011. Once an RC facility is in operation, Tinum Group may enter into contracts with tax equity investors to lease or sell the RC facility, which we refer to as an "invested" RC facility. Such investors subsequently operate the RC facility to produce and sell RC to a utility. RC facilities that are producing and selling RC, but have not been leased or sold, are referred to as "retained" RC facilities, whereby the RC is produced and sold by Tinum Group and where the related tax benefits may be realized by the owners of Tinum Group. As of December 31, 2016, Tinum Group had 13 invested RC facilities producing RC at utility sites and no retained RC facilities. The remaining 15 RC facilities, although placed in service, were either installed but not operating, awaiting site selection or in various other stages of contract negotiation or permanent installation. Of these remaining 15 RC facilities, eight have been installed and are ready to operate pending final commitments for the purchase or lease of such facilities by tax equity investors. The remaining facilities are awaiting site selection or in various other stages of contract negotiation, permanent installation or commissioning.



Although we intend to utilize our share of the Section 45 tax credits which have been or may be generated by producing RC at retained RC facilities, it is also financially advantageous to lease or sell RC retained facilities to tax equity investors. The tax equity investor for a particular RC facility pays the operating expenses of the RC facility and also pays Tinum Group for either the purchase or lease of the RC facility, and in return, takes over production and sale of RC including the related tax benefit. We benefit from equity income and distributions accruing through our investment in Tinum Group. Tax equity investors may benefit from their investment in RC facilities through the realization of tax assets and credits from the production and sale of RC. As of December 31, 2016 and 2015, respectively, the Section 45 tax credits were \$6.81 and \$6.71 per ton of RC

produced and sold to a utility. The value of the Section 45 tax credits are adjusted annually based on inflation adjustment factors published in the Federal Register. As of December 31, 2016, we have received substantial tax credits and benefits from certain retained RC facilities that previously produced and sold RC for the benefit of Tinum Group, but have not been able to fully utilize them. See Note 16 to our Consolidated Financial Statements included under Item 8 of this Report for additional information regarding our net operating losses ("NOL's"), tax credits and other deferred tax assets.

The 13 RC facilities producing RC as of December 31, 2016 are operated by our 50% owned entity, Tinum Services, under operating and maintenance agreements with the owners or lessees of the RC facilities.

#### Legislation and Environmental Regulations

##### U.S. Federal Mercury and Air Toxic Standards ("MATS") Affecting Electric Utility Steam Generating Units

On December 16, 2011, the U.S. EPA issued the final "MATS Rule," which took effect in April 2012. The EPA structured the MATS Rule as a MACT-based hazardous pollutant regulation applicable to coal and oil-fired Electric Utility Steam Generating Units ("EGU"), which generate electricity via steam turbines and have a capacity of 25 megawatts or greater, and provide for, among other provisions, control of mercury and particulate matter and control of acid gases such as HCl and other Hazardous Air Pollutants ("HAPs"). According to our estimates, the standard sets a limit that we believe requires the capture of up to 80-90% of the mercury in the coal burned in electric power generation boilers as measured at the exhaust stack outlet for most plants. The MACT standards are also known as National Emission Standards for Hazardous Air Pollutants ("NESHAP"). Plants generally had four years to comply with the rule, and we estimate that, based on data reported to the EPA and conversations with plant operators, most plants were required to comply by April 2016. From May 2016 through October 2016, 679 EGU's had reported operations compared to 744 with operations during all of 2016, which included the pre-compliance period through April 2016. Although operating data indicated over 60 boilers ceased operations following the compliance date, not all of these boilers have been permanently shut down and some may return to operations at a future date.

##### State Mercury and Air Toxics Regulations Affecting EGUs

In addition to the federal MATS Rule, certain states have their own mercury rules that are similar to or more stringent than MATS, and power plants around the country are subject to consent decrees that require the control of acid gases and particulate matter, in addition to mercury emissions. Seventeen states have mercury-specific rules that affect more than 260 generating units.

##### U.S. Federal Industrial Boiler MACT

In January 2013, the U.S. EPA issued the final set of adjustments to the MACT-based air toxics standards for industrial boilers, including mercury, particulate matter, and acid gas emission limits. Existing boilers typically had until January 31, 2017 to comply with the rule. On December 1, 2014, the EPA announced the reconsideration of the IBMACT and proposed amendments to the version published January 31, 2013, representing technical corrections and clarifications. The proposed amendments do not affect the applicability of the final rule.

The EPA estimated that approximately 600 coal-fired boilers will be affected by the industrial boiler MACT ("IBMACT"), in industries such as pulp and paper. Our estimates, based on conversations with plant operators, suggest that most of the affected plants have or will either shut down or switch fuels to natural gas to comply with the regulation.

##### Effluent Limitation Guidelines

On September 30, 2015, the EPA set the first federal limits on the levels of toxic metals in wastewater that can be discharged from power plants. The final rule requires, among other things, zero discharge for fly ash transport water, and limits on mercury, arsenic, selenium, and nitrate from flue gas desulfurization ("FGD") wastewater (also known as "legacy wastewater"). Plants must comply with limits for legacy wastewater beginning as early as November 2018, with a possible extension to December 2023 with state approval. Although halogens are not directly regulated in the effluent guidelines, some halogens may impact the effectiveness of biological wastewater treatment systems that are often used for the removal of selenium. We expect that these regulations and restrictions on liquid effluents will generate a continuous market beginning in 2017 or 2018 for technologies and operating approaches to reduce liquid effluents. We are evaluating whether the potential market opportunity supports our development of new products to help plants comply with these rules, as well as how these rules may affect our current product offerings.



#### Additional U.S. Legislation and Regulations

On August 3, 2015, the EPA finalized rules to reduced greenhouse gases ("GHGs") in the form of the CPP, which established guidelines for states to follow in developing plans to reduce GHG emissions. Under the CPP, states are required to prepare State Implementation Plans to meet state targets established based on emission reductions from affected sources. The CPP requires that the Best System of Emission Reduction ("BSER") be implemented and establishes three building blocks, which include heat rate improvements at affected coal-fired power plants, substituting coal-fired generation with less carbon-intensive EGUs such as natural gas combined cycle plants, and substituting renewable generation. The CPP has been challenged by multiple states in the U.S. Court of Appeals for the District of Columbia Circuit ("DC Circuit"). The CPP is currently stayed by the Supreme Court, and a panel of 10 judges on the DC Circuit are reviewing the CPP following a hearing in September 2016.

#### International Regulations

There are various international regulations related to mercury control. In Canada, the Canada-Wide Standard ("CWS") was initially implemented in 2010, with increasingly stringent limits through 2020 with varying mercury caps for each province. China and Germany both have limits for mercury emissions that are less stringent than U.S. limits, which are typically met using co-benefits from other installed air pollution control equipment designed to control other pollutants.

Based upon the existing and potential regulations, we believe the international market for mercury control products may expand in the coming years, and we are positioning our patent portfolio accordingly to be prepared if a market for our products appears.

#### Segment Information

As of December 31, 2016, our operations consisted of two reportable segments: (1) RC and (2) EC.

Financial information related to each of our reportable segments is set forth in Note 17 of the Consolidated Financial Statements included in Item 8 of this Report.

#### (1)RC Segment

Our RC segment derives its earnings from equity method investments as well as royalty payment streams and other revenues related to reduced emissions of both NO<sub>x</sub> and mercury from coal treated with our proprietary chemicals and burned at coal fired power plants. Reducing emissions of both NO<sub>x</sub> and mercury from the combustion of coal is necessary to comply with regulatory standards. Our equity method investments related to the RC segment include Tinum Group and Tinum Services. Additionally, through March 3, 2016, we had an equity method investment referred to as RCM6, which impacted the results of the RC segment. As of December 31, 2016, we held equity interests of 42.5% and 50% in Tinum Group and Tinum Services, respectively.

Tinum Group owns, leases or sells facilities used in the production of RC. The RC facilities are located at coal-fired generation stations owned by regulated utilities, cooperatives, government agencies and wholesale power generators (collectively, "Generators"). The RC produced by the RC facilities is used by the Generators as fuel in the coal-fired boilers to produce electricity. The production and sale of RC in these RC facilities qualifies for Section 45 tax credits during the term of such credits. The IRS has issued guidance regarding emissions reductions in the production of electricity by coal-fired power plants, including measurement and certification criteria necessary to qualify for the Section 45 tax credits.

The RC facilities that Tinum Group has leased or sold to tax equity investors are referred to as invested facilities. For invested facilities, Tinum Group collects lease income from the lessee, if leased, or sales proceeds from the buyer if sold. We benefit from these transactions through our equity method investment in Tinum Group. RC facilities that are producing RC, but that Tinum Group has not leased or sold, are referred to as retained RC facilities. The owners of Tinum Group, including the Company, produce and sell RC to Generators, and may benefit to the extent Section 45 tax credits and other tax benefits are realized from the operation of retained RC facilities. The ability to produce RC, which generates Section 45 tax credits, expires 10 years after each RC facility is placed into service, but not later than December 31, 2021. RCM6, of which we owned a 24.95% equity interest and was sold in March 2016, owned a single RC facility managed by a wholly-owned subsidiary of Tinum Group.

Tinum Services operates and maintains RC facilities under operating and maintenance agreements with owners or lessees of RC facilities. Tinum Group or the owners or lessees of the RC facilities pay Tinum Services, subject to certain limitations,

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the costs of operating and maintaining the RC facilities plus various fees. Tinum Services also arranges for the purchase and delivery of certain chemical additives, which include the chemicals required for our CyClean™, M-45™ and M-45-PC™ technologies, necessary for the production of RC under chemical agency agreements. The term of each chemical agency agreement runs concurrently with the respective RC facility's lease. Tinum Services is also the primary beneficiary of certain RC facilities that are variable interest entities ("VIEs") and therefore consolidates such RC facilities. All net income (loss) associated with these consolidated RC facilities is allocated to the noncontrolling equity owners and therefore does not impact our equity earnings (loss) from Tinum Services.

Tinum Group also pays us royalties from the licensing of our M-45™ and M-45-PC™ EC technologies ("M-45 License"). Royalties are earned based upon: (i) a percentage of the per-ton, pre-tax margin net of certain allocable operating expenses related to the lease or sale of an invested RC facility that produces and sells RC under the M-45 License, (ii) a percentage of the value of the Section 45 tax credits produced net of certain allocable operating expenses as a result of the production and sale of RC under the M-45 License at retained RC facilities and (iii) a percentage of the revenue, net of all direct expenses, received by Tinum Group as a direct result of Tinum Group's exercise of the M-45 License.

## (2) EC Segment

### (a) Systems & Equipment- Activated Carbon Injection, Dry Sorbent Injection System and Other Systems

We are an established market leader in the supply of ACI systems for the coal-fired electric industry. The injection of activated carbon into the coal combustion flue gas for the purpose of absorbing mercury molecules is the most established and accepted technology to specifically reduce mercury emissions. Our proprietary and highly engineered ACI systems facilitate a customer's ability to reliably and cost effectively meet regulatory emissions limits. Most coal-fired power plants had purchased and installed required mercury control equipment by mid-April 2016, and most coal-fired industrial boilers requiring ACI systems will have installed systems by January 2017 to meet compliance deadlines. We believe that a limited number of additional systems may be required to address fuel or operational changes after these dates.

DSI is used to control HCl and can improve the effectiveness of ACI for some plants. Most power plants requiring DSI for MATS compliance had procured and installed systems by mid-April 2016. We believe that a limited number of additional systems may be required to address fuel or operational changes, or to meet other regulations in 2017 and 2018.

The ADAir™ Mixer was designed to improve the effectiveness of ACI and DSI systems. We believe sales of the ADAir™ Mixer may increase in 2017 and 2018 as plants gain experience with their ACI and DSI systems and seek options to optimize their systems to reduce operating costs.

### (b) Chemicals

#### (i) Mercury Control Additives

Our patented M-Prove™ pre-combustion coal treatment technology involves the application of patented chemicals to coal. This technology substantially reduces mercury emissions and also can reduce the amount of activated carbon or other sorbents used to meet regulatory mercury emission limits. The power industry is beginning to experience corrosion and wastewater issues in their plants that they attribute to the use of bromine to enhance the capture of mercury. One of the advantages of the M-Prove™ additive is that it is effective at very low application rates, significantly reducing balance of plant risks associated with other coal additive technologies for mercury control. We believe that demand for M-Prove™ technology will increase in 2017 and 2018 as plants gain experience with their mercury control systems and begin to optimize their strategy to reduce operational impacts, especially as they relate to corrosion and wastewater. In October 2012, we were awarded the first of a family of patents designed to protect this technology in the U.S., and are pursuing similar patents in various other countries.

We license certain emissions control technologies, including the M-Prove™ additive, to Tinum Group for the production of RC to reduce emissions of both mercury and NO<sub>x</sub> from coal-fired boilers. We licensed our patented

CyClean™ technology to Tinum Group upon formation of the entity in 2006 for use with cyclone boilers for the life of the patents. In July 2012, we executed the M-45 license with Tinum Group, which is effective for the duration that Section 45 tax credits are available. We believe these licenses will leverage Tinum Group's operating expertise and allow it the ability to provide and use either the CyClean™ or M-45™ technology to produce RC. Later in 2012, we made a technological advancement in the M-45™ technology, which was incorporated in the M-45 License and allows it to be effective in "pulverized coal" ("PC") boilers. In addition to the royalty payments we receive from Tinum Group, the use of M-Prove™ technology in the production of RC provides valuable operating data and validates the effectiveness of the M-Prove™ technology in a range of coal-fired boilers. We expect this information will help in our sales process for the M-Prove™ technology.

## (ii) Flue Gas Chemicals and Services

We have deployed technologies for conditioning flue gas streams from coal-fired combustion sources. Our flue gas conditioning chemical allows existing air pollution control devices, such as electrostatic precipitators ("ESPs"), to operate more efficiently without the use of traditional SO<sub>3</sub> additives, which have been shown to be detrimental to effective mercury control by partially negating the effectiveness of certain sorbents used to absorb mercury, including activated carbon. Such treatment of the flue gas stream allows for effective collection of fly ash particles that would otherwise escape into the atmosphere. The use of the proprietary chemical blends may help existing marginally sized ESPs continue to operate effectively when applied exclusively, or in combination with other chemicals such as hydrated lime, activated carbon products, or other high-resistivity materials. Our flue gas conditioning chemical is currently sold under the registered trademark RESPond®.

## (c) Consulting Services

We also offer consulting services to assist electric power generators, the electric utility industry and others in planning and implementing strategies to meet the new and increasing government emission standards requiring reductions in SO<sub>2</sub>, SO<sub>3</sub>, HCl, NO<sub>x</sub>, particulates, acid gases and mercury.

The following table shows the amount of total revenue by type:

(in thousands)	Years Ended December		
	2016	2015	2014
Revenues:			
Equipment sales	\$46,949	\$60,099	\$12,044
Chemicals	3,025	888	391
Consulting services and other	648	1,752	4,488
Total revenues	\$50,622	\$62,739	\$16,923

## Competition

We are an established leader in the mercury control market for coal-fired electric power generators. We believe we add significant value to our base offerings by having complementary products and services. Our expertise and experience in conducting full-scale emissions control demonstrations reflect our understanding of the application of the control technologies that customers find valuable. Our ability to provide users with performance guarantees on our equipment, along with comprehensive testing services and overall compliance strategies, enhances our competitive position in this market. In the EC equipment market, we believe Norit Americas, Inc., a division of Cabot Corporation, United Conveyor Corporation, Nol-Tec Systems, Inc. and Clyde Bergemann, Inc. are our principal ACI market competitors and that Nol-Tec Systems, Inc., United Conveyor Corporation and Clyde Bergemann, Inc. are our principal DSI market competitors. Competition for ACI and DSI systems is based primarily on price, quality, performance, terms of performance guarantees and the ability to meet the requested delivery and installation schedule. In the EC chemicals market, our mercury control chemicals primarily compete against the use of brominated activated carbon, as well as the use of bromine applied to the coal prior to combustion. Our primary competitors for our coal additives are Nalco and ME2C. As it relates to brominated activated carbon providers, our competitors include ADA Carbon Solutions, Norit Americas, and Calgon Carbon. Because of a number of market and technology dynamics, there is not a definitive connection between the sale of mercury control systems and the ultimate supply of mercury control chemicals. Thus when we are successful with a contract for the ACI equipment, it does not guarantee that we will also sell that customer M-Prove™ coal additives, and when a customer buys a competitors' ACI system it does not mean that that customer is not a viable candidate for our chemicals.

In the RC market, we believe Chem-Mod, LLC and licensees of the Chem-Mod technology are our principal competitors. Competition within the RC market is based primarily on price, the number of tons of coal burned at the coal-fired power plant where the RC facilities are operating and the tax compliance facts associated with each RC facility. Additionally, competition for tax equity investors extends into other investment opportunities, including opportunities related to potential tax incentive transactions available to potential investors.





#### Patents

As of December 31, 2016, we held 35 U.S. patents that were issued or allowed, 16 additional U.S. Provisionals or applications that were pending, and 10 international patent applications that were either pending or filed relating to different aspects of our technology. Our existing patents generally have terms of 15 to 20 years, measured from the application date, the earliest of which was in 1997. We consider many of our patents or pending patents to be critical to the ongoing conduct of our business.

#### Our Vendors and Supply of Materials

We purchase our materials, including equipment, fabricated modules and steel, from a variety of vendors for engineered ACI and DSI systems, components and other equipment we provide. Such equipment is available from numerous sources; however, based on the system requested by the customer, we may determine that some sources are not suitable. We typically subcontract the major portion of the work associated with installation of such equipment to a variety of vendors, who are usually located near the work site.

We purchase our proprietary chemicals through negotiated blending contracts that include confidentiality agreements with chemical suppliers. These arrangements attempt to assure continuous supply of our proprietary chemical blends. The chemicals used in our proprietary chemical products are readily available, and there are several chemical suppliers that can provide us with our requirements. Supply agreements are generally renewed on an annual basis.

#### Seasonality of Activities

The sale of our chemical products and RC facility operation levels depend on the operations of the electric power generators to which the applicable chemicals are provided and the location of the RC facilities, respectively. Electric power generators routinely schedule maintenance outages in the spring and/or fall depending upon the operation of the boilers. During the period in which an outage may occur, which may range from one week to over a month, no chemicals are used or RC produced and sold, and our revenues can be correspondingly reduced. Additionally, power generation is weather dependent, with electricity and steam production varying in response to heating and cooling needs.

#### Dependence on Major Customers

We depend on our customer relationships with owners and operators of coal-fired power generation facilities as well as general market demand for coal-fueled power generation. Our internal sales staff and external sales representative network market our technology through trade shows, mailings and direct contact with potential customers.

Through our investment in Tinum Group, we depend on our relationships with owners and operators of coal-fired power generation facilities, including various electric utilities and tax equity investors. Tinum Group is the exclusive licensee for purposes of producing RC using the CyClean™ and M-45 License technologies. Tinum Group depends on tax equity investors, with significant concentration within affiliates of Goldman Sachs ("GS"). These investors could renegotiate or terminate their leases, or the utilities where the RC facilities are installed could materially reduce their use of RC. See Risk Factors -- Customers may cancel or delay projects and our backlog may not be indicative of our future revenues.

Additional information related to major customers is disclosed in Note 18 of the Consolidated Financial Statements included in Item 8 of this Report.

#### Research and Development Activities

In 2016, we focused on assisting our customers in successfully implementing their MATS strategies and conducted limited research and development activities. Certain research and development related to CO<sub>2</sub> capture was funded, in part, under contracts and/or cost reimbursement arrangements with the U.S. Department of Energy ("DOE") and other third parties. Our research and development expense, net of DOE and industry cost-share partners' reimbursements, for the years ended December 31, 2016, 2015 and 2014 was \$(0.6) million, \$5.4 million and \$1.5 million, respectively. Excluding cost-share reimbursements, we incurred research and development expenses of \$0.2 million, \$6.7 million and \$3.6 million on our own behalf for research and development activities related to further development of our technologies for the years ended December 31, 2016, 2015 and 2014, respectively. We engage in these activities in order to continue to develop technologies to bring to the broader EC market and to expand our own offerings into other areas. However, we expect future research and development activities will not be significant as the Company aligns the business with its current strategic objectives.



## Refined Coal Data

The following table provides summary information related to the Company's investment in Tinum Group and the related RC facilities as of December 31, 2016 and tons of RC produced and sold for the year ended December 31, 2016:

	# of RC Facilities	Not Operating	Operating Invested	Retained
RC Facilities	28	15	13	—
RC tons produced and sold (000's)			41,628	890

Additional information related to RC facilities is included in Item 7 Management's Discussion and Analysis of Financial Condition and Results of Operations ("Item 7") of this Report.

## Backlog

Backlog represents the dollar amount of revenues we expect to recognize in the future from fixed-price contracts, primarily for ACI and DSI systems as well as certain fixed-price consulting service contracts that have been executed, but work has not commenced, and those that are currently in progress. A project is included within backlog when a contract is executed. Backlog amounts include anticipated revenues associated with the original contract amounts, executed change orders, and any claims that may be outstanding with customers. It does not include contracts that are in the bidding stage or have not been awarded. As a result, we believe the backlog figures are firm, subject to customer modifications, alterations or cancellation provisions contained in the various contracts.

Backlog may not be indicative of future operating results. Estimates of profitability could increase or decrease based on changes in direct materials, labor and subcontractor costs, and indirect costs related to contract performance, such as indirect labor, supplies, tools and repairs, and any claims with customers. Backlog is not a measure defined by accounting principles generally accepted in the United States ("U.S. GAAP") and is not a measure of profitability. Our method for calculating backlog may not be comparable to methodologies used by other companies.

(in thousands)

Backlog as of December 31, 2015	\$92,642
New contracts	7,864
Change order and claims to existing contracts, net	(3,970 )
Revenues recognized	(47,068 )
Backlog as of December 31, 2016	\$49,468

## Operating Locations

During the year ended December 31, 2016, we had domestic operations located in Colorado. During 2015, we had domestic and international operations, in which the domestic operations were located in Colorado and Pennsylvania. The Pennsylvania location, used as a manufacturing facility, was closed at the end of 2015, with certain wind-down activities remaining through early 2016. The international operations were not material to our total revenues or long-lived assets and were closed at the end of 2015. Tinum Group and the related operating entity, Tinum Services, have operations within 12 states across the United States.

## Employees

As of December 31, 2016 we employed 25 full-time and part-time personnel, including four ADES executives; all employees were employed at our offices in Colorado.

#### Available Information

Our periodic and current reports are filed with the SEC pursuant to Section 13(a) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") and are available free of charge within 24 hours after they are filed with, or furnished to, the SEC at the Company's website at [www.advancedemissionssolutions.com](http://www.advancedemissionssolutions.com). The filings are also available through the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549 or by calling 1-800- SEC-0330. Alternatively, these reports can be accessed at the SEC's website at [www.sec.gov](http://www.sec.gov). The information contained on our web site shall not be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended (the "Securities Act") or the Exchange Act.

#### Copies of Corporate Governance Documents

The following Company corporate governance documents are available free of charge at our website at [www.advancedemissionssolutions.com](http://www.advancedemissionssolutions.com) and such information is available in print to any stockholder who requests it by contacting the Secretary of the Company at 640 Plaza Drive, Suite 270, Highlands Ranch CO, 80129.

#### ☉ Certificate of Incorporation

#### ♻️ Bylaws

#### ♻️ Code of Ethics and Business Conduct

#### ♻️ Insider Trading Policy

#### ♻️ Whistleblower Protection Policy

#### ♻️ Board of Directors Responsibilities

#### ♻️ Audit Committee Charter

#### ♻️ Compensation Committee Charter

#### ♻️ Nominating and Governance Committee Charter

#### Forward-Looking Statements Found in this Report

This Report contains forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act that involve risks and uncertainties. In particular such forward-looking statements are found in this Part I and under the heading in Part II, Item 7 below. Words or phrases such as "anticipates," "believes," "expects," "intends," "plans," "estimates," "predicts," the negative expressions of such words, or similar expressions are used in this Report to identify forward-looking statements, and such forward-looking statements include, but are not limited to, statements or expectations regarding:

- (a) the scope and impact of mercury and other regulations or pollution control requirements, including the impact of the final MATS;
- (b) the production and sale of RC by the RC facilities will qualify for Section 45 tax credits;
- (c) expected growth or contraction in and potential size of our target markets;
- (d) expected supply and demand for our products and services;
- (e) increasing competition in the emission control market;
- (f) our ability to satisfy warranty and performance guarantee provisions;
- (g) expected dissolution and winding down of certain of our wholly-owned subsidiaries;
- (h) future level of research and development activities;
- (i) the effectiveness of our technologies and the benefits they provide;
- (j) Tinum Group's ability to profitably sell and/or lease additional RC facilities and/or RC facilities that may be returned to Tinum Group, or recognize the tax benefits from production and sale of RC on retained RC facilities;
- (k) probability of any loss occurring with respect to certain guarantees made by Tinum Group ("Party Guarantees");
- (l) the timing of awards of, and work and related testing under, our contracts and agreements and their value; the timing and amounts of or changes in future revenues, royalties earned, backlog, funding for our business and
- (m) projects, margins, expenses, earnings, tax rate, cash flow, royalty payment obligations, working capital, liquidity and other financial and accounting measures;
- (n) the outcome of current and pending legal proceedings;
- (o) awards of patents designed to protect our proprietary technologies both in the U.S. and other countries;
- (p)

the materiality of any future adjustments to previously recorded reimbursements as a result of the DOE audits and the amount of contributions from the DOE and others towards planned project construction and demonstrations;  
and

- (q) whether any legal challenges or EPA actions will have a material impact on the implementation of the MATS or other regulations and on our ongoing business.

Our expectations are based on certain assumptions, including without limitation, that:

- (a) coal will continue to be a major source of fuel for electrical generation in the United States;
- (b) the IRS will allow the production and sale of RC to qualify for Section 45 tax credits;
- (c) we will continue as a key supplier of equipment, chemicals and services to the coal-fired power generation industry as it seeks to implement reduction of mercury emissions;
- (d) current environmental laws and regulations requiring reduction of mercury from coal-fired boiler flue gases will not be materially weakened or repealed by courts or legislation in the future;
- (e) we will be able to meet any performance guarantees we make and continue to meet our other obligations under contracts;
- (f) we will be able to obtain adequate capital and personnel resources to meet our operating needs and to fund anticipated growth and our indemnity obligations;
- (g) we will be able to establish and retain key business relationships with other companies;
- (h) orders we anticipate receiving will be received;
- (i) governmental audits of our costs incurred under DOE contracts will not result in material adjustments to amounts we have previously received under those contracts;
- (j) we will be able to formulate new chemicals and blends that will be useful to, and accepted by, the coal-fired boiler power generation business;
- (k) we will be able to effectively compete against others;
- (l) we will be able to meet any technical requirements of projects we undertake;
- (m) Tinnuum Group will be able to sell or lease the remaining RC facilities, including RC facilities that may be returned to Tinnuum Group, to third party investors; and
- (n) we will be able to utilize our portion of the Section 45 tax credits generated by production and sale of RC from retained facilities.

The forward-looking statements included in this Report involve risks and uncertainties. Actual events or results could differ materially from those discussed in the forward-looking statements as a result of various factors including, but not limited to, timing of new and pending regulations and any legal challenges to or extensions of compliance dates of them; the US government's failure to promulgate regulations or appropriate funds that benefit our business; changes in laws and regulations, accounting rules, prices, economic conditions and market demand; impact of competition; availability, cost of and demand for alternative energy sources and other technologies; technical, start up and operational difficulties; failure of the RC facilities to produce RC; termination of or amendments to the contracts for sale or lease of RC facilities; decreases in the production of RC; inability to commercialize our technologies on favorable terms; our inability to ramp up our operations to effectively address recent and expected growth in our business; loss of key personnel; potential claims from any terminated employees, customers or vendors; failure to satisfy performance guarantees; availability of materials and equipment for our businesses; intellectual property infringement claims from third parties; pending litigation; identification of additional material weaknesses or significant deficiencies; as well as other factors relating to our business, as described in our filings with the SEC, with particular emphasis on the risk factor disclosures contained in those filings and in Risk Factors of this Report. You are cautioned not to place undue reliance on the forward-looking statements made in this Report and to consult filings we have made and will make with the SEC for additional discussion concerning risks and uncertainties that may apply to our business and the ownership of our securities. The forward-looking statements contained in this Report are presented as of the date hereof, and we disclaim any duty to update such statements unless required by law to do so.

## Item 1A. Risk Factors

### Risks relating to our business

The following risks relate to our business as of the date this Report is filed with the SEC, or any alternative date specified. This list of risks is not intended to be exhaustive, but reflects what we believe are the material risks inherent in our business and the ownership of our securities as of the specified dates. A statement to the effect that the occurrence of a specified event may have a negative impact on our business, results of operations, profitability, financial condition, or the like, is intended to reflect the fact that such an event would be likely to have a negative impact on your investment in the Company, but should not imply the likelihood of the occurrence of such specified event. The order in which the following risk factors are presented is not intended as an indication of the relative seriousness of any given risk.

Demand for our products and services depends significantly on environmental laws and regulations; uncertainty as to the future of such laws and regulations, as well as changes to such laws and regulations, or granting of extensions of compliance deadlines has had, and will likely continue to have, a material effect on our business.

A significant market driver for our existing products and services, and those planned in the future, are present and expected environmental laws and regulations, particularly those addressing the reduction of mercury and other emissions from coal-fired power plants. If such laws and regulations are delayed, or are not enacted or are repealed or amended to be less strict, or include prolonged phase-in periods, or not enforced, our business would be adversely affected by declining demand for such products and services. For example:

The implementation of environmental regulations regarding certain pollution control and permitting requirements has been delayed from time to time due to various lawsuits. The uncertainty created by litigation and reconsiderations of rule-making by the EPA has negatively impacted our business, results of operations and financial condition and will likely continue to do so.

To the extent federal, state, and local legislation mandating that electric power generating companies serving a state or region purchase a minimum amount of power from renewable energy sources such as wind, hydroelectric, solar and geothermal, and such amount lessens demand for electricity from coal-fired plants, the demand for our products and services would likely decrease.

Federal, state, and international laws or regulations addressing emissions from coal-fired facilities, climate change or other actions to limit emissions, including public opposition to new coal power plants, has caused and could continue to cause electricity generators to transition from coal to other fuel and power sources, such as natural gas, nuclear, wind, hydroelectric and solar. The potential financial impact on us of future laws or regulations or public pressure will depend upon the degree to which electricity generators diminish their reliance on coal as a fuel source. That, in turn, will depend on a number of factors, including the specific requirements imposed by any such laws or regulations, the periods over which those laws or regulations are or will be phased in, the amount of public opposition, and the state and cost of commercial development of related technologies and processes. In addition, Public Utility Commissions ("PUC's") may not allow utilities to charge consumers for, and pass on the cost of, emission control technologies without federal or state mandate. In view of the significant uncertainty surrounding each of these factors, we cannot reasonably predict the impact that any such laws or regulations or public opposition may have on our results of operations, financial condition or cash flows.

The ability of Tinum Group to generate revenues from the sale or lease of RC facilities to tax equity investors is not assured, and the inability to sell, lease or operate RC facilities to produce and sell RC and generate Section 45 tax credits could adversely affect our future growth and profitability.

Except for RC facilities that Tinum Group may retain and operate permanently for its own benefit, Tinum Group is attempting to sell or lease the remaining RC facilities to investors. The inability of Tinum Group to successfully lease or sell additional RC facilities to third party tax equity investors who will receive the benefit of the Section 45 tax credits that are expected to be generated from those RC facilities, as well as RC facilities that may be returned to Tinum Group over time, would likely have an adverse effect on our future growth and profitability.



Furthermore, if in the future electric power generators decide to limit coal-fired generation for economic reasons and/or do not burn and use RC and instead switch to another power or fuel source, Tinium Group would likely be unable to fully produce the RC and the associated Section 45 tax credits potentially available from RC facilities over the anticipated term of the Section 45 tax credit program. In addition, pursuant to Tinium Group's operating agreement, if Tinium Group is unable to generate enough revenue for cash distributions through the sale or lease of RC facilities over the next five years to return the

unrecovered investment balance to its Class B Member, GSFS Investments I Corp. ("GSFS"), an affiliate of GS, then GSFS may require Tinum Group to redeem its interest in Tinum Group for any deficit of such amount not distributed to GSFS. As of December 31, 2016, the unrecovered investment balance inclusive of the 15% annual return was \$18.3 million, as shown in the Tinum Group Consolidated Financial Statements, which are included in Item 15 Exhibits and Financial Statement Schedules ("Item 15") of this Report.

Market uncertainty created by the lack of guidance and rulings issued by courts and the IRS related to Section 45 tax credits could inhibit Tinum Group's ability to lease or sell additional RC facilities or require a restructuring of, or result in the termination of, existing arrangements.

The availability of Section 45 tax credits, related to the production and sale of RC, to taxpayers investing in RC facilities depends upon a number of factors, including the risk assumed by the taxpayer in the RC facility investment transaction. The law addressing when a taxpayer may and may not be considered the producer and seller of RC and avail itself of Section 45 tax credits is not fully developed and is subject to rulings by courts, interpretations by the IRS and other official pronouncements on tax credit regulations. If rulings, guidance or other pronouncements of courts or the IRS are not definitive or interpreted as allowing the IRS to restrict availability, increase the difficulty, or prohibit or limit the ability of taxpayers to be considered to be the producer and seller of RC and take advantage of Section 45 tax credits, several aspects of our current and future RC business could be adversely impacted. For example, current investors in RC facilities may decide to terminate their existing agreements, or potential investors may reduce the price they are willing to pay or change the structure of the investment to account for perceived risks associated with being considered the producer and seller of RC and the availability of the associated Section 45 tax credits.

Technical or operational problems with long-term operation of our RC facilities could result in additional costs and delays that adversely affect our financial condition.

Our initial RC facilities were operated using CyClean™ technology at cyclone boilers. Tinum Group began operating RC facilities using the M-45™ technology at circulating fluidized bed ("CFB") boilers in 2012 and pulverized coal ("PC") boilers in 2013. Given the different technology we use at different types of boilers, the likelihood for technical or operational problems may be increased. Any such problems could result in decreased production of RC at such facilities and/or delays in, or postponement or cancellation of, expected potential future installations and operations at electric power generators and would likely have a material adverse effect on our business, financial condition and results of operations.

Present reliance upon one investor for a substantial portion of our earnings from Tinum Group and any renegotiation by or loss of this investor or any failure to continue to produce and sell RC at the investor's RC facilities would have a material adverse effect on our business.

As of December 31, 2016, 10 of Tinum Group's 28 RC facilities are leased to entities affiliated to GS. Significant components of our total cash flows come from Tinum Group's distributions relating to payments received under these leases. These leases have an initial fixed period and then automatically renew, unless terminated at the option of the lessee, for successive one-year terms through 2019 or 2021. If these GS related entities renegotiated or terminated their leases, or if the utilities where the RC facilities are installed materially reduce their use of RC, these events would have a material adverse effect on our business, results of operations or financial condition. Certain GS related entities amended their leases during 2016, with some of the amended leases including less favorable terms to Tinum Group.

Reduction of coal consumption by U.S. electric power generators could result in less demand for our products and services. If utilities significantly reduce the number of coal fired power plants or the amount of coal burned, without a corresponding increase in the services required at the remaining plants, this could reduce our revenues and materially and adversely affect our business, financial condition, and results of operations.

The amount of coal consumed for U.S. electric power generation is affected by, among other things, (1) the location, availability, quality and price of alternative energy sources for power generation, such as natural gas, fuel oil, nuclear, hydroelectric, wind, biomass and solar power; and (2) technological developments, including those related to competing alternative energy sources.

Natural gas-fueled generation has been displacing and may continue to displace coal-fueled generation, particularly from older, less efficient coal-powered generators. We expect that many of the new power plants needed to meet

increasing demand for electricity generation will be fueled by natural gas because the price of natural gas has remained at relatively low levels after a period of sharp decline. Gas-fired plants are cheaper to construct, and permits to construct these plants are easier to obtain, as natural gas is seen as having a lower environmental impact than coal-fueled generators, and ongoing costs associated with

meeting environmental compliance are lower. Possible advances in technologies and incentives, such as tax credits, to enhance the economics of renewable energy sources could make those sources more competitive with coal. Several large U.S.-based banks have publicly indicated they will no longer finance new coal-fired power plants in the U.S., and at least five large coal companies have filed bankruptcy in recent years. Any reduction in the amount of coal consumed by domestic electric power generators could reduce the demand for our current products and services, thereby reducing our revenues and materially and adversely affecting our business and results of operations. Additionally, long-term changes in environmental regulation that threaten or preclude the use of coal or other fossil fuels as a primary fuel source for electricity production, and result in the reduction or closure of a significant number of coal-fired power plants, may adversely affect our business, financial condition and results of operations. Changes in taxation rules or financial accounting standards could adversely affect our results of operations or financial condition.

Changes in taxation rules and accounting pronouncements (and changes in interpretations of accounting pronouncements) have occurred and may occur in the future. A change in existing taxation rules, particularly those related to Section 45 tax credits or the ability of taxpayers to benefit from tax credits or net operating loss carryforwards, could have an adverse effect on our reported or future results of operations or financial condition and could also impact our businesses that produce and sell RC and generate Section 45 tax credits.

Additionally, changes in future tax rates may occur in the future. A change to existing tax rates could negatively impact tax capacity of current or potential tax equity investors. Additionally, a change to existing tax rates may cause a change related to our current estimate of the amount of deferred tax assets that we may be able to utilize in future periods.

Our dependence on third parties for manufacturing key components of our systems may cause delays in deliveries, increased warranty claims and increased costs to us.

Between 2012 and 2015, we owned and controlled a manufacturing and assembly facility for our DSI systems. At the end of 2015, manufacturing and assembly operations at that facility were shut down. Like most of our competitors, we currently rely heavily upon third parties for the manufacture, assembly and some of the testing of key components for both our ACI and DSI systems. Delays or difficulties in the manufacturing, assembly, or delivery of key components of our ACI and DSI systems could harm our business and financial condition.

There are limited sources of acceptable supply for some key ACI and DSI system components. Business disruptions, financial difficulties of suppliers or raw material shortages could increase the costs of our equipment systems sold or reduce the availability of these components. If we are unable to obtain a sufficient supply of required components that meet customer specifications in a timely manner, we could experience significant delays in delivery or increased warranty claims, associated with delivery and product performance. Disruptions of these types could result in the loss of orders or customers or liability for liquidated damages, which could materially and adversely affect our business, financial condition and results of operations.

If the quality and effectiveness of our technologies, products and services do not meet our customers' expectations, then our sales, results of operations and ultimately our reputation could be negatively impacted.

If flaws in the design, production, assembly, delivery, installation, performance or providing of our technologies, products or services (caused by us or our suppliers) were to occur, we could experience substantial liquidated damages, repair, replacement or service costs and potential damage to our reputation. We have provided warranties and performance guarantees for certain ACI and DSI systems we have sold. Under those contractual arrangements, we are responsible for repair or replacement costs and certain operating costs, within the limits provided by the contracts, if the agreed specifications are not met. Continued improvement in manufacturing capability assessment and quality control, technological development, supply-chain management, product testing, installation, delivery and other costs are critical factors in our future growth and meeting our customers' expectations. Our efforts to monitor, develop, modify and implement appropriate technologies, designs and processes for the manufacture, production, installation and testing of our products may not be sufficient to avoid failures and meet performance criteria that may result in dissatisfied customers, significant repair or replacement costs or potential damage to our reputation, any of which could have a material adverse effect on our business, results of operations or financial condition.



Our businesses that are joint ventures are managed under operating agreements where we do not have sole control of the decision making process, and we cannot mandate decisions or ensure outcomes.

We oversee our joint ventures under the terms of their operating agreements by participating in the following activities: (1) representation on the respective governing boards of directors, (2) regular oversight of financial and operational performance and controls and establishing audit and reporting requirements, (3) hiring of management personnel, (4) technical support of RC facilities, and (5) other regular and routine involvement with our joint venture partners. Notwithstanding this regular participation and oversight, our joint venture partners also participate in the management of these businesses and they may have business or economic interests that divert their attention from the joint venture, or they may prefer to operate the business, make decisions or invest resources in a manner that is contrary to our preferences. Since material business decisions must be made jointly with our joint venture partners, we cannot mandate decisions or ensure outcomes.

Failure to protect our intellectual property or infringement of our intellectual property by a third party could have an adverse impact on our financial condition.

We rely on a combination of patent, copyright and trademark laws, trade secrets, confidentiality procedures and contractual provisions to protect our proprietary rights. Such means of protecting our proprietary rights may not be adequate because they provide only limited protection. We also enter into confidentiality and non-disclosure agreements with our employees, consultants, many of our customers and many of our vendors, and generally control access to and distribution of our proprietary information. Notwithstanding these measures, a third party could copy or otherwise obtain and use our proprietary information without authorization. We cannot assure you that the steps taken by us will prevent misappropriation of our technology and intellectual property, which could result in injury to our business and financial condition. In addition, such actions by third parties would divert the attention of our management from the operation of our business.

We may be subject to intellectual property infringement claims from third parties that are costly to defend and that may limit our ability to use the disputed technologies.

Companies in the business of developing technology face the risk of being subject to intellectual property infringement claims that are costly to defend. As a company involved in developing and commercializing new technologies, we may be subject to intellectual property infringement claims from third parties, the defense of which would likely be costly in terms of monetary expenses and management demands. If our technologies infringe the intellectual property rights of others, we may be prevented from continuing sales of existing products or services and from pursuing research, development or commercialization of new or complimentary products or services. Further, we may be required to obtain licenses to third party intellectual property, or be forced to develop or obtain alternative technologies. Our failure to obtain a license to a technology that we may require, or to develop or obtain alternative technologies, could significantly and negatively affect our business.

Agreements to indemnify third party licensees of our technologies against intellectual property infringement claims concerning our licensed technology and our products could be significant to us.

We have agreed to indemnify licensees of our technologies (including Tinum Group and Arch Coal, Inc.) and purchasers of our products and we may enter into additional agreements with others under which we agree to indemnify and hold the third party harmless from and against losses it may incur as a result of the infringement of third party rights caused by the use of our technologies and products. Infringement claims, which are expensive and time-consuming to defend, could have a material adverse effect on our business, operating results and financial condition, even if we are successful in defending ourselves (and indemnified parties) against them.

Our future success depends in part on our ongoing identification and development of intellectual property and our ability to invest in and deploy new products, services and technologies into the marketplace efficiently and cost effectively.

The process of identifying customer needs and developing and enhancing products, services and solutions for our business segments is complex, costly and uncertain. Any failure by us to identify and anticipate changing needs, emerging trends and new regulations could significantly harm our future market share and results of operations.

Historically, our approach to technology development, implementation and commercialization of products has focused on quickly taking technology to full-scale testing and enhancing it under actual power plant operating conditions. We continue to review and adjust methods to deploy products, services and technologies to our customers. We may focus

our resources on technologies, services or products that are not widely accepted or commercially viable, or on operational processes that are not profitable, even after significant up-front investment of our resources, such as occurred with the shut-down of ADA Analytics, LLC, ADA Analytics Israel Ltd. (collectively, "ADA Analytics") and BCSI, LLC. Our results are subject to risks related to our investments in new technologies,

but if we are unable to develop and scale up new technologies, products, and services to meet the needs of our customers, our financial results would be adversely affected.

The effects of providing warranties and performance guarantees for our equipment and chemical sales or Tinnuum Group providing payment and performance guarantees of its RC facilities are largely unknown and could adversely affect our financial condition.

Providing warranties on equipment and chemicals that generally do not extend beyond 12 months from the installation date and delivery date, respectively, have been and will likely continue to be an integral part of successful sales of our products and services. Providing certain performance guarantees during a discrete performance testing period that generally do not extend beyond six months from the initial test date have been and will likely continue to be an integral part of successful sales of our products and services. Guarantees with respect to our ACI and DSI systems typically require the equipment to meet stated injection rates of a specified or approved absorbent or alkali material. In some cases, guarantees might require that emissions of certain pollutants (such as mercury) be reduced by a specified amount if certain operating parameters of the generating facility, including the nature of the coal burned, are met. Such guarantees sometimes require us to spend amounts up to the value of the sales contract to “make right” the performance of the ACI or DSI system, or subject us to liquidated damages if the guaranteed level of performance is not achieved. In 2014, 2015 and 2016 under certain contracts, we provided customers with more stringent performance guarantees and higher cost related remedies. Although we believe compliance with these more stringent guarantees is probable, these stronger guarantees and customer remedies place us at greater risk and may also require us to delay revenue recognition on such contracts. In addition to performance guarantees on ACI and DSI systems we sell, Tinnuum Group indemnifies certain utilities and lessees of RC facilities for particular risks associated with the operations of those facilities. We have provided limited, joint and several guarantees of Tinnuum Group’s obligations under those leases. Any substantial payments made under such guarantees could have a material adverse effect on our financial condition, results of operations and cash flows.

Material adjustments pursuant to DOE audits of our past performance could have a detrimental impact on our business.

Certain of our completed and current contracts awarded by the DOE and related industry participants remain subject to government audits. Our historical experience with these audits has not resulted in significant adverse adjustments to reimbursement amounts previously received; however audits for the years 2010 and later have not been finalized. If the results of future audits require us to repay material amounts, our results of operations and business would likely suffer material adverse impacts.

Information technology vulnerabilities and cyberattacks on our networks could have a material adverse impact on our business.

We rely upon information technology ("IT") to manage and conduct business, both internally and with our customers, suppliers and other third parties. Internet transactions involve the transmission and storage of data including, in certain instances, customer and supplier business information. Therefore, maintaining the security of computers and other electronic devices, computer networks and data storage resources is a critical issue for us and our customers and suppliers because security breaches could result in reduced or lost ability to carry on our business and loss of and/or unauthorized access to confidential information. We have limited personnel and other resources to address information technology reliability and security of our computer networks and to respond to known security incidents to minimize potential adverse impact. Experienced hackers, cybercriminals and perpetrators of threats may be able to penetrate our network security and misappropriate or compromise our confidential information or that of third parties, create system disruptions or cause shutdowns. These perpetrators of cyberattacks also may be able to develop and deploy viruses, worms, malware and other malicious software programs that attack our information and networks or otherwise exploit any security vulnerabilities of our information and networks. Techniques used to obtain unauthorized access to or sabotage systems change frequently and often are not recognized until long after being launched against a target, and we may be unable to anticipate these techniques or to implement adequate preventative measures. A breach of our IT systems and security measures as a result of third-party action, malware, employee error, malfeasance or otherwise could materially adversely impact our business and results of operations and expose us to customer, supplier and other third party liabilities.



We have made and may make future acquisitions or form partnerships and joint ventures that may involve numerous risks that could impact our financial condition, results of operations and cash flows.

Our strategy may include expanding our scope of products and services organically or through selective acquisitions, investments or creating partnerships and joint ventures. We have acquired, and may selectively acquire, other businesses,

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product or service lines, assets or technologies that are complementary to our business. We may be unable to find or consummate future acquisitions at acceptable prices and terms, or we may be unable to integrate existing or future acquisitions effectively and efficiently and may need to divest those acquisitions as we did with our acquired operations in ADA Analytics and BCSI, LLC. We continually evaluate potential acquisition opportunities in the ordinary course of business. Acquisitions involve numerous risks, including among others:

- integration difficulties, including challenges and costs associated with implementing systems and processes to comply with requirements of being part of a publicly-traded company;
- diverting management's attention from normal daily operations of the business;

entering markets in which we have no or limited direct prior experience and where competitors in such markets have stronger market positions;

unanticipated costs and exposure to undisclosed or unforeseen liabilities or operating challenges;

potential loss of key employees and customers of the acquired businesses, product or service lines, assets or technologies;

our ability to properly establish and maintain effective internal controls over an acquired company; and

increasing demands on our operational and IT systems.

Although we have conducted what we believe to be a prudent level of investigation regarding the operating and financial condition of acquisitions we have made, an unavoidable level of risk remains regarding their actual operating results and financial condition. Until we assume operating control of these acquisitions, we may not be able to ascertain their actual value, costs or exposures to liabilities. This is particularly true with respect to acquisitions outside the U.S.

In addition, acquisitions of businesses may require additional debt or equity financing, resulting in additional leverage or dilution of ownership. Our loan agreements contain certain covenants that limit, or that may have the effect of limiting, among other things acquisitions, capital expenditures, the sale of assets and the incurrence of additional indebtedness.

Customers may cancel or delay projects and our backlog may not be indicative of our future revenues.

Customers may cancel or delay projects for reasons beyond our control. Our equipment and chemical orders normally contain cancellation provisions that permit us to recover our costs incurred through termination. If a customer cancels an order, we have to recognize our costs and revenues immediately, and may not achieve the full amount of our backlog. If projects are delayed, the timing to recognize our revenues, particularly when using the completed contract method of accounting, will be adversely impacted and projects may remain in our backlog for extended periods of time. Revenue recognition may occur over extended periods of time and is subject to unanticipated delays and quarterly fluctuations, which may also impact quarterly backlog. As a result, our backlog may not be indicative of our future revenues.

We may be unable to renew our bank line of credit agreement upon maturity.

Our bank line of credit ("Line of Credit") agreement matures on September 30, 2017 and it is primarily used to support current and future letters of credit that are not supported by cash collateral. If we are unable to extend the Line of Credit, we may have to utilize existing cash resources to support letters of credit.

Inability to prepare and timely file periodic reports under the Exchange Act limits our access to the public markets to raise debt or equity capital and could result in increased transaction costs.

We are required to comply with Section 13 of the Exchange Act. For the period beginning December 31, 2013 through September 30, 2015, we did not file current Annual Reports on Form 10-K or Quarterly Reports on Form 10-Q. Because we did not remain current in our reporting requirements under the Exchange Act, we have been, and continue to be, limited in our ability to access the public markets to raise debt or equity capital. Our limited ability to access the public markets could prevent us from implementing business strategies that we may otherwise believe are beneficial to our business. Until one year after the date, April 19, 2016, we maintain compliance with the filing

requirements of the Exchange Act, we will be ineligible to use shorter and less costly filings, such as Form S-3 under the Securities Act, to register our securities for sale. We may use Form S-1 under the Securities Act to register a sale of our stock to raise capital, but doing so would likely increase transaction costs and adversely affect our ability to raise capital in a timely manner.

#### Risks relating to our common stock

Our stock price may continue to be volatile.

The market price of our common stock fluctuates significantly. The market price of our common stock may continue to be affected by numerous factors, including:

- actual or anticipated fluctuations in our operating results and financial condition;
- changes in laws or regulations and court rulings and trends in our industry;
- Tinnuum Group's ability to lease or sell RC facilities;
- announcements of sales awards;
- changes in supply and demand of components and materials;
- adoption of new tax regulations or accounting standards affecting our industry;
- changes in financial estimates by securities analysts;
- perceptions of the value of corporate transactions; and
- the degree of trading liquidity in our common stock and general market conditions.

From December 31, 2013 to December 31, 2016, the closing price of our common stock ranged from \$3.27 to \$27.90 per share (retroactively restated to reflect the two-for-one stock split of our common stock, which was effected in the form of a common stock dividend distributed on March 14, 2014). Significant declines in the price of our common stock could impede our ability to obtain additional capital and attract and retain qualified employees, and could reduce the liquidity of our common stock.

In addition, the stock market has from time to time experienced significant price and volume fluctuations that have particularly affected the market prices for the common stock of similarly staged companies. These broad market fluctuations may adversely affect the market price of our common stock.

Our certificate of incorporation and bylaws contain provisions that may delay or prevent an otherwise beneficial takeover attempt of us.

Certain provisions of our certificate of incorporation and bylaws could make it more difficult for a third party to acquire us, even if doing so would be beneficial to our stockholders. These include provisions that:

- limit the business at special meetings to the purpose stated in the notice of the meeting;
- authorize the issuance of "blank check" preferred stock, which is preferred stock with voting or other rights or preferences that could impede a takeover attempt and that our Board of Directors (the "Board") can create and issue without prior stockholder approval;
- establish advance notice requirements for submitting nominations for election to the Board and for proposing matters that can be acted upon by stockholders at a meeting; and
- require the affirmative vote of the "disinterested" holders of a majority of our common stock to approve certain business combinations involving an "interested stockholder" or its affiliates, unless either minimum price criteria or procedural requirements are met, or the transaction is approved by a majority of our "continuing directors" (known as "fair price provisions").

These provisions, alone or in combination with each other, may discourage transactions involving actual or potential changes of control, including transactions that otherwise could involve payment of a premium over prevailing market prices to holders of our common stock, or could limit the ability of our stockholders to approve transactions that they may deem to be in their best interest.

#### Item 1B. Unresolved Staff Comments

None.

#### Item 2. Properties

##### Office and Warehouse Leases

As of December 31, 2016, we leased office, warehouse and laboratory space in Highlands Ranch, Colorado for a total of approximately 52,869 square feet under three leases. Original lease terms ranged from four to seven years. Certain of these leases have options permitting renewals for additional periods.



Our lease of approximately 37,102 square feet of office space in Highlands Ranch, Colorado was entered into in 2012 with an initial term ending in February 2019. In December 2016, we terminated the lease effective February 2017 and paid a termination fee of \$0.3 million. In December 2016, the Company entered into a new office lease for approximately 8,208 square feet of office space in Highlands Ranch, Colorado. This lease is effective February 2017 and runs through May 2020.

Our lease of approximately 7,559 square feet of warehouse space in Highlands Ranch, Colorado was entered into in 2012 and expires in February 2019 with the option to renew for two additional five-year periods.

See Note 14 to our 2016 Consolidated Financial Statements included in Item 8 of this Report for information with respect to our lease commitments as of December 31, 2016.

### Item 3. Legal Proceedings

Securities class action lawsuit: United Food and Commercial Workers Union v. Advanced Emissions Solutions, Inc., No. 14-cv-01243-CMA-KMT (U.S. District Court, D. Colo.)

A class action lawsuit against ADES and certain of its current and former officers was filed in May 2014 in the federal court in Denver, Colorado alleging that ADES and other defendants misrepresented to the investing public the Company's financial condition and its financial controls to artificially inflate and maintain the market price of ADES's common stock. In May 2016, the parties reached an agreement in principle to settle this litigation, and on June 30, 2016, the parties entered into a Stipulation and Agreement of Settlement to resolve the action in its entirety. On February 10, 2017, we received an order and final judgment that the lawsuit was settled, and the entire case has been dismissed with prejudice.

The settlement agreement for this case contains no admission of liability, and all of the defendants in this litigation have expressly denied, and continue to deny, all allegations of wrongdoing or improper conduct. The Company's insurance carriers funded the full settlement in November 2016. However, until an order and final judgment of the lawsuit having been settled was received, the funded settlement did not relieve the Company's recorded liability.

Stockholder derivative lawsuits: In Re Advanced Emissions Solutions, Inc. Shareholder Derivative Litigation, No. 2014CV-30709 (District Court, Douglas County, Colorado) (consolidated actions).

In June and July 2014, stockholder derivative actions were filed in the Douglas County District Court and in the Colorado District Court for the City and County of Denver against certain of the Company's current and former officers and directors, along with the Company as a "nominal defendant." In May 2016, the parties reached an agreement in principle to settle this stockholder derivative action, and on September 30, 2016, the parties entered into a Stipulation and Agreement of Settlement to resolve the action in its entirety. The Stockholder Derivative Settlement was approved and the case was closed on January 4, 2017.

The settlement agreement for this case contained no admission of liability, and all of the defendants in this stockholder derivative action have expressly denied, and continue to deny, all allegations of wrongdoing or improper conduct. The Company's insurance carriers funded the full settlement in January 2017.

### SEC Inquiry

On April 7, 2014, the SEC Staff informed the Company that it had initiated the SEC Inquiry to determine if violations of the federal securities laws had occurred, and in September 2014 the SEC issued a formal order of investigation. The SEC Inquiry generally pertains to the restatement of the Company's financial statements and internal controls processes, as described in Note 2 to the Consolidated Financial Statements of the Company included in the Annual Report on Form 10-K for the fiscal year ended December 31, 2014. The Company cooperated with the SEC by

providing information and documents to the SEC on an ongoing basis. In July 2016, the SEC Staff communicated to the Company that it would recommend to the SEC that it authorize a settlement with the Company on terms that include payment of a civil monetary penalty of \$0.5 million. This penalty will not be funded by the Company's insurance carriers. The SEC must approve the SEC Staff recommendation and any final settlement or relief.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

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

Price Range of Common Stock

As of December 31, 2016, our common stock was quoted on the NASDAQ Global Market under the symbol "ADES." The table below sets forth the price range of our common stock for each quarter of 2016 and 2015:

	2016		2015	
	High	Low	High	Low
1st Quarter	\$8.18	\$3.27	\$21.86	\$9.40
2nd Quarter	\$8.19	\$6.20	\$17.00	\$12.20
3rd Quarter	\$8.60	\$6.40	\$13.00	\$6.30
4th Quarter	\$9.89	\$7.53	\$7.14	\$3.70

For the period from January 1 through February 2, 2015, our common stock traded on the NASDAQ Capital Market under the symbol ADES. For the period beginning February 3, 2015 through July 6, 2016, our common stock traded on the OTC Pink® Marketplace - Limited Information Tier ("OTC") under the symbol ADES as a result of NASDAQ suspending trading on February 2, 2015 due to our non-compliance with filing requirement under the Exchange Act.

For the period noted above for which our stock traded on the OTC market, the OTC quotations reflect inter-dealer prices, without retail mark-up, markdown or commissions. Such quotes were not necessarily representative of actual transactions or the value of our common stock.

The trading volume for our common stock is relatively limited. There is no assurance that an active trading market will provide adequate liquidity for our existing stockholders or for persons who may acquire our common stock in the future.

Performance Graph

The following performance graph illustrates a five-year comparison of cumulative total return of our common stock, the Russell 3000 Index and a select industry peer group ("Peer Group") for the period beginning on December 31, 2011 and ending on December 31, 2016. The graph assumes an investment of \$100 on December 31, 2011 and assumes the reinvestment of all dividends.

The performance graph is not intended to be indicative of future performance. The performance graph shall not be deemed "soliciting material" or to be "filed" with the SEC for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any of the Company’s filings under the Securities Act or the Exchange Act.



Five Year Cumulative Total Shareholder Return Comparison

Advanced Emissions Solutions Return Relative to the Russell 3000 Index and Select Industry Peer Group

The select industry Peer group includes the following: American Vanguard Corp., Calgon Carbon Corporation, CECO Environmental Corp., Clean Energy Fuels Corp., EnerNOC, Inc., FutureFuel Corp., Fuel-Tech, Inc., Hawkins Inc., Headwaters Incorporated, KMG Chemicals Inc., Lydall Inc., Flotek Industries, Inc., Rentech, Inc. and TerraVia Holdings, Inc.

Holdings

The number of holders of record of our common stock as of March 8, 2017 was approximately 1,006. The approximate number of beneficial stockholders is estimated at 2,260.

Dividends

We have not paid cash dividends since inception. In addition, the Energy Capital Partners I, LP and its affiliated funds ("ECP") Settlement Agreement signed in November 2011 restricts our ability to pay dividends without concurrently increasing our letters of credit in an amount equal to 50% of the fair market value of the dividend. However, the maximum total letter of credit related to dividends or earnings, as described in Note 14 of the Consolidated Financial Statements included in Item 8 of this Report, is \$7.5 million. Should we pay dividends, the payment of such dividends will be dependent upon earnings, financial condition and other factors considered relevant by the Board and will be subject to limitations imposed under Delaware law.

### Securities Authorized for Issuance under Equity Compensation Plans

We have equity plans under which options and shares of our common stock are authorized for grant or issuance as compensation to eligible employees, consultants, and members of the Board. Our stockholders have approved these plans. See Note 13 Stock-Based Compensation included in Item 8 of this Report for further information about the material terms of our equity compensation plans. The following table is a summary of the shares of our common stock authorized for issuance under the equity compensation plans as of December 31, 2016:

Plan Category	Number of securities issued	Weighted-Average Exercise Price of Outstanding Options	Number of securities remaining available for future issuance under equity compensation plans
Equity compensation plans approved by security holders	1,508,758	\$ 11.61	891,242
Equity compensation plans not approved by security holders	—	\$ —	—
Total	1,508,758		891,242

### Purchases of Equity Securities by the Company and Affiliated Purchasers

Neither we nor any “affiliated purchaser,” as defined in Rule 10b-18(a)(3) of the Exchange Act, purchased any of our equity securities during the three months ended December 31, 2016.

## Item 6. Selected Financial Data

## FIVE-YEAR SUMMARY OF SELECTED FINANCIAL DATA

The following selected financial data are derived from the audited Consolidated Financial Statements for the years ended December 31, 2016, 2015, 2014, 2013 and 2012 and should be read in conjunction with Item 1A, Item 7 and our Consolidated Financial Statements and the related notes included in Item 8 of this Report.

(in thousands)	Years Ended December 31,				
	2016	2015	2014	2013	2012
Statement of operations data:	(4) (5) (6)	(3) (5)	(3) (5)	(3)	(3)
Revenues	\$50,622	\$62,739	\$16,923	\$13,286	\$16,316
Earnings from equity method investments	45,584	8,921	42,712	15,502	813
Royalties, related party	6,125	10,642	6,410	2,505	1,446
Income tax (benefit) expense	(60,938 )	20	296	463	14
Net income (loss)	97,678	(30,141 )	1,387	(15,987 )	(13,129 )
Net income (loss), per common share, basic <sup>(1) (2)</sup>	4.40	(1.37 )	0.06	(0.78 )	(0.65 )
Net income (loss), per common share, diluted	4.34	(1.37 )	0.06	(0.78 )	(0.65 )
	As of December 31,				
(in thousands)	2016	2015	2014	2013	2012
Balance sheet data:	(4) (5) (6)	(3) (5)	(3) (5)	(3)	(3)
Total assets	\$107,296	\$60,775	\$93,699	\$73,524	\$28,885
Total debt	—	28,025	15,910	—	—
Stockholders' equity (deficit)	76,165	(24,978 )	(697 )	(6,167 )	(21,456 )

(1) For the years ended December 31, 2013 and 2012, the number of common shares and per common share amounts have been retroactively restated to reflect the two-for-one stock split of our common stock, which was effected in the form of a common stock dividend distributed on March 14, 2014.

(2) For the years ended December 31, 2015, 2013 and 2012, the computation of diluted net loss per common share was the same as basic net loss per common share as the inclusion of outstanding options or unvested equity instruments for those years would have been anti-dilutive .

(3) On August 31, 2012, we acquired and consolidated the assets of two related private companies engaged in the DSI business. The fabrication facility related to this acquisition was shut down during the fourth quarter of 2015 as described in Note 2 of the Consolidated Financial Statements included in Item 8 of this Report.

(4) As described in Item 7 of this Report and Note 14 of our Consolidated Financial Statements included in Item 8 of the 2014 10-K, during 2011, we entered into settlement agreements with various third parties related to litigation regarding one of our equity method investments (the "Royalty Award"), whereby we paid a lump-sum payment totaling \$33 million in the third quarter of 2011. In addition, we agreed to pay an additional \$7.5 million over a three-year period with payments commencing in the second quarter of 2012, payable in three equal installments. We also relinquished our investment in the equity method entity and were also required to pay additional damages in the form of future royalty payments related to certain future revenues generated from the equity method investment through the second quarter of 2018.

(5) As described in Note 7 of the Consolidated Financial Statements included in Item 8 of this Report, on February 10, 2014, we purchased a 24.95% membership interest in RCM6, which owns a single RC facility that produces and sells RC that qualifies for Section 45 tax credits, from Tinum Group through an up-front payment of \$2.4 million and an initial note payable to Tinum Group of \$13.3 million. During the year ended December 31, 2016, the Company recognized equity method losses related to RCM6 of \$0.6 million. On March 3, 2016, the Company sold its 24.95% membership interest in RCM6 for a cash payment of \$1.8 million and assumption of the outstanding note payable made by the Company in connection with its purchase of RCM6 membership interests from Tinum Group in February 2014.

(6) As described in Note 16 of the Consolidated Financial Statements included in Item 8 of this Report, during the fourth quarter of 2016, the Company released \$61.4 million of the valuation allowance related to the deferred tax assets, which resulted in an income tax benefit during 2016 of \$60.9 million.

The Notes to the Consolidated Financial Statements included in Item 8 of this Report contain additional information about charges resulting from other operating expenses and other income (expense) which affects the comparability of information presented.

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

### Overview

This Form 10-K for the year ended December 31, 2016 is filed by Advanced Emissions Solutions, Inc. together with its consolidated subsidiaries (collectively, "ADES," the "Company," "we," "us," or "our" unless the context indicates otherwise).

We are a leader in emissions reductions technologies and associated specialty chemicals, primarily serving the coal-fueled power plant industry. Our proprietary environmental technologies and specialty chemicals enable power and coal-fired plants to enhance existing air pollution control equipment, minimize mercury, CO<sub>2</sub> and other emissions, maximize capacity, and improve operating efficiencies, to meet the challenges of existing and pending emission control regulations. See further discussion of our business included in Item 1 of this Report. Discussion regarding segment information is included within the discussion of our consolidated results under this Item 7. Additionally, discussion related to our reportable segments is included in Item 1 and Note 17 of the Consolidated Financial Statements included in Item 8 of this Report.

### Components of Revenue, Expenses and Equity Method Investees

The following briefly describes the components of revenues and expenses as presented in the Consolidated Statement of Operations. Descriptions of the revenue recognition policies are included in Note 1 to the Consolidated Financial Statements included in Item 8 of this Report.

### Revenues and costs of revenue

#### Equipment sales

Equipment sales represent the sale of activated carbon injection ("ACI") systems to control mercury, dry sorbent injection ("DSI") systems to control SO<sub>2</sub>, SO<sub>3</sub>, and HCl and electrostatic precipitator ("ESP") liquid flue gas conditioning systems. Revenue from extended equipment contracts is recorded using the completed contract method of accounting.

We also enter into other non-extended equipment contracts for which we recognizes revenue on a time and material basis as services to build equipment systems are performed or as equipment is delivered.

#### Chemicals

We sell proprietary chemical blends to coal-fired utilities that allow the respective utilities to comply with the regulatory emissions standards.

#### Consulting services and other

We provide consulting services to assist electric power generators and others in planning and implementing strategies to meet the new and increasingly stringent government emission standards requiring reductions in SO<sub>2</sub>, NO<sub>x</sub>, particulates, acid gases and mercury. This includes demonstrations of our commercial products.

### Other Operating Expenses

#### Payroll and benefits

Payroll and benefits costs include personnel related fringe benefits, sales and administrative staff labor costs and stock compensation expenses.

#### Rent and occupancy

Rent and occupancy costs include rent, insurance, and other occupancy-related expenses.

#### Legal and professional fees

Legal and professional costs include external legal, audit and consulting expenses.

General and administrative

General and administrative costs include director fees and expenses, bad debt expense and other general costs of conducting business.

#### Research and development, net

Research and development expense consists of research relating to various projects including the CO<sub>2</sub> capture and control market. Historically, we have entered into reimbursement contracts with the DOE related to certain of our research and development contracts. These contracts have been best-effort-basis contracts and we have included industry cost-share partners to offset the costs incurred that are anticipated to be in excess of funded amounts from the DOE. During 2016, we continued to receive DOE reimbursements related to prior years' executed contracts. We recognize amounts funded by the DOE and industry partners under research-and-development-cost-sharing arrangements as an offset to our aggregate research and development expenses within the Research and development, net line in the Consolidated Statements of Operations included in Item 8 of this Report.

#### Depreciation and amortization

Depreciation and amortization expense consists of depreciation expense related to property and equipment and the amortization of long lived intangibles.

#### Other Income (Expense), net

##### Earnings from equity method investments

Earnings from equity method investments relates to our share of earnings (losses) related to our equity method investments.

Our equity method earnings in Tinum Group are positively impacted when Tinum Group obtains an investor in an RC facility and receives lease payments from the lessee, or purchase payments from the sale, of the RC facility. If Tinum Group operates a retained RC facility, the Company's equity method earnings will be negatively impacted as operating retained RC facilities generate operating losses. However, we benefit on an after-tax basis if we are able to utilize net operating losses and tax credits associated with the production and sale of RC from operation of retained RC facilities by Tinum Group. These benefits, if utilized in future periods, will reduced the tax expense reported within the Income tax (benefit) expense line item in the Consolidated Statements of Operations included in Item 8 of this Report. In addition, our equity method earnings in Tinum Group are negatively impacted due to an annual preferred return to which one of Tinum Group's equity owners, GSFS, is entitled. Therefore, Tinum Group's equity earnings available to its common members are equal to Tinum Group's net income less the preferred return due to GSFS.

Through March 3, 2016, we owned a 24.95% equity interest in RCM6, which owns a single RC facility that is managed by Tinum Group. The economics to us were consistent with an invested facility discussed above except that we were subject to funding our share of RCM6's operating costs during 2014 and 2015 and through March 3, 2016. Our purchase of RCM6 resulted in us recording a basis difference related to fixed assets and identifiable intangible assets, which resulted in a difference between our proportionate share of RCM6's net losses and our recorded equity losses related to additional depreciation and amortization expense recorded by us related to the basis difference.

Tinum Services operates and maintains RC facilities under operating and maintenance agreements. Tinum Group or the lessee/owner of the RC facilities pays Tinum Services, subject to certain limitations, the costs of operating and maintaining the RC facilities plus certain fees. Tinum Services also arranges for the purchase and delivery of certain chemical additives necessary for the production of refined coal under chemical agency agreements. Tinum Services is also the primary beneficiary of certain RC facilities that are variable interest entities ("VIE's) and therefore consolidates them. All net income (loss) associated with these consolidated VIE's is allocated to the noncontrolling equity holders of Tinum Services and therefore does not impact our equity earnings (loss) from Tinum Services.

#### Royalties, related party

We generate royalties under a licensing arrangement with Tinum Group for our M-45<sup>TM</sup> and M-45-PC<sup>TM</sup> emission control technologies to Tinum Group ("M-45 License"). Royalties are earned based upon (i) a percentage of the per-ton, pre-tax margin net of certain allocable operating expenses related to the lease or sale of an invested RC facility that produces and sells RC under the M-45 License, (ii) a percentage of the value of the Section 45 tax credits

generated related to retained RC facilities, net of certain allocable operating expenses as a result of the production and sale of RC under the M-45 License, and (iii) a percentage of the revenue, net of all direct expenses, received by Tinum Group as a direct result of Tinum Group's exercise of the M-45 License.

Other income (expense)

The remaining components of other income (expense) include interest income, interest expense and other miscellaneous items, including with respect to 2016 an adjustment to a litigation loss accrual and change in estimate related to royalty indemnity expense.



We record interest expense due to our share of Tinuum Group's equity method earnings for RC facility leases that are treated as installment sales for tax purposes. IRS Section 453A requires taxpayers using the installment method to pay an interest charge on the portion of the tax liability that was deferred under the installment method. We refer to this as "453A interest."

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## Results of Operations

For comparison purposes, the following tables set forth our results of operations for the periods presented in the Consolidated Financial Statements included in Item 8 of this Report. The year-to-year comparison of financial results is not necessarily indicative of financial results that may be achieved in future years.

## Year ended December 31, 2016 Compared to Year ended December 31, 2015

## Total Revenue and Cost of Revenue

A summary of the components of revenues and cost of revenue for the years ended December 31, 2016 and 2015 is as follows:

(Amounts in thousands except percentages)	Years Ended December 31,		Change	
	2016	2015	(\$)	(%)
Revenues:				
Equipment sales	\$46,949	\$60,099	\$(13,150)	(22)%
Chemicals	3,025	888	2,137	241%
Consulting services and other	648	1,752	(1,104)	(63)%
Total revenues	50,622	62,739	(12,117)	(19)%
Operating expenses:				
Equipment sales cost of revenue, exclusive of depreciation and amortization	37,741	45,433	(7,692)	(17)%
Chemicals cost of revenue, exclusive of depreciation and amortization	1,700	601	1,099	183%
Consulting services and other cost of revenue, exclusive of depreciation and amortization	376	1,518	(1,142)	(75)%

## Equipment sales and Equipment sales cost of revenue

During the years ended December 31, 2016 and 2015, we entered into five and four long-term (6 months or longer) fixed price contracts to supply ACI systems with aggregate contract values including change orders of \$2.9 million and \$5.5 million, respectively. The total value per contract may change due to the relative sizes of ACI systems and the contracts related thereto. During the years ended December 31, 2016 and 2015, we completed 17 and 32 ACI systems, recognizing revenues of \$26.9 million and \$51.7 million and cost of revenue of \$20.5 million and \$38.4 million, respectively. We recognized \$0.5 million and \$0.1 million in loss provisions related to ACI systems contracts during the years ended December 31, 2016 and 2015, respectively.

During the years ended December 31, 2016 and 2015, we entered into zero and one long term (6 months or longer) fixed price contracts to supply DSI systems and other material handling equipment with contract values including associated change orders of \$1.5 million and \$2.4 million, respectively. Total value per contract may change due to the relative sizes of DSI systems and the contracts related thereto. During the years ended December 31, 2016 and 2015, we completed 11 and seven DSI systems and zero and two other material handling equipment systems, recognizing revenues of \$15.8 million and \$7.2 million and cost of revenue of \$14.8 million and \$5.9 million, respectively. Due to potential cost overruns related to certain DSI projects, we expect that the future relationship between revenues and costs may be dissimilar from prior results. During the year ended December 31, 2016, we recognized a reduction of \$0.1 million in previously recognized loss provisions included in cost of revenue. During the year ended December 31, 2015, we recorded \$0.2 million in loss provisions included in cost of revenue related to DSI system contracts.

Additionally, in 2016, we executed sales-type lease agreements related to ACI and DSI systems and recognized revenue of \$3.4 million and cost of revenue of \$1.2 million during the year ended December 31, 2016.

The remaining changes were due to other equipment sales.

As a result of using the completed contract method for revenue recognition on long-term equipment contracts, our revenue and cost of revenue information may not be comparable to the information of our competitors who do not use the completed contract method. For example, due to the long-term revenue recognition period on certain contracts, we may recognize less revenue and related cost of revenue during a particular period, but record significant deferred revenue and deferred project costs. This impacts our outstanding backlog as is discussed in more detail in Item 1 of this Report.

Demand for ACI and DSI system contracts during 2015 and 2016 has been driven by coal-fired power plant utilities that need to comply with MATS and MACT standards by 2016. Revenues related to ACI and DSI system contracts fluctuate due to changes in the number of contracts entered into as well as the long duration of completing certain contracts, which involve long-lead time requirements for manufacturing, installation and testing of the equipment. As the deadline for these standards has now passed, we have experienced and expect to continue to experience a significant decline in the number of long-term fixed price contracts entered into going forward as the coal-fired power plant and other utilities markets have materially completed purchases of these systems to assist in the achievement of initial compliance with regulatory standards.

#### Chemicals and Chemical cost of revenue

During the years ended December 31, 2016 and 2015, revenues increased year over year primarily due to an overall increase in pounds of our chemicals sold, most significantly driven by higher sales of our M-Prove™ chemicals during the second half of 2016. The increase in revenue is due to our increased focus on selling these products to coal-fired power plants to be in compliance with applicable regulations. We believe revenues will continue to increase in 2017 due to the full year financial impact of existing customers and a continued expansion of our customer base. However, we believe that it is likely that gross margins on sales of chemicals for 2017 will be lower than in 2016 based on the nature of certain chemical sale contracts, which may include longer field testing time frames, which can result in decreased margins, as we attempt to not only expand our customer base but also the volume size and duration of chemical sales contracts.

#### Consulting services and other and Consulting services cost of revenue

We also provide consulting services related to emissions regulations. During the years ended December 31, 2016 and 2015, revenues decreased year over year due to a decrease in the number of consulting service engagements performed. The decrease in the number of consulting services engagements was due in part to us no longer performing consulting services related to a certain customer within the legacy Emissions Control - Manufacturing segment. Additional information related to revenue concentrations and contributions by class and reportable segment can be found within the segment discussion below and in Note 18 to the Consolidated Financial Statements included in Item 8 of this Report.

#### Other Operating Expenses

A summary of the components of our operating expenses, exclusive of cost of revenue items (presented above), for the years ended December 31, 2016 and 2015 is as follows:

	Years Ended		Change	
	December 31,			
(in thousands, except percentages)	2016	2015	(\$)	(%)
Operating expenses:				
Payroll and benefits	\$12,390	\$23,589	\$(11,199)	(47)%
Rent and occupancy	2,168	3,309	(1,141)	(34)%
Legal and professional fees	8,293	16,604	(8,311)	(50)%
General and administrative	3,721	6,104	(2,383)	(39)%
Research and development, net	(648)	5,362	(6,010)	(112)%
Depreciation and amortization	979	2,019	(1,040)	(52)%
	\$26,903	\$56,987	\$(30,084)	(53)%

#### Payroll and benefits

Payroll and benefits expenses decreased in 2016 compared to 2015 primarily due to a decrease in restructuring expenses in connection with the departure of certain executive officers and management's alignment of the business with strategic objectives. During the year ended December 31, 2016 and December 31, 2015, we recorded net restructuring charges of \$1.6 million and \$10.4 million, respectively, including the modification and acceleration of equity awards of \$0.4 million and \$3.4 million, respectively. Additionally, we had a decrease in headcount of

approximately 70% during the year ended 2016 compared to the same period in 2015 in connection with employees impacted by management's alignment of the business with strategic objectives. We expect a continued decrease in Payroll and benefits going forward as we realize the full year benefit of actions taken during 2016 to continue to align personnel with our strategic objectives.

Rent and occupancy

Rent and occupancy expenses decreased in 2016 compared to 2015 primarily due to the shutdown of our BCSI, LLC ("BCSI") office and fabrication facilities in the fourth quarter of 2015. During the first quarter of 2016, we entered into an agreement to terminate various lease agreements covering approximately 207 thousand square feet of manufacturing, warehouse and office space in Pennsylvania. As consideration for terminating the leases, we agreed to pay the lessor a termination fee of \$0.3 million

in April 2016 and the same amount in April 2017. During the first quarter of 2016, we recorded a gain of \$0.2 million related to the difference between the amount accrued as of the cease-use date of December 31, 2015 and the settlement amount. In December 2016, we entered into an agreement to terminate approximately 37 thousand square feet of office space and relocate our corporate office in Colorado. For terminating the lease, we agreed to pay the lessor a termination fee of \$0.3 million. The amount was paid in full in December 2016.

#### Legal and professional fees

Legal and professional fees expenses decreased during the year ended December 31, 2016 compared to the year ended December 31, 2015 as a result of a reduction in the professional resources deployed to address the Restatement of our consolidated financial statements, including the SEC Inquiry and related private litigation. Expenses related to the Restatement during the year ended December 31, 2016 and 2015 were \$2.0 million and \$9.5 million, respectively. In addition, legal and professional fees decreased as a result of a reduction in other consulting fees during the year ended December 31, 2016.

#### General and administrative

General and administrative expenses decreased in 2016 compared to 2015 due to a \$0.5 million allowance recorded during 2015 against the entire principal balance of a note receivable. Additionally, during the year ended December 31, 2016, there was a decrease in expenses of \$1.6 million due to the shutdown of our BCSI office and fabrication facilities in the fourth quarter of 2015. Other decreases during the year ended December 31, 2016 were due to decreases in general operating expenses, including travel and professional expenses. These decreases were partially offset by impairment charges recognized during the year ended December 31, 2016 on property and equipment and inventory of \$0.5 million, as projected future cash flows from operations related to such property and equipment and inventory did not support the carrying value of these assets.

#### Research and development, net

Research and development expense decreased in 2016 compared to 2015 primarily due to a decrease in research and development activities, as we have concluded all material R&D activities except for continued product development necessary to our ongoing business. We also reduced R&D expense by \$0.8 million during the year ended December 31, 2016 due to final billings made during this period to the DOE for one R&D contract which resulted in negative expense during 2016. Additional decreases in R&D expense were due to expenses incurred during 2015 related to our investment in ADA Analytics of \$2.6 million, of which \$1.9 million related to the impairment charge we recognized in the third quarter of 2015.

#### Depreciation and amortization

Depreciation and amortization expense decreased in 2016 compared to 2015 by approximately \$0.8 million due to the shutdown of our BCSI office and fabrication facility in the fourth quarter of 2015 and by approximately \$0.2 million due to the termination of the Highview technology license. See further discussion of the termination of the Highview technology license in Note 9 of the Consolidated Financial Statements included in Item 8 of this Report.

#### Other Income (Expense), net

A summary of the components of our other income (expenses), net for the years ended December 31, 2016 and 2015 is as follows:

(Amounts in thousands, except percentages)	Years Ended		Change	
	December 31, 2016	2015	(\$)	(%)
Other income (expense):				
Earnings from equity method investments	\$45,584	\$8,921	\$36,663	411 %
Royalties, related party	6,125	10,642	(4,517 )	(42 )%
Interest income	268	24	244	*
Interest expense	(5,066 )	(8,402 )	3,336	(40 )%

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Litigation settlement and royalty indemnity expense, net	3,464	—	3,464	*
Other	2,463	494	1,969	399 %
Total other income	\$52,838	\$11,679	\$41,159	352 %

\* Calculation not meaningful

## Earnings in equity method investments

The following table presents the equity method earnings, by investee, for the years ended December 31, 2016 and 2015:

(in thousands)	Year ended December 31,		Change	
	2016	2015	(\$)	(%)
Earnings from Tinium Group	\$41,650	\$8,651	\$32,999	381 %
Earnings from Tinium Services	4,491	4,838	(347 )	(7 )%
Loss from RCM6	(557 )	(4,568 )	4,011	(88 )%
Earnings from equity method investments	\$45,584	\$8,921	\$36,663	411 %

Earnings from equity method investments, and changes related thereto, are impacted by our equity method investees: Tinium Group, Tinium Services and RCM6 (through the date of the sale of our interest in RCM6 on March 3, 2016). Earnings from equity method investments increased during the year ended December 31, 2016 compared to 2015 primarily as a result of an increase in cash distributions, as Tinium Group did not invest significant capital expenditures related to the installation of RC facilities or incur significant costs to operate retained RC facilities during 2016 as they did during 2015. See discussion below regarding the accounting of earnings from Tinium Group.

During the year ended December 31, 2016, we recognized \$41.7 million in equity earnings from Tinium Group compared to our proportionate share of Tinium Group's net income of \$35.0 million for the year. During the year ended December 31, 2015, we recognized \$8.7 million in equity earnings from Tinium Group compared to our proportionate share of Tinium Group's net income of \$35.3 million for the year. The difference between our pro-rata share of Tinium Group's net income and our earnings from our Tinium Group equity method investment as reported on the Condensed Consolidated Statements of Operations relates to us receiving cumulative distributions in excess of the carrying value of the investment, and therefore recognizing such excess distributions as equity method earnings in the period the distributions occur, as discussed in more detail below.

As a result of cash flows from invested RC facilities, Tinium Group distributions to us during the year ended December 31, 2016 were \$41.7 million, which exceeded our pro-rata share of Tinium Group's net income, resulting in us having cumulative cash distributions that exceeded our cumulative pro-rata share of Tinium Group's net income as of December 31, 2016.

The following table for Tinium Group presents our investment balance, equity earnings, cash distributions received and cash distributions in excess of the investment balance for the years ended December 31, 2016 and 2015 (in thousands).

Description	Date(s)	Investment balance	ADES equity earnings (loss)	Cash distributions	Memorandum Account: Cash distributions and equity loss in (excess) of investment balance
Total investment balance, equity earnings (loss) and cash distributions	12/31/2014	\$ —	\$—	\$ —	\$ (29,877 )
ADES proportionate share of net income from Tinium Group <sup>(1)</sup>	2015 activity	35,265	35,265	—	—
Recovery of cash distributions in excess of investment balance (prior to cash distributions)	2015 activity	(29,877)	(29,877 )	—	29,877
Cash distributions from Tinium Group	2015 activity	(8,651)	—	8,651	—



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Adjustment for current year cash distributions in excess of investment balance	2015 activity	3,263	3,263	—	(3,263 )
Total investment balance, equity earnings (loss) and cash distributions	12/31/2015	—	8,651	8,651	(3,263 )
ADES proportionate share of net income from Tinium Group <sup>(1)</sup>	2016 activity	35,019	35,019	—	—
Recovery of cash distributions in excess of investment balance (prior to cash distributions)	2016 activity	(3,263 )	(3,263 )	—	3,263
Cash distributions from Tinium Group	2016 activity	(41,650)	—	41,650	—
Adjustment for current year cash distributions in excess of investment balance	2016 activity	9,894	9,894	—	(9,894 )
Total investment balance, equity earnings and cash distributions	12/31/2016	\$ —	\$ 41,650	\$ 41,650	\$ (9,894 )

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(1) The amounts of our 42.5% proportionate share of net income as shown in the table above differ from mathematical calculations of the Company's 42.5% equity interest in Tinum Group multiplied by the amounts of Net Income available to Class A members as shown in the table above of Tinum Group results of operations due to adjustments related to the Class B preferred return and the elimination of Tinum Group earnings attributable to RCM6, of which we owned 24.95%, for the period from January 1 to March 3, 2016 and for the years ended December 31, 2015 and 2014.

Tinum Group's consolidated financial statements as of December 31, 2016 and 2015, and for the years ended December 31, 2016, 2015 and 2014 are included in Item 15 of this Report.

Equity earnings from our interest in Tinum Services decreased by \$0.3 million in 2016 as compared to 2015 primarily due to a decrease in the number of RC facilities being operated by Tinum Services throughout the year. The weighted-average number of RC facilities for which Tinum Services provided operating and maintenance services, based upon the number of months each facility was operated during the respective years, decreased year over year. As of December 31, 2016 and 2015, Tinum Services provided operating and maintenance services to 13 and 14 RC facilities, respectively. Tinum Services derives earnings from both fixed-fee arrangements as well as fees that are tied to actual RC production, depending upon the specific RC facility operating and maintenance agreement. The reduction in operating facilities during the year ended December 31, 2016 compared to the year ended December 31, 2015 was due to suspending operations on retained facilities to reduce operating expenses.

During February 2014, we purchased a membership interest in RCM6 and recognized equity method losses in all subsequent reporting periods resulting from the operation of the RC facility owned by RCM6; although, RCM6 produced and sold RC, which generated tax credits and tax benefits that were available to us. Equity losses from our interest in RCM6 decreased during the year ended December 31, 2016 compared to the year ended December 31, 2015 due to the sale of our 24.95% membership interest in RCM6 on March 3, 2016 for a cash payment of \$1.8 million and assumption by the buyer of the outstanding note payable made by us in connection with our purchase of RCM6 membership interests from Tinum Group in February 2014. As a result of the sale, we are no longer a member of RCM6 and are no longer subject to any quarterly capital calls and variable payments to RCM6.

We earned the following tax credits that may be available for future benefit related to the production of RC from the operation of retained RC facilities:

	Years Ended	
	December 31,	
(in thousands)	2016	2015
Section 45 tax credits earned	\$2,956	\$38,998

The decrease in production and sale of RC, and the related tax credits earned during the year ended December 31, 2016 compared to December 31, 2015 was due to the suspension of retained RC facilities, as described above.

As discussed in Item 1 of this Report, Tinum Group operates and leases or sells facilities used in the production and sale of RC to third party tax equity investors. All dispositions of such facilities are treated as sales for federal income tax purposes at Tinum Group. The resulting gain from these sales is reported by Tinum Group pursuant to the installment method under IRC Section 453. As of December 31, 2016, ADES's allocable share of the gross deferred installment gain from Tinum Group to be recognized in future years is approximately \$204 million.

Due to the production and sale of RC from the operation of retained RC facilities, Tinum Group has generated PTCs under IRC Section 45 and IRC Section 38. These Section 45 and Section 38 tax credits qualify as General Business Credits ("GBC"). These GBC's are allocated to the owners of Tinum Group, including us, who may benefit to the extent that the GBC's are realized from the operation of retained RC facilities. As of December 31, 2016, we had approximately \$99.9 million in GBC carryforwards and \$31.7 million of federal net operating loss ("NOL's") carryforwards. Unused NOL's and GBC's may be carried forward 20 years from the tax year in which they are generated.

In the hypothetical event of an ownership change, as defined by IRC Section 382, utilization of the NOL's and tax credits generated prior to the change would be subject to an annual limitation imposed by IRC Section 382 for NOL's and IRC Section 383 for tax credits. The results of a recent analysis indicated that we had not experienced an ownership change as of December 31, 2016, as defined by IRC Section 382. Such analysis for the period from January

1, 2017 through the date of this filing has not been completed. Therefore, it is possible that we experienced an ownership change between January 1, 2017 and the date of this filing, thus subjecting our NOL and GBC carryforwards to limitation. Should a limitation exist, however, we would likely be in a position to substantially increase the limitation amount by virtue of our approximately \$204 million deferred installment sale gain at Tinium Group.

Specifically, IRC Section 382 provides that a corporation with a net unrealized built-in gain ("NUBIG") immediately before an ownership change may increase its limitation by the amount of recognized built-in gain ("RBIG") arising from the sale of a built-in gain asset during a recognition period, which is generally the five-year period immediately following an ownership

change. Built-in gain reported on the installment sale method that is attributable to assets sold by the corporation before or during the recognition period may increase the corporation's limitation during and after the recognition period. Therefore, it is likely that any IRC Section 382 limitation imposed upon an ownership change may be increased by our share of RBIG from Tinum Group's installment sale gain attributable to RC facilities sold before or during the period in which the change in ownership occurred.

There are numerous assumptions that must be considered in calculating the RBIG related to Tinum Group and the increase to our IRC Section 382 limitation. Assuming the following assumptions below, we may be able to increase the total limitation by approximately \$204 million over the duration of the installment sale. As of December 31, 2016, after increasing the total hypothetical limitation, we would likely not have been able to utilize \$10 million of tax credits.

- The Tinum Group RBIG is a result of the sale of RC facilities by Tinum Group and its election to utilize the installment sale method for tax purposes;
- Investors in RC facilities will not terminate existing contracts as completion of an installment sale transaction is necessary to realize RBIG;
- We have no net unrealized built-in loss to offset the NUBIG from Tinum Group;
- Our RBIG is equal to the deferred gain allocated from Tinum Group or, approximately \$204 million;
- We will have a NUBIG immediately before a hypothetical ownership change such that the Tinum Group RBIG is available to increase the IRC Section 382 limitation;
- We will continue our historic business operations for at least two years following a hypothetical ownership change; and
- A second ownership change does not occur.

The annual limitation will be increased by the amount of RBIG that is included in taxable income each year.

Additional information related to equity method investments can be found in Note 7 to the Consolidated Financial Statements included in Item 8 of this Report.

#### Royalties, related party

During the years ended December 31, 2016 and 2015, there were 16.2 million tons and 22.0 million tons, respectively, of RC produced using M-45™ and M-45-PC™ technologies, which Tinum Group licenses from us. The decrease was primarily due to a decrease in the number of RC facilities producing RC with our technologies, specifically the suspension of retained operations at facilities during the fourth quarter of 2015 and the first quarter of 2016 to reduce operating expenses and a decrease in the tons of refined coal produced. Additionally, as the royalties are earned on a percentage of the per-ton, pre-tax margin net of certain allocable operating expenses related to the lease or sale of an invested RC facility, which produces and sells RC using the M-45 License, the increase in operating expenses of Tinum Group due to payments made to secure the location for an RC facility, while waiting to sell or lease the project to a tax equity investor, also decreased the royalty we earned. As a result of increases in the average number of invested facilities, we anticipate that 2017 royalties will increase from the level of 2016 royalties.

#### Interest expense

During the year ended December 31, 2016 interest expense decreased compared to the year ended December 31, 2015 due to a decrease in 453A interest and the elimination of the RCM6 note payable. These decreases were \$2.1 million and \$2.2 million, respectively, for the year ended December 31, 2016 compared to 2015. These decreases were offset by an increase in interest expense of \$0.7 million related to the credit agreement for a \$15.0 million short-term loan with a related party (the "Credit Agreement"), which was entered into during the fourth quarter of 2015 and was paid off as of June 30, 2016.

During the year ended December 31, 2016 compared to 2015, there was an increase in RC facilities in which Tinuum Group recognized installment sales for tax purposes from 12 to 13. IRC section 453A requires taxpayers using the installment method to pay an interest charge on the portion of the tax liability that was deferred under the installment method.

The following table shows the balance of the tax liability that has been deferred and the applicable interest rate to calculate section 453A interest:

(in thousands)	As of December 31,	
	2016	2015
Tax liability deferred on installment sales <sup>(1)</sup>	\$71,559	\$111,905
Interest rate	4.00 %	4.00 %

(1) Represents the approximate tax effected liability related to the deferred gain on installment sales (approximately \$204 million as of December 31, 2016).

#### Revision of estimated litigation settlement and royalty indemnity expense, net

During the fourth quarter of 2016, management revised its estimate for future Royalty Award payments based on an updated forecast provided to the Company by a former equity method investment for which we are required to pay additional damages related to certain future revenues generated from the former equity method investment. This forecast included a material reduction in estimated future revenues generated at the specific activated carbon plant from which the royalties are generated. Based primarily on the updated forecast, management recorded a \$4.0 million reduction to its Royalty Award accrual as of December 31, 2016.

During the year ended December 31, 2016, we recorded an expense for the estimated payment of monetary penalties in connection with the SEC Inquiry in the amount of \$0.5 million. For additional details related to both of these matters, see Note 14 of the Consolidated Financial Statements included in Item 8 of this Report.

#### Other

##### Gain on sale of equity method investment

On March 3, 2016, we sold our 24.95% membership interest in RCM6 for a cash payment of \$1.8 million and the assumption, by the buyer, of the note payable, which we entered into in connection with our purchase of RCM6 membership interests from Tinum Group in February 2014. The outstanding balance on the note payable at the time of the sale was \$13.2 million. With the sale of our membership interest in RCM6, we recognized a gain on the sale of \$2.1 million, which is included within the Other line item in the Consolidated Statements of Operations for the year ended December 31, 2016.

##### Gain on settlement of note payable

As of December 31, 2014, we terminated the consulting portion of our agreements with the DSI Business Owner. Originally, we were required to make all remaining payments, structured as a note payable, through the third quarter of 2017. In February 2016, we entered into an agreement with the DSI Business Owner to settle the remaining amounts owed of approximately \$1.1 million for a one-time payment of \$0.3 million. The one-time payment was made during the first quarter of 2016, and we recognized a gain of approximately \$0.9 million, which is included in the Other line item in the Consolidated Statements of Operations for the year ended December 31, 2016.

##### Gain on settlement of licensed technology obligation

On June 15, 2016, we entered into an agreement with Highview to terminate a license agreement in exchange for a one-time payment by us of £0.2 million (approximately \$0.2 million). According to the agreement, this payment will only be made upon the sale of our shares in Highview to satisfy the liability. As a result of terminating this license agreement, we eliminated the licensed technology asset, reduced the corresponding long-term liability to the amount of the one-time payment, and recognized a gain of approximately \$0.2 million, which is included in the Other line item in the Consolidated Statements of Operations for the year ended December 31, 2016.

##### Impairment of cost method investment

As of December 31, 2016, we estimated the fair value of the cost method investment based upon an anticipated equity raise by Highview at a price of £2.00 per share, which was less than our cost per share of £4.25. As a result, we

recorded an impairment charge of \$1.8 million, which is included in the Other line item in the Consolidated Statements of Operations for the year ended December 31, 2016.

Gain on lease termination

On September 30, 2016, we and the lessee terminated a sale-type lease, and we recorded a lease termination fee of \$3.6 million, which was in excess of the carrying value of the net investment in sales-type lease of \$2.7 million. As a result of this lease termination, we recognized a gain of \$0.9 million, which is included in the Other line item in the Consolidated Statements of Operations for the year ended December 31, 2016.

#### Income tax (benefit) expense

As of December 31, 2016 and 2015, we had a valuation allowance recorded of \$75.9 million and \$148.3 million, respectively, against our deferred tax assets. During 2016, we recorded an income tax benefit of \$60.9 million compared to an income tax expense of zero for 2015. The income tax benefit for 2016 primarily reflects a \$61.4 million reversal of the valuation allowance of our deferred tax assets.

Accounting for income taxes requires that companies assess whether a valuation allowance should be recorded against their deferred tax asset based on an assessment of the amount of the deferred tax asset that is “more likely than not” to be realized. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount that is more likely than not to be realized.

We assess the valuation allowance recorded against deferred tax assets at each reporting date. The determination of whether a valuation allowance for deferred tax assets is appropriate requires the evaluation of positive and negative evidence that can be objectively verified. Consideration must be given to all sources of taxable income available to realize the deferred tax asset, including, as applicable, the future reversal of existing temporary differences, future taxable income forecasts exclusive of the reversal of temporary differences and carryforwards, taxable income in carryback years and tax planning strategies. In estimating taxes, we assess the relative merits and risks of the appropriate tax treatment of transactions taking into account statutory, judicial, and regulatory guidance.

We have historically recorded a valuation allowance for all of our deferred tax assets primarily due to a historical three-year cumulative loss position. However, we concluded that, as of December 31, 2016, it is more likely than not we will generate sufficient taxable income within the applicable NOL and tax credit carry-forward periods to realize \$61.4 million of our net deferred tax assets and, therefore, reversed the valuation allowance by this amount. This conclusion was reached after weighing all of the evidence and determining that the positive evidence outweighed the negative evidence. The positive evidence considered by management in arriving at its conclusion to partially reverse the valuation allowance includes factors such as the emergence from the previous three-year cumulative loss position during the fourth quarter of 2016, achievement of four consecutive quarters of profitability and forecasts of continued future profitability under several potential scenarios derived from currently contracted business within the RC segment. We believe these factors support the partial utilization of deferred tax assets attributable to temporary differences that do not expire and NOLs and tax credits prior to their expiration between 2031 through 2036.

The ability to recognize the remaining deferred tax assets that continue to be subject to a valuation allowance is evaluated on a quarterly basis to determine if there are any significant events that would affect the ability to utilize those deferred tax assets.

Our conclusion that it more likely than not that \$61.4 million of net deferred tax assets will be realized is based, among other considerations, on management’s estimate of future taxable income. Our estimate of future taxable income is based on internal projections which consider historical performance, multiple internal scenarios and assumptions, as well as external data that we believe is reasonable. If events are identified that affect our ability to utilize our deferred tax assets, the analysis will be updated to determine if any adjustments to the valuation allowance are required. If actual results differ significantly from the current estimates of future taxable income, even if caused by adverse macro-economic conditions, the remaining valuation allowance may need to be increased. Such an increase could have a material adverse effect on our financial condition and results of operations. Conversely, better than expected results and continued positive results and trends could result in further releases to the deferred tax valuation allowance, and any such decreases could have a material positive effect on our financial condition and results of operations.

See additional discussion in Note 16 of the Consolidated Financial Statements included in Item 8 of this Report.



Year ended December 31, 2015 Compared to Year ended December 31, 2014

### Total Revenue and Cost of Revenue

A summary of the components of revenues and costs of revenue for the years ended December 31, 2015 and 2014 is as follows:

(in thousands except percentages)	Years Ended December 31,		Change	
	2015	2014	(\$)	(%)
Revenues:				
Equipment sales	\$60,099	\$12,044	\$48,055	399 %
Chemicals	888	391	497	127 %
Consulting services and other	1,752	4,488	(2,736 )	(61 )%
Total revenues	62,739	16,923	45,816	271 %
Operating expenses:				
Equipment sales cost of revenue, exclusive of depreciation and amortization	45,433	9,277	36,156	390 %
Chemicals cost of revenue, exclusive of depreciation and amortization	601	140	461	329 %
Consulting services and other cost of revenue, exclusive of depreciation and amortization	1,518	2,203	(685 )	(31 )%

### Equipment sales and Equipment sales cost of revenue

During the years ended December 31, 2015 and 2014, we entered into four and 25 long-term (six months or longer) fixed price contracts to supply ACI systems with aggregate contract values including change orders of \$5.5 million and \$35.8 million, respectively. The total value per contract may change due to the relative sizes of ACI systems and the contracts related thereto. During the years ended December 31, 2015 and 2014, we completed 32 and 15 ACI systems, recognizing revenues of \$51.7 million and \$11.1 million and cost of revenue of \$38.4 million and \$8.1 million, respectively. We recognized \$0.1 million and zero in loss provisions related to ACI systems contracts during the years ended December 31, 2015 and 2014, respectively.

During the years ended December 31, 2015 and 2014, we entered into one and 13 long-term (6 months or longer) fixed price contracts to supply DSI systems and other material handling equipment with contract values including associated change orders of \$2.4 million and \$10.9 million, respectively. Total value per contract may change due to the relative sizes of DSI systems and the contracts relate thereto. During the years ended December 31, 2015 and 2014, we completed seven and two DSI systems and two and five other material handling equipment systems, recognizing revenues of \$7.2 million and \$0.6 million and cost of revenue of \$5.9 million and \$0.8 million, respectively. Due to potential cost overruns related to certain DSI projects, we expect that the future relationship between revenues and costs may be dissimilar from prior results. We recognized \$0.2 million and \$0.3 million in loss provisions related to DSI systems contracts during the years ended December 31, 2015 and 2014, respectively.

The remaining changes were due to other equipment projects.

Demand for ACI and DSI system contracts during 2014 and 2015 was primarily driven by coal-fired power plant utilities that needed to comply with MATS and MACT standards by 2015 or 2016. Revenues related to ACI and DSI system contracts fluctuated due to changes in the number of contracts executed as well as the timing of revenue recognition on contracts, which is based on substantial completion of the contracts, due to long-lead time requirements for manufacturing, installation and testing of the equipment. Sales of ACI and DSI equipment continued to decrease in 2015 as many of the respective utilities had already reached the date at which they needed to comply with the MATS and MACT standards.

### Chemicals and Chemicals cost of revenue

During the years ended December 31, 2015 and 2014, the most significant component of Chemicals revenues and Chemicals cost of revenue were chemical sales related to EC technologies. Revenues increased year over year due to an increase in average contract revenue. The increase in revenues was also due to our increased focus on selling these products to coal-fired power plants to be in compliance with applicable regulations.

Consulting services and other and Consulting services cost of revenue

We provided consulting services related to emissions regulations. Revenues decreased year over year due to a decrease in average contract revenue, driven by smaller scale consulting contracts with new customers in 2015 and our reduction in force of personnel providing consulting services.

Additional information related to revenue concentrations and contributions by class and reportable segment can be found in Note 18 to the Consolidated Financial Statements included in Item 8 of this Report.

Other Operating Expenses

A summary of the components of our operating expenses, exclusive of cost of revenue items (presented above), for the years ended December 31, 2015 and 2014 is as follows:

(in thousands, except percentages)	Years Ended		Change	
	2015	2014	(\$)	(%)
Operating expenses:				
Payroll and benefits	\$23,589	\$20,767	\$2,822	14 %
Rent and occupancy	3,309	2,468	841	34 %
Legal and professional fees	16,604	14,430	2,174	15 %
General and administrative	6,104	6,066	38	1 %
Research and development, net	5,362	1,521	3,841	253 %
Depreciation and amortization	2,019	1,865	154	8 %
Total operating expenses	\$56,987	\$47,117	\$9,870	21 %

Payroll and benefits

Payroll and benefits expenses increased in 2015 compared to 2014 due to an increase in restructuring expenses, including the modification and acceleration of equity awards during 2015 in connection with the departure of certain executive officers and management's alignment of the business with strategic objectives. Restructuring expenses recorded during 2015 were \$8.5 million compared to \$3.5 million in 2014, of which \$3.4 million was due to the accelerated vesting of modified equity-based compensation awards for certain terminated employees. Incentive compensation in 2015 compared to 2014 also increased by \$0.6 million due to bonuses awarded during 2015. These increases were offset by a decrease in overall and executive headcount by approximately 30% related to the reduction in force and management's realignment of the business.

Rent and occupancy

Rent and occupancy expenses increased in 2015 compared to 2014 primarily due to \$0.8 million in lease termination costs incurred in 2015 associated with the BCSI facility closure and an increase in insurance expense. These increases were partially offset by the termination of a lease relating to warehouse space in the third quarter of 2015 resulting in a \$0.1 million reduction of expense.

Legal and professional fees

Legal and professional fees expenses increased by \$2.2 million in 2015 compared to 2014 as a result of the significant professional resources deployed to address the Restatement, including the SEC Inquiry, which individually increased expenses by \$3.3 million, resulting in total 2015 Restatement expenses of \$9.5 million. Other increases related to legal fees of \$0.8 million and consulting fees of approximately \$2.7 million most significantly related to strategic advisory services and information technology services. These increases were offset by a \$3.7 million decrease in professional fees for a residual payment agreement with a former consultant who was involved in the development and deployment of RC technologies, and expenses related to the termination of the consulting agreement with the former owner of the DSI equipment assets acquired by BCSI. The remaining decrease of \$0.9 million was due to decreases in various other professional fees during 2015 compared to 2014.

General and administrative

General and administrative expenses increased in 2015 compared to 2014 primarily due to modest increases in general operating expenses.

Research and development, net

Research and development expenses increased in 2015 compared to 2014 mostly due to our investment in ADA Analytics. We recorded gross R&D expenses of \$6.7 million and \$3.6 million in 2015 and 2014, respectively, offset by reimbursements

received from the DOE and industry cost share partners of \$1.4 million and \$2.0 million, respectively. We incurred expenses related to our investment in ADA Analytics of \$2.6 million, of which \$1.9 million related to the impairment charge we recognized in the third quarter of 2015. Additionally, we incurred \$1.2 million related to a liquefied natural gas project that we assisted in funding during 2015, which was subsequently terminated.

#### Depreciation and amortization

Depreciation and amortization expense increased in 2015 compared to 2014 due to amortization of the Highview technology license and asset additions.

#### Other Income (Expense), net

A summary of the components of our other income (expense), net for the years ended December 31, 2015 and 2014 is as follows:

(in thousands, except percentages)	Years Ended		Change	
	2015	2014	(\$)	(%)
Other income (expense):				
Earnings from equity method investments	\$8,921	\$42,712	\$(33,791)	(79)%
Royalties, related party	10,642	6,410	4,232	66%
Interest income	24	74	(50)	(68)%
Interest expense	(8,402)	(5,725)	(2,677)	47%
Other	494	26	468	1,800%
Total other income	\$11,679	\$43,497	\$(31,818)	(73)%

#### Earnings in equity method investments

The following table shows the equity method earnings, by investee, for the years ended December 31, 2015 and 2014:

(in thousands)	Years Ended		Change	
	2015	2014	(\$)	(%)
Earnings from Tinum Group	\$8,651	\$43,584	\$(34,933)	(80)%
Earnings from Tinum Services	4,838	3,625	1,213	33%
Loss from RCM6	(4,568)	(4,497)	(71)	2%
Earnings from equity method investments	\$8,921	\$42,712	\$(33,791)	(79)%

Earnings from equity method investments decreased in 2015 compared to 2014 primarily due to decreases in cash distributions from Tinum Group. The weighted-average number of invested RC facilities, based upon the number of months each facility was invested during the respective years, increased year over year. The number of invested RC facilities that were generating rental income as of December 31, 2015 and 2014, were 12 and 12, respectively. The weighted-average number of retained RC facilities, based upon the number of months each facility was retained during the respective years, increased year over year. However, the number of retained RC facilities that were producing and selling RC and generating Section 45 tax credits and other tax benefits as of December 31, 2015 and 2014, were two and five, respectively. During the fourth quarter of 2015, Tinum Group suspended full-time operation of three retained RC facilities.

We recognized \$8.7 million and \$43.6 million of equity earnings from Tinum Group for the years ended December 31, 2015 and 2014 compared to our proportionate share of Tinum Group's net income of \$35.3 million and \$26.6 million, respectively. The difference between our pro-rata share of Tinum Group's net income and our earnings from our Tinum Group equity method investment as reported on our Condensed Consolidated Statements of Operations relates to us receiving distributions in excess of the carrying value of the investment during prior periods, and therefore recognizing such excess distributions as equity method earnings in the period the distributions occur.



The following table for Tinum Group shows our investment balance, equity earnings, cash distributions received and cash distributions in excess of the investment balance for the years ended December 31, 2015 and 2014 (in thousands):

Description	Date(s)	Investment balance	ADES equity earnings (loss)	Cash distributions	Memorandum Account: Cash distributions and equity loss in (excess) of investment balance
Beginning balance	12/31/2013	\$ —	\$ —	\$ —	\$ (12,906 )
ADES proportionate share of net income from Tinum Group <sup>(1)</sup>	2014 activity	26,613	26,613	—	—
Recovery of cash distributions in excess of investment balance (prior to cash distributions)	2014 activity	(12,906)	(12,906)	—	12,906
Cash distributions from Tinum Group	2014 activity	(43,584)	—	43,584	—
Adjustment for current year cash distributions in excess of investment balance	2014 activity	29,877	29,877	—	(29,877 )
Total investment balance, equity earnings (loss) and cash distributions	12/31/2014	—	43,584	43,584	(29,877 )
ADES proportionate share of net income from Tinum Group <sup>(1)</sup>	2015 activity	35,265	35,265	—	—
Recovery of cash distributions in excess of investment balance (prior to cash distributions)	2015 activity	(29,877)	(29,877)	—	29,877
Cash distributions from Tinum Group	2015 activity	(8,651)	—	8,651	—
Adjustment for current year cash distributions in excess of investment balance	2015 activity	3,263	3,263	—	(3,263 )
Total investment balance, equity earnings (loss) and cash distributions	12/31/2015	\$ —	\$ 8,651	\$ 8,651	\$ (3,263 )

(1) The amounts of our 42.5% proportionate share of net income as shown in the table above differ from the mathematical calculations of our 42.5% equity interest in Tinum Group multiplied by the amounts of Net Income available to Class A members as shown in the table above of Tinum Group's results of operations due to adjustments related to the Class B preferred return and the elimination of Tinum Group's earnings attributable to RCM6, of which we owned 24.95% during the years ended December 31, 2015 and 2014.

Tinum Group distributed \$8.7 million in cash during 2015, which we recognized as equity method earnings, compared to distributions and earnings of \$43.6 million during 2014. As of December 31, 2015, our cumulative distributions exceeded our proportionate share of Tinum Group's cumulative earnings by approximately \$3.3 million.

While Tinum Group recognized \$87.3 million in earnings allocable to Class A shareholders during 2015, of which our proportionate share totaled approximately \$35.3 million, Tinum Group's distributions were severely limited and restricted, primarily by capital expenditures, changes in working capital items and other requirements for cash to be retained within the business. As compared to distributions received in 2014, Tinum Group's distributions in 2015 were also limited by a reduction in the number of closings of sales or leases of RC facilities to new tax equity investors, in which closings generally include upfront purchase price payments that have historically been

immediately distributed to Tinum Group's equity owners, including us. A substantial portion of the 2014 distributions received from Tinum Group were due to such upfront purchase payments or lease payments that were received by Tinum Group as a result of closings of sales or leases of RC facilities to new tax equity investors.

Equity earnings from our interest in Tinum Services increased by \$1.2 million in 2015 compared to 2014, primarily due to an increase in the number of RC facilities being operated by Tinum Services during 2015. The weighted-average number of RC facilities for which Tinum Services provided operating and maintenance services, based upon the number of months each facility was operated during the respective years, increased year over year. As of December 31, 2015 and 2014, Tinum Services provided operating and maintenance services to 14 and 17 RC facilities, respectively. Tinum Services derives earnings both from fixed-fee arrangements as well as fees that are tied to actual RC production, depending upon the specific RC facility operating and maintenance agreement.

During February 2014, we purchased a membership interest in RCM6 and recognized equity method losses during the years ended December 31, 2015 and 2014 resulting from the production and sale of RC from the RC facility owned by RCM6, which also generated tax credits and tax benefits available to us.



Although all of our deferred tax assets had a full valuation allowance recorded against them as of December 31, 2015 and 2014, we earned, through our ownership in Tinum Group, the following Section 45 tax credits, which may be available for future benefit related to the operation of retained RC facilities:

(in thousands)	Years Ended	
	December 31,	
	2015	2014
Section 45 tax credits earned	\$38,998	\$25,817

#### Royalties, related party

During the years ended December 31, 2015 and 2014, there were 22.0 million tons and 12.4 million tons of RC produced, respectively, using M-45™ and M-45-PC™ technologies, which Tinum Group licenses from us, which resulted in a 66% increase in our income from royalties from the M-45 license. Certain of the RC facilities that were operating in 2015 were retained facilities that were producing RC for the benefit of Tinum Group and its owners. Effective in the fourth quarter of 2015, some of these facilities were idled pending the sale or lease to tax equity investors.

#### Interest expense

Interest expense increased in 2015 compared to 2014 by \$1.3 million primarily due to the increase in RC facilities in 2015 from 11 to 12 on which Tinum Group recognized installment sales for tax purposes and an increase in the interest rate. IRC section 453A requires taxpayers using the installment method to pay an interest charge on the portion of the tax liability that was deferred under the installment method. The following table shows the balance of the tax liability that has been deferred and the applicable interest rate to calculate section 453A interest:

(in thousands)	As of December 31,			
	2015		2014	
Tax liability deferred on installment sales <sup>(1)</sup>	\$111,905		\$120,129	
Interest rate	4.00	%	3.00	%

(1) Represents the approximate tax effected liability related to the deferred gain on installment sales (approximately \$336 million as of December 31, 2015).

Additionally, interest expense increased by \$0.2 million and \$1.2 million related to the note payable used to finance our purchase of RCM6 in February 2014 and the Credit Agreement entered into in the fourth quarter of 2015, respectively.

#### Income tax (benefit) expense

We did not recognize any federal income tax expense (benefit) during the years ended December 31, 2015 or 2014 as a result of recording full valuation allowances against all of our net deferred tax assets in all jurisdictions. However, we did recognize state income tax expense for the years ended December 31, 2015 and 2014 of zero and \$0.3 million, respectively.

#### Business Segments

As of December 31, 2016, we have two reportable segments: (1) RC; and (2) EC.

The business segment measurements provided to and evaluated by our chief operating decision maker ("CODM") are computed in accordance with the principles listed below:

The accounting policies of the operating segments are the same as those described in the summary of significant accounting policies except as described below.

Segment revenue includes equity method earnings and losses from our equity method investments. Segment revenue also includes royalty earnings from Tinum Group and income related to sales-type leases.

Segment operating income (loss) includes the equity method earnings and losses from our equity method investments, royalty earnings from Tinum Group (including depreciation and amortization expense) and gains related to sales of

equity method investments. However, segment operating income (loss) excludes Payroll and benefits, Rent and occupancy, Legal and professional fees, and General and administrative ("Corporate general and administrative expenses") unless otherwise specifically included, as the Company does not allocate those amounts between segments.

▲All items not included in operating income, except as noted below, are excluded from the RC and EC segments.

The principal products and services of our segments are:

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RC - Our RC segment derives its earnings from equity method investments as well as royalty payment streams and other revenues related to enhanced combustion of and reduced emissions of both NO<sub>x</sub> and mercury from the burning of RC. Our equity method investments related to the RC segment include Tinium Group, Tinium Services and, through March 3, 2016, RCM6. Segment revenues includes equity method earnings (losses) from our equity method investments and royalty earnings from Tinium Group. These earnings are included within the Earnings

1. from equity method investments and Royalties, related party line items in the Consolidated Statements of Operations included in Item 8 of this Report. Key drivers to RC segment performance are operating and retained produced and sold RC, royalty-bearing RC produced, lease and sale revenue, and the number of operating (leased or sold) and retained RC facilities. These key drivers impact our earnings and cash distributions from equity method investments.

EC - Our EC segment includes revenues and related expenses from the sale of ACI and DSI equipment systems, chemical sales consulting services and chemical and other sales related to the reduction of emissions in the coal-fired electric generation process and the electric utility industry. The fabrication of ACI systems is largely

2. dependent upon third-party manufacturers. We historically fabricated DSI systems through our subsidiary BCSI, however, we closed the fabrication facility during the fourth quarter of 2015 and future fabrication will occur through the use of third party manufacturers. These amounts are included within the respective revenue and cost of revenue line items in the Consolidated Statements of Operations included in Item 8 of this Report.

Management uses segment operating income (loss) to measure profitability and performance at the segment level. Management believes segment operating income (loss) provides investors with a useful measure of our operating performance and underlying trends of the businesses. Segment operating income (loss) may not be indicative of our overall consolidated performance and therefore, should be read in conjunction with our Consolidated Results of Operations.

The following table presents our operating segment results for the years ended December 31, 2016, 2015 and 2014:

(in thousands)	Years Ended December 31,			Change	
	2016	2015	2014	(\$)	(\$)
Revenues:					
Refined Coal:					
Earnings in equity method investments	\$45,584	\$8,921	\$42,712	\$36,663	\$(33,791)
Consulting services	—	55	665	(55)	(610)
Royalties, related party	6,125	10,642	6,410	(4,517)	4,232
	51,709	19,618	49,787	32,091	(30,169)
Emissions Control:					
Equipment sales	46,949	60,099	12,044	(13,150)	48,055
Chemicals	3,025	888	391	2,137	497
Consulting services	648	1,697	3,823	(1,049)	(2,126)
	50,622	62,684	16,258	(12,062)	46,426
Total segment reporting revenues	\$102,331	\$82,302	\$66,045	\$20,029	\$16,257
Adjustments to reconcile to reported revenues:					
Refined Coal:					
Earnings in equity method investments	\$(45,584)	\$(8,921)	\$(42,712)	(36,663)	33,791
Royalties, related party	(6,125)	(10,642)	(6,410)	4,517	(4,232)
	(51,709)	(19,563)	(49,122)	(32,146)	29,559
Total reported revenues	50,622	62,739	16,923	(12,117)	45,816
Segment reporting operating income (loss)					
Refined Coal <sup>(1)</sup>	\$51,264	\$12,131	\$42,094	\$39,133	\$(29,963)
Emissions Control <sup>(2)</sup>	7,334	(7,583)	(13,348)	14,917	5,765
Total segment operating income	\$58,598	\$4,548	\$28,746	\$54,050	\$(24,198)

(1) Included within the RC segment operating income for the year ended December 31, 2016 is a \$2.1 million gain on the sale of RCM6. Also included within the RC segment operating income for the years ended December 31, 2016, 2015, and 2014 is 453A interest expense of \$2.5 million, \$4.6 million and \$3.4 million respectively, and interest expense related to the RCM6 note payable of \$0.3 million, \$2.5 million and \$2.2 million, respectively.

(2) Included within the EC segment operating income for the year ended December 31, 2016 is a \$0.9 million gain related to a termination of a sales-type lease.

A reconciliation of segment operating income to consolidated net income (loss) is included in Note 17 of the Consolidated Financial Statements included in Item 8 of this Report.

## RC

The following table details the segment revenues of our respective equity method investments for the years ended December 31, 2016, 2015 and 2014:

(in thousands)	Year ended December 31,		
	2016	2015	2014
Earnings from Tinnium Group	\$41,650	\$8,651	\$43,584
Earnings from Tinnium Services	4,491	4,838	3,625
Loss from RCM6	(557)	(4,568)	(4,497)
Earnings from equity method investments	\$45,584	\$8,921	\$42,712



RC earnings increased primarily due to increased equity earnings from Tinum Group during the year ended December 31, 2016 compared to the year ended December 31, 2015, as presented above. Our equity earnings increased primarily due to an increase in cash distributions from Tinum Group due to no significant RC facility installation costs in 2016 compared to 2015, as discussed in the consolidated results above. For the year ended December 31, 2016, Tinum Group's consolidated earnings decreased \$4.1 million from the comparable December 31, 2015 period due to a decrease in lease revenues driven by the reduced impact of the amortization of deferred revenues and changes in lease rates, which was partially offset by a reduction in cost of sales related to chemicals and royalties as well as a decrease in operating expenses related to the suspension of operations of all retained RC facilities in 2016.

As discussed above and in Note 7 of the Consolidated Financial Statements included in Item 8 of this Report, our earnings in Tinum Group may not equal our pro-rata share due to the accounting related to our equity method investment. As such, our earnings in Tinum Group increased by \$33.0 million during the year ended December 31, 2016 compared to the year ended December 31, 2015 due to \$46.2 million of cash distributions received that were in excess of our pro-rata share of cumulative earnings in Tinum Group.

RC earnings were positively impacted during the year ended December 31, 2016 due to lower operating losses associated with our RCM6 equity method investment, which was sold during the first quarter of 2016.

RC earnings were negatively impacted during the year ended December 31, 2016 by a decrease in earnings from Tinum Services primarily due to a decrease in the number of RC facilities being operated by Tinum Services, as discussed in the consolidated results above.

RC earnings were also negatively impacted during the year ended December 31, 2016 by a decrease in royalties related to Tinum Group's use of our M-45 License. During the year ended December 31, 2016 and 2015, there were 16.2 million tons and 22.0 million tons, respectively, of RC produced and sold using the M-45 License. The decrease in tonnage was due to a decrease in the per facility tonnage and a decrease in the number of RC facilities producing RC with our technologies, as well as an increase in certain RC facility operating expenses, as discussed in the consolidated results above.

RC segment operating income increased during the year ended December 31, 2016 compared to the same period in 2015. In addition to the impacts of RC earnings discussed above, RC segment operating income was positively impacted by a decrease in 453A interest expense. 453A interest expense decreased during the year ended December 31, 2016 due to a decrease in the tax liability being deferred as of December 31, 2016.

#### EC

Discussion of revenues derived from our EC segment and costs related thereto are included within our consolidated results in Item 8 of this Report.

EC segment operating income increased during the year ended December 31, 2016 compared to 2015 due to the earnings discussed within the consolidated results and decreases in operating expenses. Specifically, Payroll and benefits and Research and development expense, net decreased year over year by 5.7 million and \$6.0 million, respectively. Additionally, impacting the year over year change was an increase in operating income due to the settlement of the remaining amounts owed to the former DSI Business Owner, resulting in a reduction of segment expenses of \$0.9 million during the year ended December 31, 2016. Offsetting these items was the allowance recorded during the year ended December 31, 2015 of \$0.5 million related to a note receivable.

## Liquidity and Capital Resources

### Overview of Factors Affecting Our Liquidity

During 2016, our liquidity position was positively affected primarily due to distributions from Tinum Group and Tinum Services, a reduction in the operation of retained RC facilities, proceeds received from the sale of our interest in RCM6 and the elimination of the related note payable, the elimination of our short term borrowings as well as the ability to utilize our bank line of credit ("Line of Credit") to support certain letters of credit. As a result, our working capital position improved by \$40.6 million.

Our principal sources of liquidity currently include:

- cash on hand;
- cash provided by our operations, including the release of restricted cash;
- distributions from Tinum Group and Tinum Services;
- royalty payments from Tinum Group; and
- our Line of Credit.

In November 2016, we renegotiated the terms of our Line of Credit to update certain covenants and increase the borrowing amount to enable us to have borrowing capacity to provide short-term liquidity for operating purposes. From inception to the date of this amendment, we were unable to borrow on the Line of Credit as a result of not being in compliance with certain covenants. No borrowings were outstanding as of December 31, 2016 or December 31, 2015. A key provision in the terms of the amendment to the Line of Credit is the ability to use the facility to secure performance and other contractual and settlement obligations in lieu of pledging restricted cash, contingent upon our maintaining a minimum cash compensating balance and meeting certain financial metrics. At December 31, 2016, we held \$13.7 million in restricted cash, and \$3.0 million of this amount could potentially be released to unrestricted cash upon our fulfillment of the finalization of litigation matters, as discussed in Note 14 of the Consolidated Financial Statements included in Item 8 of this Report, as well as continued compliance with the applicable financial covenants. While such a release would be desirable, in the event we do not meet the conditions, we believe that our existing and forecasted liquidity from cash distributions and royalties as well as other expected operating results will result in cash flow and liquidity sufficient to fund our continuing operations.

Prior to June 2014, the Line of Credit was used primarily to provide collateral support for certain letters of credit that had been issued to customers related to certain contractual performance and payment guarantees, typically provided in lieu of surety bonds. Upon notification of covenant non-compliance related to the Line of Credit, we were required to secure such letters of credit with cash collateral. Additionally, we were required to provide collateral to other financial institutions that have issued letters of credit, providing security for continuing royalty indemnification obligations related to the settlement of certain litigation. The collateral amounts are disclosed on the Consolidated Balance Sheets as Restricted cash, Restricted cash, long-term and Investment securities, restricted, long-term. As of December 31, 2016 and December 31, 2015, these collateral amounts totaled \$13.7 million and \$12.0 million, respectively. No amounts were drawn on the Line of Credit through the date of this filing.

On March 3, 2016, we sold our entire ownership interest in RCM6. We received a cash payment of \$1.8 million related to the sale and have no future obligations related to previously recorded notes payable.

Our principal uses of liquidity during 2016 have included:

- our business operating expenses;
- payoff of the Credit Agreement;
- interest expense on the Credit Agreement, notes payable, and 453A interest;
- completion of the Restatement activities related to prior year financial statements;
- delivering on our existing contracts and customer commitments;
- corporate restructuring and realignment of our businesses; and
- royalty indemnification payments.

On June 30, 2016, we, the required lenders under the Credit Agreement and the Administrative Agent agreed to terminate the Credit Agreement, prior to the maturity date of July 8, 2016, and we paid the total principal balance of the loans and advances made to or for the benefit of us, together with all accrued but unpaid interest, and the total amount of all fees, costs, expenses and other amounts owed by us thereunder, including a prepayment premium. The agreement included a waiver by the lenders for a portion of the prepayment premium of 4% reflected in the Credit Agreement.

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In February 2016, we entered into an agreement with the DSI Business Owner to settle the remaining amounts owed to the DSI Business Owner as of the date of the agreement of approximately \$1.1 million for \$0.3 million, which was paid in the first quarter of 2016.

Our ability to continue to generate sufficient cash flow required to meet ongoing operational needs and to meet obligations depends upon several factors, including executing on our contracts and initiatives, receiving royalty payments from Tinum Group and distributions from Tinum Group and Tinum Services, and increasing our share of the market for EC products, and, in particular EC chemical revenues. Increased distributions from Tinum Group will likely be dependent upon both preserving existing contractual relationships and securing additional tax equity investors for those Tinum Group RC facilities that are currently not operating.

#### Sources and Uses of Cash

Year ended December 31, 2016 Compared to Year ended December 31, 2015

Cash, cash equivalents and restricted cash increased from \$21.0 million as of December 31, 2015 to \$26.9 million as of December 31, 2016, an increase of \$6.0 million. The following table summarizes our cash flows for the years ended December 31, 2016 and 2015, respectively.

(in thousands)	Years Ended		
	December 31,		
	2016	2015	Change
Cash provided by (used in):			
Operating activities	\$(18,257)	\$(29,869)	\$11,612
Investing activities	39,899	4,334	35,565
Financing activities	(15,671 )	10,029	(25,700 )
Net change in Cash and Cash Equivalents and Restricted Cash	5,971	(15,506 )	21,477

Additionally, the following table summarizes the cash flows of Tinum Group, whose cash distributions to us most significantly impact our consolidated cash flow results, for the years ended December 31, 2016 and 2015, respectively.

(in thousands)	Years Ended		
	December 31,		
	2016	2015	Change
Tinum Group cash, beginning of year	\$6,183	\$3,870	\$2,313
Cash provided by (used in):			
Operating activities	79,723	37,750	41,973
Investing activities	(2,846 )	(30,061)	27,215
Financing activities	(72,163 )	(5,376 )	(66,787)
Net change in cash	4,714	2,313	2,401
Tinum Group cash, end of year	\$10,897	\$6,183	\$4,714

#### Cash flow from operating activities

Cash flows used in operating activities reflect the operating losses as well as the timing of our working capital requirements, in addition to other items discussed herein.

Our cash expenditures for legal and professional fees for the year ended December 31, 2016 decreased from the comparable prior year primarily due to a reduction in the professional resources deployed to address the Restatement, which decreased by \$6.1 million from the year ended December 31, 2015.

Deferred revenue and project costs resulted in a change in a use of operating cash flows on a net basis of \$6.0 million due to production of ACI and DSI equipment systems.

A reduction in advanced deposits received related to royalty earnings from Tinum Group negatively impacted operating cash flows by \$3.0 million and \$3.5 million for the years ended December 31, 2016 and 2015, respectively. During the fourth quarter of 2016, we made a final payment of \$1.4 million to Tinum Group to repay in full the royalty advanced deposit.

Our operating cash flow may also be significantly impacted by distributions from our equity investees, which are classified as either a return on investment within operating cash flows or a return in excess of cumulative earnings within investing cash flows. During 2016, we received \$33.0 million more in total cash distributions from equity

method investees than we did in

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2015 due to the suspension of operations of retained RC facilities, a decrease in RC facility installations by Tinum Group and an increase in invested facilities.

Cash flow from investing activities

Maturity of investments in securities, restricted

We are required to provide collateral in the form of restricted cash for certain letters of credit for future payments related to royalty indemnification obligations and other payments as discussed in Note 14 of the Consolidated Financial Statements included in Item 8 of this Report. Cash is pledged as security for letters of credit in the same amount as the obligations. During 2016, we ceased to pledge investments to support these letters of credit and instead used restricted cash as necessary.

Acquisition and disposal of property and equipment, net

Acquisitions of property and equipment were \$0.3 million and \$0.5 million for the years ended December 31, 2016 and December 31, 2015, respectively.

Proceeds from the sale of property and equipment, net

Proceeds from the sale of property and equipment were \$0.1 million and \$0.9 million for the years ended December 31, 2016 and December 31, 2015, respectively. During 2015, we disposed of property and equipment related to the termination of manufacturing operations at our BCSI fabrication facility.

Advance on note receivable

In December 2014, we loaned \$0.5 million to an independent third party to provide financing for the pursuit of emissions technology projects, bearing annual interest of 8%. Interest and principal were payable at maturity of the agreement in June 2015. In March 2015, we loaned an additional \$0.5 million to the third party, also bearing annual interest at 8%. All interest and principal payments under both loans were then deferred until March 2018.

Acquisition of a business

During March 2015, we acquired certain assets of Clearview, which operated as ADA Analytics, for \$2.4 million cash, as described in Note 8 of the Consolidated Financial Statements included in Item 8 of this Report, \$2.1 million of which was paid during 2015, with the balance being paid in 2014. We acquired the in-process research and development assets of Clearview in order to potentially commercialize and expand our analytics services available to customers. However, in August 2015, as part of a broader strategic restructuring of our business to simplify our operating structure in a manner that creates increased customer focus, better supports sales and product delivery and also aligns our cost structure as the EC market shifts towards compliance solutions for the MATS, our management approved an action to wind down operations of ADA Analytics.

Equity method investment

On February 10, 2014, we purchased a 24.95% membership interest in RCM6, which owned a single RC facility that produced RC that qualified for Section 45 tax credits. As part of the purchase, we were subject to quarterly capital calls and variable payments based upon differences in originally forecasted RC production as of the purchase date and actual quarterly production. During the years ended December 31, 2016 and 2015, we funded capital calls and made variable payments of \$0.2 million and \$2.4 million, respectively.

Proceeds from sale of equity method investment

As discussed in Note 7 of the Consolidated Financial Statements included in Item 8 of this Report, we sold our investment in RCM6 in March 2016. Proceeds from the sale included \$1.8 million in cash and the assumption, by the buyer, of all unpaid amounts outstanding under the original note payable.

As discussed within the Results of Operations and the operating cash flow activities above, our investing cash flow may also be significantly impacted by the classification of cash distributions from equity method investees as either a return on investment within operating cash flows or a return in excess of investment basis within investing cash flows.

Cash flow from financing activities

Short term borrowings

On June 30, 2016, we, the required lenders under the Credit Agreement and the Administrative Agent agreed to terminate the Credit Agreement, and we paid all outstanding amounts owed under the Credit Agreement of \$9.9 million. During the year ended December 31, 2016, we paid \$0.8 million in debt issuance costs related to the Second Amendment and amendment fees related to the Line of Credit. Additionally, during the year ended December 31, 2016, we paid a debt prepayment penalty of \$0.2 million due to paying off the Credit Agreement prior to maturity.



Notes payable activity

During the year ended December 31, 2016 and 2015 we used \$1.2 million and \$1.5 million cash, respectively, for repayments of principal on the RCM6 and the DSI Business Owner notes payable, as described in Note 9 of the Consolidated Financial Statements included in Item 8 of this Report.

Equity award activity

During the years ended December 31, 2016 and 2015, we used \$0.2 million and \$0.3 million, respectively, for the repurchase of shares to satisfy tax withholdings upon the vesting of equity based awards.

Year ended December 31, 2015 Compared to Year ended December 31, 2014

Cash, cash equivalents and restricted cash decreased from \$36.5 million as of December 31, 2014 to \$21.0 million as of December 31, 2015, a decrease of \$15.5 million, primarily due to an increase in expenses and cash expenditures for payroll and benefits, legal and professional fees and general and administrative costs. Additional decreases in cash were related to acquisitions of property and equipment, cost method investments and equity method investees of \$2.9 million, payment of settlement royalties of \$3.7 million, and payments related to extended equipment contracts of \$8.7 million.

(in thousands)	Years Ended		
	December 31,		
	2015	2014	Change
Cash provided by (used in):			
Operating activities	\$(29,869)	(40,161)	10,292
Investing activities	4,334	32,648	(28,314)
Financing activities	10,029	(1,565)	11,594
Net change in Cash and Cash Equivalents and Restricted Cash	(15,506)	(9,078)	(6,428)

Additionally, the following table summarizes the cash flows of Tinum Group, whose cash distributions to us most significantly impact our consolidated cash flow results, for the years ended December 31, 2016 and 2015, respectively.

(in thousands)	Years Ended		
	December 31,		
	2015	2014	Change
Tinum Group cash, beginning of year	\$3,870	\$11,663	\$(7,793)
Cash provided by (used in):			
Operating activities	37,750	83,633	(45,883)
Investing activities	(30,061)	(9,789)	(20,272)
Financing activities	(5,376)	(81,637)	76,261
Net change in cash	2,313	(7,793)	10,106
Tinum Group cash, end of year	\$6,183	\$3,870	\$2,313

Cash flow from operating activities

Cash flows used in operating activities reflect the timing of our working capital requirements, in addition to other items discussed herein.

Our cash expenditures for legal and professional fees our efforts related to the Restatement and the SEC Inquiry increased by \$2.9 million from the prior year primarily due to our efforts related to the Restatement and the SEC Inquiry.

Deferred revenue and project costs resulted in a change in the use of operating cash flows on a net basis of \$7.7 million due to production of ACI and DSI equipment systems.

A reduction in advanced deposits received related to royalty earnings from Tinum Group negatively impacted operating cash flows by \$3.5 million and \$2.1 million for the years December 31, 2015 and 2014, respectively.

Our operating cash flow may also be significantly impacted by distributions from our equity investees, which are classified as either a return on investment within operating cash flows or a return in excess of cumulative earnings within investing cash flows.



#### Cash flow from investing activities

##### Acquisition of property and equipment

Acquisitions of property and equipment were \$0.5 million in 2015. During 2015 and 2014, we used investing cash flows for the purchase of equipment and leasehold improvements.

##### Advance on note receivable

In December 2014, we loaned \$0.5 million to an independent third party to provide financing for the pursuit of emissions technology projects, bearing annual interest of 8%. Interest and principal were payable at maturity of the agreement in June 2015. In March 2015, we loaned an additional \$0.5 million to the third party, also bearing annual interest at 8%. All interest and principal payments on both loans were then deferred until March 2018. As of December 31, 2015, we had recorded an allowance against the entire principal balance of the note receivable outstanding, reversed accrued interest and put the note on non-accrual status.

##### Acquisition of a business

During March 2015, we acquired certain assets of Clearview, which operated as ADA Analytics, for \$2.4 million cash, \$2.1 million of which was paid in 2014. We acquired the in-process research and development assets of Clearview in order to potentially commercialize and expand our analytics services available to customers. However, in August 2015, as part of a broader strategic restructuring of our business to simplify our operating structure in a manner that creates increased customer focus, better supports sales and product delivery and also aligns our cost structure as the emissions control market shifts towards compliance solutions for MATS, our management approved an action to wind down operations of ADA Analytics.

##### Equity method and cost method investments

During 2015, there was a decrease in distributions from equity method investments presented within the investing section due to a decrease in year over year distributions in excess of cumulative earnings from Tinuum Group. During 2015 and 2014, all cash distributions from Tinuum Group were included within investing cash flows as returns of our equity investment in Tinuum Group.

On February 10, 2014, we purchased a 24.95% equity interest in RCM6 for consideration of \$2.4 million in cash and the execution of a \$13.3 million note payable. During the year ended December 31, 2015, we also funded capital calls and made variable payments of \$2.4 million.

In November 2014, we acquired an 8% interest in Highview for \$2.8 million.

#### Cash flow from financing activities

##### Short term borrowings and repayment of short term borrowings

In October 2015, we entered into the Credit Agreement from which we received net proceeds of \$13.5 million and recorded debt discounts and debt issuance costs of \$1.5 million. We made principal payments of \$1.8 million during 2015.

##### Equity award activity

During 2014, we received proceeds from the exercise of options. During 2015 and 2014, we repurchased shares from employees upon the vesting of equity awards or upon options being exercised to cover the minimum statutory tax withholdings.

##### Notes payable activity

During the years ended December 31, 2015 and 2014, we used \$1.5 million and \$0.2 million cash, respectively, for repayments of principal on the RCM6 and DSI Business Owner notes payable. Principal payments increased from 2014 to 2015, as we did not purchase RCM6 until the first quarter of 2014, and limited payments during 2014 were applied to the RCM6 note principal balance. Additionally, we did not terminate our consulting agreement with the DSI Business Owner until December 31, 2014, at which time the Company recorded a note payable for remaining amounts owed.

Contractual Obligations

Our contractual obligations as of December 31, 2016 are as follows:

(in thousands)	Payment Due by Period				
	Total	Less than 1 year	1-3 years	4-5 years	After 5 years
Operating leases (a)	787	290	442	55	—
Purchase obligations (b)	—	—	—	—	—
Settlement and royalty indemnification (c)	11,038	5,656	5,382	—	—
	\$11,825	\$5,946	\$5,824	\$ 55	\$ —

(a) In December 2016, the Company entered into an agreement to terminate its lease agreement covering approximately 37 thousand square feet of office space. Concurrently, the Company entered into a new lease agreement covering approximately 8 thousand square feet of office space. As a result, future minimum commitments under leases are reflective of the new lease commitment.

(b) Purchase obligations do not include commitments pursuant to subcontracts and/or other purchase orders related to equipment contracts since such amounts are expected to be funded under contract billings.

(c) Future cash payments related to the Royalty Award may differ from the payment amounts included within the above schedule due to actual future obligations not being equal to current estimates. If such differences were to occur, these changes would also impact our results of operations and financial condition.

We have not included obligations related to 453A interest payments due to uncertainty of amounts payable in future periods relating to matters impacting future obligations such as the balance deferred under the installment method at each future balance sheet date and changes in interest rates. If no additional RC facilities become invested in the future, the deferred gain balance would decrease and interest payments, assuming no changes in the applicable interest rate, would also decrease throughout the periods in the table above.

Outstanding letters of credit were issued in connection with equipment sales agreements, collateral support for future obligations due under the Royalty Award and other items. A summary of the information related to our letters of credit is as follows:

(in thousands)	Total Outstanding		Expiration of Letters of Credit as of December 31, 2016			
	As of December 31, 2016	As of December 31, 2015	Less than 1 year	1-3 years	4-5 years	After 5 years
Letters of credit	\$15,505	\$12,034	\$10,855	\$4,650	\$ —	\$ —

Additional information related to the letters of credit is included in Note 14 to the Consolidated Financial Statements included in Item 8 of this Report.

Off-Balance Sheet Arrangements

During 2016, 2015 and 2014, we did not engage in any off-balance sheet financing activities other than those included in the “Contractual Obligations” discussion above and those reflected in Note 14 to the Consolidated Financial Statements included in Item 8 of this Report.

Critical Accounting Policies and Estimates

Our significant accounting policies are discussed in Note 1 to the Consolidated Financial Statements included in Item 8 of this Report. In presenting our financial statements in conformity with U.S. GAAP, we are required to make estimates and assumptions that affect the amounts reported therein. Several of the estimates and assumptions we are required to make relate to matters that are inherently uncertain as they pertain to future events. Our estimates are based on historical experience and other assumptions believed to be reasonable under the circumstances, and we evaluate these estimates on an ongoing basis. Actual results may differ from these estimates under different assumptions or conditions.



We believe that the accounting estimates discussed below are critical to understanding our historical and future performance, as these estimates relate to the more significant areas involving management's judgments and estimates.

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### Revenue Recognition

We recognize revenue when: (i) persuasive evidence of a customer arrangement exists; (ii) the price is fixed or determinable; (iii) collectability is reasonably assured; and (iv) product delivery has occurred or services have been rendered and it is probable that performance guarantees, if any, will be met.

#### Equipment sales

We enter into contracts that require, over a period of months, the design and construction of emissions control systems ("extended equipment contracts"). Revenue from such extended equipment contracts is recorded using the percentage of completion, cost to cost method based on costs incurred to date compared with total estimated contract costs. However, if there is not sufficient information to estimate costs for extended equipment contracts, the completed contract method is used.

Under the completed contract method, revenues and costs from extended equipment contracts are deferred and recognized when contract obligations are substantially complete. We define substantially complete as delivery of equipment and start-up at the customer site, and, as applicable to DSI systems, the completion of any major warranty service. Such costs are accumulated in the Costs in excess of billings on uncompleted contracts line item in the Consolidated Balance Sheets included in Item 8 of this Report and typically include direct materials, direct labor and subcontractor costs, and indirect costs related to contract performance, such as indirect labor, supplies, tools and repairs. For each of the years ended December 31, 2016, 2015 and 2014, we did not have sufficient information to measure ongoing percentage of completion using a cost to cost method for our extended equipment contracts, and accordingly, the completed contract method of revenue recognition was used for each of these years and revenues, and costs are deferred until the equipment is placed into service and contract obligations are substantially complete. When multiple contracts exist with a single counterparty, we evaluate revenue recognition on a contract by contract basis. Provisions for estimated losses on uncompleted contracts are recognized when it has been determined that a loss is probable.

Costs of revenues include all labor, fringe benefits, subcontract labor, chemical and coal costs, materials, equipment, supplies, travel costs and any other costs and expenses directly related to the production of revenue. To the extent that they occur, we recognize estimated loss provisions related to contracts in the period that the potential loss is identified. In addition, warranty costs for ACI equipment systems are estimated based on historical experience and are recorded as a percentage of revenue when the equipment is substantially complete. Warranty costs, comprised of the cost of replacement materials and direct labor, are included within the Equipment sales cost of revenue line of the Consolidated Statements of Operations included in Item 8 of this Report.

Warranty costs for DSI equipment systems could not be estimated at the time the contracts were entered into due to a lack of historical experience manufacturing DSI systems and the resulting claims history, if any, needed to determine an appropriate warranty cost estimate. Therefore, revenue recognition has been deferred until the end of the warranty period, generally 12 to 24 months following substantial completion. As warranty claims are incurred, such costs are deferred within the Costs in excess of billings on uncompleted contracts line item in the Consolidated Balance Sheets included in Item 8 of this Report until such time that revenue and cost of revenues are recognized.

Additional details related to long-term equipment revenues are described in Note 1 of the Consolidated Financial Statements included in Item 8 of this Report.

#### Performance Guarantees on Equipment Systems

In the normal course of business related to ACI and DSI systems, we may guarantee certain performance thresholds during a discrete performance testing period that does not extend beyond six months from the initial test date, the commencement of which is determined by the customer. Performance thresholds include such matters as the achievement of a certain level of mercury removal and other emissions based upon the injection of a specified quantity of a qualified AC or other chemical at a specified rate given other plant operating conditions, availability of equipment and electric power usage. In the event the equipment fails to perform as specified during the testing period, we may have an obligation to correct or replace the equipment. In the event the level of emissions removal is not achieved, we may have a "make right" obligation within the contract limits. If incurred, guarantees are included within the Equipment sales cost of revenue line of the Consolidated Statements of Operations included in Item 8 of this Report. Resolution of these performance guarantees is not expected to result in a material adverse effect on our operating performance or liquidity in 2017 or beyond. However, we will defer revenues related to these two contracts

until the performance guarantee issues are resolved.

Additional details related to performance guarantees are described in Note 1 and Note 14 of the Consolidated Financial Statements included in Item 8 of this Report.

#### Royalty Award

The Royalty Award at December 31, 2016 totaled \$11.0 million, or 35% of total liabilities, and represents our estimate of the future obligations related to certain future revenues through the second quarter of 2018 generated from a former equity method investment as described in Note 14 of the Consolidated Financial Statements included in Item 8 of this Report. Our estimate is based upon projections of future revenues subject to the Royalty Award. It is reasonably possible that future revenues subject to the Royalty Award may be materially different from those currently projected and changes in estimates will impact our Consolidated Statements of Operations.

#### Stock-Based Compensation Expense

We grant certain executives PSU's that vest in equal installments over a period of three years subject to the grantee's continuous service with us. Each PSU represents a contingent right to receive shares of our common stock if we meet certain performance measures over the requisite period. Compensation expense is recognized for PSU awards on a straight-line basis over a three year service period based on the estimated fair value at the date of grant using a Monte Carlo simulation model. The Monte Carlo model determines the grant date fair value of the award based upon estimated stock performance compared to the projected relative placement of our total stockholder return ("TSR") for the award period. Approximately 75% of the award is based on the relative performance of our TSR performance compared to the respective TSR's of a specified group of peer companies and the remaining portion of the award is based on our TSR performance compared to the Russell 3000 Index. Different Monte Carlo simulation results could result in a different grant date fair value and could impact the share-based compensation expense we would recognize over the award period in our Consolidated Statements of Operations. Refer to Note 13 of our Consolidated Financial Statements included in Item 8 of this Report for additional information regarding our PSU awards.

We grant certain executives stock options that vest based on performance measures subject to the grantee's continuous service with us. Compensation expense is recognized for these options on a straight-line basis over the determinable service period based on the estimated fair value at the date of grant using a Black-Scholes model. Different estimates of key inputs in the Black-Scholes model such as the expected term of an option and the expected volatility of our stock price, as well as our estimate of the service period, could impact the share-based compensation expense we would recognize over the award period in our Consolidated Statements of Operations. Refer to Note 13 of our Consolidated Financial Statements included in Item 8 of this Report for additional information regarding our stock option awards.

#### Income Taxes

We account for income taxes as required by U.S. GAAP, under which management judgment is required in determining income tax expense and the related balance sheet amounts. This judgment includes estimating and analyzing historical and projected future operating results, the reversal of taxable temporary differences, tax planning strategies, and the ultimate outcome of uncertain income tax positions. Actual income taxes paid may vary from estimates, depending upon changes in income tax laws, actual results of operations, and the final audit of tax returns by taxing authorities. Tax assessments may arise several years after tax returns have been filed. Changes in the estimates and assumptions used for calculating income tax expense and potential differences in actual results from estimates could have a material impact on our results of operations and financial condition.

Deferred tax assets and liabilities are determined on the basis of the differences between the financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

We recognize deferred tax assets to the extent that we believe these assets are more likely than not to be realized. In making such a determination, we consider all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations.

Prior to the fourth quarter of 2016, we were historically in a tax net operating loss position in several jurisdictions in which we operate, including the U.S. federal jurisdiction, resulting in significant deferred tax assets. We establish a

valuation allowance against our deferred tax assets when, based upon the weight of all available evidence, we believe it is more likely than not that some portion or all of the deferred tax assets will not be realized. As of December 31, 2016 and 2015, we have established valuation allowances for our deferred tax assets that in our judgment will not be realized. In making this determination, we have considered the relative impact of all of the available positive and negative evidence regarding future sources of taxable income and tax planning strategies, including emergence from the previous three-year cumulative loss position, achievement of four consecutive quarters of profitability and forecasts of continued future profitability under several potential scenarios materially derived from currently contracted business within the RC segment. However, there could be material impact to our

effective tax rate if there is a significant change in our judgment. If and when our judgment changes, then the valuation allowances are adjusted through the provision for income taxes in the period in which this determination is made. Refer to Note 16 of our Consolidated Financial Statements included in Item 8 of this Report for additional information regarding our net deferred tax assets and related income tax expense (benefit).

#### Recently Issued Accounting Standards

Refer to Note 1 of the Consolidated Financial Statements included in Item 8 of this Report for information regarding recently issued accounting standards.

#### Item 7A. Quantitative and Qualitative Disclosures About Market Risk

##### Interest Rate Risk

We are exposed to market risk from changes in interest rates. Our assets include cash equivalents and restricted cash subject to variable interest rates. Restricted cash is required to provide collateral for certain letters of credit for ACI and DSI equipment projects, as well as for future payments related to the Royalty Award as discussed in Note 14 of the Consolidated Financial Statements included in Item 8 of this Report. As of December 31, 2016, \$13.2 million of cash and \$13.7 million of restricted cash was earning interest at variable rates.

We are exposed to interest rate risk related to our obligations to pay 453A interest to the IRS. At December 31, 2016, the applicable 453A interest rate, which, according to the applicable rules is rounded to the nearest full percentage to determine interest due, was 3.56%, which was rounded to 4.00%. There would have to have been a 94 basis point increase in the applicable interest rate for a change to have occurred in the 453A interest expense during the year ended December 31, 2016.

We are also exposed to interest rate risk in connection with the Line of Credit, if amounts are drawn, which bears interest at a variable rate, which is the higher of 5% or the "Prime Rate" plus 1%. At December 31, 2016 the Prime Rate was 3.50%, but no amounts were outstanding on the Line of Credit.

Using the December 31, 2016 cash balances, a 10% proportionate increase in short-term interest rates on an annualized basis compared to the actual interest rates as of December 31, 2016, and a corresponding and parallel shift in the remainder of the yield curve, would result in an increase to pretax income of \$13 thousand. Conversely, a corresponding decrease in interest rates would result in a comparable change to pretax income. Actual interest rates could change significantly more than 10%. There are inherent limitations in the sensitivity analysis presented, primarily due to the assumption that interest rate movements are not linear and instantaneous. As a result, the analysis is unable to reflect the potential effects of more complex market changes that could arise, which may positively or negatively affect income.

##### Foreign Currency Risk

We are exposed to changes in currency rates as a result of an obligation denominated in a foreign currency. As of December 31, 2016, this obligation was carried on our Consolidated Balance Sheet at approximately \$0.2 million and the impact to the Consolidated Balance Sheet and Consolidated Statement of Operations from a change in the foreign currency rate would be immaterial.

##### Commodity Price Risk

In the normal course of our business, we are exposed to market risk or price fluctuations related to the goods we procure related to our revenue-producing activities. Components of ACI and DSI systems, which are or may be significant to such revenue producing activities, have market prices that fluctuate regularly, but not widely. We do not engage in commodity hedging transactions for raw materials, though we have committed and will continue to commit to purchase certain materials for specified periods of time. Significant increases in the prices of our products due to increases in the cost of goods could have a negative effect on demand for products and on profitability. However, to mitigate risk related to price fluctuations, commodity purchases are made concurrently with contracts being awarded. Therefore, the cost of significant price increases would likely be able to be materially passed on to the customer.

Item 8. Financial Statements and Supplementary Data

Advanced Emissions Solutions, Inc.

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Advanced Emissions Solutions, Inc.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders  
Advanced Emissions Solutions, Inc. and Subsidiaries

We have audited the accompanying consolidated balance sheets of Advanced Emissions Solutions, Inc. and subsidiaries as of December 31, 2016 and 2015, and the related consolidated statements of operations, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2016. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Advanced Emissions Solutions, Inc. and subsidiaries as of December 31, 2016 and 2015, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2016, in conformity with U.S. generally accepted accounting principles.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), Advanced Emissions Solutions, Inc. and subsidiaries' internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013, and our report dated March 13, 2017 expressed an unqualified opinion on the effectiveness of Advanced Emissions Solutions, Inc. and subsidiaries' internal control over financial reporting.

/s/ Hein & Associates LLP

Denver, Colorado  
March 13, 2017



Advanced Emissions Solutions, Inc. and Subsidiaries  
Consolidated Balance Sheets

	As of December 31,	
(in thousands, except share data)	2016	2015
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$13,208	\$9,265
Restricted cash	13,736	728
Receivables, net	8,648	8,361
Receivables, related parties, net	1,934	1,918
Costs in excess of billings on uncompleted contracts	25	2,137
Prepaid expenses and other assets	1,357	2,306
Total current assets	38,908	24,715
Restricted cash, long-term	—	10,980
Property and equipment, net of accumulated depreciation of \$2,920 and \$4,557	735	2,040
Investment securities, restricted, long-term	—	336
Cost method investment	1,016	2,776
Equity method investments	3,959	17,232
Deferred tax assets	61,396	—
Other assets	1,282	2,696
Total Assets	\$107,296	\$60,775
<b>LIABILITIES AND STOCKHOLDERS' EQUITY (DEFICIT)</b>		
Current liabilities:		
Accounts payable	\$1,920	\$6,174
Accrued payroll and related liabilities	2,121	5,800
Current portion of notes payable, related parties	—	1,837
Billings in excess of costs on uncompleted contracts	4,947	9,708
Short-term borrowings, net of discount and deferred loan costs, related party	—	12,676
Legal settlements and accruals	10,706	6,502
Other current liabilities	4,017	7,395
Total current liabilities	23,711	50,092
Long-term portion of notes payable, related parties	—	13,512
Legal settlements and accruals, long-term	5,382	13,797
Other long-term liabilities	2,038	8,352
Total Liabilities	31,131	85,753
Commitments and contingencies (Note 14)	—	—
Stockholders' equity (deficit):		
Preferred stock: par value of \$.001 per share, 50,000,000 shares authorized, none outstanding	—	—
Common stock: par value of \$.001 per share, 100,000,000 shares authorized, 22,322,022 and 21,943,872 shares issued and 22,024,675 and 21,809,164 shares outstanding at December 31, 2016 and 2015, respectively	22	22
Additional paid-in capital	119,494	116,029
Accumulated deficit	(43,351)	(141,029)
Total stockholders' equity (deficit)	76,165	(24,978)
Total Liabilities and Stockholders' Equity (Deficit)	\$107,296	\$60,775
See Notes to the Consolidated Financial Statements.		

Advanced Emissions Solutions, Inc. and Subsidiaries  
Consolidated Statements of Operations

(in thousands, except per share data)	Years Ended December 31,		
	2016	2015	2014
Revenues:			
Equipment sales	\$46,949	\$60,099	\$12,044
Chemicals	3,025	888	391
Consulting services and other	648	1,752	4,488
Total revenues	50,622	62,739	16,923
Operating expenses:			
Equipment sales cost of revenue, exclusive of depreciation and amortization	37,741	45,433	9,277
Chemicals cost of revenue, exclusive of depreciation and amortization	1,700	601	140
Consulting services and other cost of revenue, exclusive of depreciation and amortization	376	1,518	2,203
Payroll and benefits	12,390	23,589	20,767
Rent and occupancy	2,168	3,309	2,468
Legal and professional fees	8,293	16,604	14,430
General and administrative	3,721	6,104	6,066
Research and development, net	(648 )	5,362	1,521
Depreciation and amortization	979	2,019	1,865
Total operating expenses	66,720	104,539	58,737
Operating loss	(16,098 )	(41,800 )	(41,814 )
Other income (expense):			
Earnings from equity method investments	45,584	8,921	42,712
Royalties, related party	6,125	10,642	6,410
Interest income	268	24	74
Interest expense	(5,066 )	(8,402 )	(5,725 )
Litigation settlement and royalty indemnity expense, net	3,464	—	—
Other	2,463	494	26
Total other income	52,838	11,679	43,497
Income (loss) before income tax expense	36,740	(30,121 )	1,683
Income tax (benefit) expense	(60,938 )	20	296
Net income (loss)	\$97,678	\$(30,141)	\$1,387
Earnings (loss) per common share (Note 1):			
Basic	\$4.40	\$(1.37 )	\$0.06
Diluted	\$4.34	\$(1.37 )	\$0.06
Weighted-average number of common shares outstanding:			
Basic	21,931	21,773	21,554
Diluted	22,234	21,773	22,079
See Notes to the Consolidated Financial Statements.			

Advanced Emissions Solutions, Inc. and Subsidiaries  
Consolidated Statements of Changes in Stockholders' Equity (Deficit)  
For the Years Ended December 31, 2016, 2015 and 2014

(in thousands, except share data)	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Total Stockholders' Equity (Deficit)
	Shares	Amount			
Balances, January 1, 2014	21,661,908	\$ 22	\$106,086	\$(112,275 )	\$ (6,167 )
Stock-based compensation	40,729	—	4,712	—	4,712
Issuance of stock to 401(k) plan	5,250	—	127	—	127
Issuance of stock upon exercise of options, net	260,126	—	243	—	243
Repurchase of shares to satisfy tax withholdings	(114,750 )	—	(1,500 )	—	(1,500 )
Reclassification and settlement of equity awards	—	—	501	—	501
Net income	—	—	—	1,387	1,387
Balances, December 31, 2014	21,853,263	\$ 22	\$110,169	\$(110,888 )	(697 )
Stock-based compensation	127,867	—	6,462	—	6,462
Clawback of equity awards	(20,656 )	—	(325 )	—	(325 )
Repurchase of shares to satisfy tax withholdings	(16,602 )	—	(277 )	—	(277 )
Net loss	—	—	—	(30,141 )	(30,141 )
Balances, December 31, 2015	21,943,872	\$ 22	\$116,029	\$(141,029 )	(24,978 )
Stock-based compensation	405,354	—	2,762	—	2,762
Repurchase of shares to satisfy tax withholdings	(27,204 )	—	(196 )	—	(196 )
Reclassification and settlement of equity awards	—	—	899	—	899
Net income	—	—	—	97,678	97,678
Balances, December 31, 2016	22,322,022	\$ 22	\$119,494	\$(43,351 )	\$ 76,165

See Notes to the Consolidated Financial Statements.

Advanced Emissions Solutions, Inc. and Subsidiaries  
 Consolidated Statements of Cash Flows  
 Years Ended December 31, 2016, 2015 and 2014

(in thousands)	Years Ended Years Ended December 31,		
	2016	2015	2014
Cash flows from operating activities			
Net income (loss)	\$97,678	\$(30,141)	\$1,387
Adjustments to reconcile net income (loss) to net cash used in operating activities:			
Deferred tax benefit	(61,396 )	—	—
Depreciation and amortization	979	2,019	1,865
Amortization of debt issuance costs	1,152	987	100
Debt prepayment penalty	228	—	—
Impairment of property, equipment, inventory and intangibles	520	2,087	355
Provision for bad debt expense and note receivable	13	633	500
Interest costs added to principal balance of notes payable	—	923	1,124
Consulting expense financed through note payable	—	—	1,600
Share-based compensation expense	2,868	7,204	4,712
Clawback of equity awards	—	(325 )	—
Earnings from equity method investments	(45,584 )	(8,921 )	(42,712)
Gain on sale of equity method investment	(2,078 )	—	—
Impairment of cost method investment	1,760	—	—
Gain on settlement of note payable, licensed technology, and sales-type lease	(1,910 )	—	—
Other non-cash items, net	35	285	39
Changes in operating assets and liabilities, net of effects of acquired businesses:			
Receivables	(301 )	8,361	(3,651 )
Related party receivables	(16 )	(479 )	(809 )
Prepaid expenses and other assets	1,195	(107 )	(1,877 )
Costs incurred on uncompleted contracts	29,623	6,492	(56,606)
Other long-term assets	961	205	(47 )
Accounts payable	(4,254 )	(1,340 )	2,328
Accrued payroll and related liabilities	(2,887 )	(102 )	686
Other current liabilities	(3,105 )	(812 )	(672 )
Billings on uncompleted contracts	(32,272 )	(15,186 )	55,621
Advance deposit, related party	(2,980 )	(3,544 )	(2,135 )
Other long-term liabilities	(2,175 )	595	144
Legal settlements and accruals	(4,211 )	(3,722 )	(4,622 )
Distributions from equity method investees, return on investment	7,900	5,019	2,509
Net cash used in operating activities	(18,257 )	(29,869 )	(40,161)

(in thousands)	Years Ended Years Ended December 31,		
	2016	2015	2014
Cash flows from investing activities			
Distributions from equity method investees in excess of cumulative earnings	38,250	8,651	43,584
Purchase of investment securities	—	—	(105 )
Maturity of investment securities	—	—	210
Maturity of investment securities, restricted	336	—	403
Acquisition of property and equipment	(289 )	(507 )	(1,563 )
Proceeds from sale of property and equipment	52	942	26
Advance on note receivable	—	(500 )	(500 )
Acquisition of business	—	(2,124 )	—
Purchase of cost method investment	—	—	(2,776 )
Purchase of and contributions to equity method investee	(223 )	(2,128 )	(6,631 )
Proceeds from sale of equity method investment	1,773	—	—
Net cash provided by investing activities	39,899	4,334	32,648
Cash flows from financing activities			
Short-term borrowings	—	13,539	—
Repayments on short-term borrowings	(13,250 )	(1,750 )	—
Repayments on notes payable, related party	(1,246 )	(1,484 )	(238 )
Loan costs and amendment fees	(751 )	—	(70 )
Debt prepayment penalty	(228 )	—	—
Proceeds received upon exercise of stock options	—	—	243
Repurchase of shares to satisfy tax withholdings	(196 )	(276 )	(1,500 )
Net cash (used in) provided by financing activities	(15,671 )	10,029	(1,565 )
Increase (Decrease) in Cash and Cash Equivalents and Restricted Cash	5,971	(15,506 )	(9,078 )
Cash and Cash Equivalents and Restricted Cash, beginning of year	20,973	36,479	45,557
Cash and Cash Equivalents and Restricted Cash, end of year	\$26,944	\$20,973	\$36,479
Supplemental disclosure of cash flow information:			
Cash paid for interest	\$3,647	\$6,274	\$5,201
Cash paid for income taxes	541	29	566
Supplemental disclosure of non-cash investing and financing activities:			
Acquisition of technology license through long-term payable	—	—	1,525
Acquisition of equity method investment through note payable	—	—	13,301
Settlement of RCM6 note payable	13,234	—	—
Non-cash reduction of equity method investment	11,156	—	—
Stock award reclassification (liability to equity)	899	—	501
Issuance of common stock to settle liabilities	—	—	127
See Notes to the Consolidated Financial Statements.			

## Notes to Consolidated Financial Statements

### Note 1 - Summary of Operations and Significant Accounting Policies

#### Nature of Operations

Advanced Emissions Solutions, Inc. ("ADES" or the "Company") is a Delaware corporation with its principal office located in Highlands Ranch, Colorado. The Company is principally engaged in providing environmental and emissions control equipment, technologies and specialty chemicals to the coal-burning electric power generation industry. The Company generates substantial earnings and tax credits under Section 45 of the Internal Revenue Code ("IRC") from its equity investments in certain entities and royalty payment streams related to technologies that are licensed to Tinum Group, LLC, a Colorado limited liability company ("Tinuum Group") (f/k/a Clean Coal Solutions, LLC). Such technologies allow Tinuum Group to provide their customers with various solutions to enhance combustion and reduced emissions of nitrogen oxide ("NO<sub>x</sub>") and mercury from coal burned to generate electrical power. The Company's sales occur principally throughout the United States. See Note 17 for additional information regarding the Company's operating segments.

As of December 31, 2016, ADES's wholly-owned subsidiaries included:

▲ADA-ES, Inc. ("ADA"), a Colorado corporation

▲BCSI, LLC ("BCSI"), a Delaware limited liability company;

▲Advanced Clean Energy Solutions, LLC ("ACES"), a Delaware limited liability company;

▲ADEquity, LLC ("ADEquity"), a Delaware limited liability company;

▲ADA Environmental Solutions, LLC ("ADA LLC"), a Colorado limited liability company;

▲ADA-ES Intellectual Property, LLC ("ADA IP"), a Colorado limited liability company;

▲ADA Analytics, LLC, a Delaware limited liability company;

▲ADA Analytics Israel Ltd., an Israel limited liability company (collectively with ADA Analytics, LLC, "ADA Analytics"), which had no operations for the years ended December 31, 2016 and December 31, 2015

ADA LLC ceased operations in 2012 and ADA IP has had no operations since inception.

During 2015, the Company elected to cease the operations of ADA Analytics. The Company anticipates that ADA Analytics will be legally dissolved during 2017. In addition, the Company terminated its manufacturing operations, conducted under BCSI, effective as of the end of the 2015. The Company anticipates that BCSI will eventually be legally dissolved upon the winding down of its remaining operations, commitments and obligations. However, the Company has continued to serve the Dry Sorbent Injection ("DSI") market, which BCSI previously served, through ADA.

In addition, we are an investor in Tinuum Group and Tinuum Services, LLC ("Tinuum Services") (f/k/a Clean Coal Solutions Services, LLC), which are accounted for using the equity method of accounting and whose results significantly impact our financial position and results of operations. As of December 31, 2016, the Company holds equity interests of 42.50% and 50.00% in Tinuum Group and Tinuum Services, respectively. As discussed in Note 7, the Company sold its equity investment in RCM6, LLC ("RCM6") in March 2016, which was also accounted for using the equity method prior to the sale.

#### Principles of Consolidation

The Consolidated Financial Statements include accounts of wholly-owned subsidiaries. All significant intercompany balances and transactions have been eliminated in consolidation.

All investments in partially owned entities for which the Company has greater-than-20% ownership are accounted for using the equity method based on the legal form of the Company's ownership percentage and the applicable ownership percentage of the entity and are included in the Equity method investments line item in the Consolidated Balance Sheets. Tinuum Group is deemed to be variable interest entity ("VIE") under the VIE model of consolidation, but the Company does not consolidate Tinuum Group as it is not deemed to be its primary beneficiary.

#### Cash and Cash Equivalents

Cash and cash equivalents include bank deposits and other highly liquid investments purchased with an original maturity of three months or less.

#### Restricted Cash

Restricted cash primarily consists of funds withheld to provide collateral support for certain letters of credit issued to i) customers related to certain contractual performance and payment guarantees, ii) certain settlement parties to provide security for continuing royalty indemnification payments related to the settlement of certain litigation (the "Royalty Award"), and iii) minimum cash balance requirements under the 2013 Loan and Security Agreement ("Line of Credit").

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### Receivables and Credit Policies

Receivable balances represent unsecured, customer obligations due under trade terms typically requiring payment within 30-45 days from the invoice date and are stated net of allowance for doubtful accounts. The Company records allowances for doubtful accounts when it is probable that the accounts receivable balances will not be collected. The following tables show the receivables balances:

	As of December 31,	
(in thousands)	2016	2015
Receivables	\$4,289	\$8,518
Other Receivables	4,559	—
Less: Allowance for doubtful accounts	(200 )	(157 )
Total	\$8,648	\$8,361

	As of December 31,	
(in thousands)	2016	2015
Receivables, related parties	\$1,934	\$1,918
Total	\$1,934	\$1,918

During the years ended December 31, 2016, 2015 and 2014, the Company recognized zero, \$0.1 million and zero, respectively, of bad debt expense related to the write-off of specific accounts whose ultimate collection was in doubt. Bad debt expense is included within the General and administrative line item in the Consolidated Statements of Operations.

Notes receivable are reported at their outstanding principal balances, adjusted for any amounts determined to be uncollectible. During the years ended December 31, 2015 and 2014, the Company recorded impairment charges related to a Note Receivable of \$0.5 million and \$0.5 million, respectively, related to the write-off of a specific account whose ultimate collection was in doubt. Interest income is accrued and credited to income based on the unpaid principal balance outstanding. The accrual of interest is discontinued when substantial doubt exists about the ability to collect principal and interest based upon the contractual terms. Notes receivable are included within the Other assets line item in the Consolidated Balance Sheets. Additional details regarding Note receivable balances are included in Note 11.

### Inventory

Inventories are stated at the lower of cost or market and consist principally of parts, components and materials for activated carbon injection ("ACI") and dry sorbent injection ("DSI") projects. The cost of inventory is determined using the first-in-first-out ("FIFO") method. Inventories are included within the Other assets line item in the Consolidated Balance Sheets. As of December 31, 2016 and 2015, the balance of inventory was comprised of materials and supplies and finished goods of zero and \$0.2 million, respectively.

### Other Intangible Assets

Other Intangible assets consist of patents and licensed technology and are included in the Other assets line item in the Consolidated Balance Sheets. During the year ended December 31, 2016, the Company entered into an agreement with Highview Enterprises Limited ("Highview") to terminate a license agreement (the "License Agreement") to certain technology ("Licensed Technology") in exchange for a one-time payment by the Company of £0.2 million (approximately \$0.2 million). Under the termination, payment of the termination fee, if any, will only be settled by relinquishing shares of Highview currently owned by the Company equal to £0.2 million. As a result of terminating the License Agreement, the Company wrote off the Licensed Technology, reduced the corresponding long-term liability ("Highview Obligation") to the amount of the one-time payment, and recognized a gain of approximately \$0.2 million. The gain on the settlement of the Highview Obligation is included in the Other income line on the Company's Consolidated Statement of Operations for the year ended December 31, 2016. During the years ended December 31, 2015 and 2014, the Company did not recognize any intangible asset impairment charges.





The Company has developed technologies resulting in patents being granted by the U.S. Patent and Trademark Office. All research and development costs associated with the technology development are expensed as incurred. Legal costs associated with securing the patent are capitalized and amortized over the legal or useful life beginning on the patent filing date.

(in thousands, except years)	Years Ended December 31,		2015			
	2016	Weighted-Average Amortization Period (in years)	Initial Cost	Net of Accumulated Amortization	Initial Cost	Net of Accumulated Amortization
Patents	16		\$913	\$ 696	\$742	\$ 581
Licensed technology	0		1,525	—	1,525	1,360
Total	16		\$2,438	\$ 696	\$2,267	\$ 1,941

Included in the Consolidated Statements of Operations is amortization expense related to intangible assets of \$0.1 million, \$0.4 million and zero for the years ended December 31, 2016, 2015 and 2014, respectively. The estimated future amortization expense for existing intangible assets as of December 31, 2016 is expected to be \$0.1 million for each of the five succeeding fiscal years.

#### Investment Securities

Investment securities represent certificates of deposits with original maturities greater than 90 days. Investment securities pledged as security for letters of credit in the same amount as the investments are classified as restricted in the accompanying Consolidated Balance Sheets and are carried at fair value. Investments in partially-owned subsidiaries for which the Company has less-than-20% ownership are accounted for using the cost method. Cost method investments are evaluated for impairment upon an indicator of impairment such as an event or change in circumstances that may have a significant adverse effect on the fair value of the investment. If no such events or changes in circumstances have occurred, the fair value is estimated only if practicable to do so.

#### Equity Method of Accounting

The investments in entities in which the Company does not have a controlling interest (financial or operating), but where it has the ability to exercise significant influence over operating and financial policies, are accounted for using equity-method accounting. Whether or not the Company exercises significant influence with respect to an investee depends on an evaluation of several factors including, among others, representation on the investee company's board of directors and the Company's ownership level. Under the equity method of accounting, an investee company's accounts are not reflected within the Company's Consolidated Balance Sheets and Consolidated Statements of Operations; however, the Company's share of the earnings or losses of the investee company is reported in the Earnings from equity method investments line item in the Consolidated Statements of Operations and the Company's carrying value in an equity method investee company is reported in the Equity method investments line in the Consolidated Balance Sheets.

When the Company receives distributions in excess of the carrying value of the investment and the Company has not guaranteed any obligations of the investee, nor is it required to provide additional funding to the investee, the Company recognizes such excess distributions as equity method earnings in the period the distributions occur. When the investee subsequently reports income, the Company does not record its share of such income until it equals the amount of distributions in excess of carrying value that were previously recognized in income. During the years ended December 31, 2016, 2015 and 2014, the Company had no guarantees or requirements to provide additional funding to investees.

Additionally, when the Company's carrying value in an equity method investment is zero and the Company has not guaranteed any obligations of the investee, nor is it required to provide additional funding to the investee, the Company will not recognize its share of any reported losses by the investee until future earnings are generated to offset previously unrecognized losses. As a result, equity income or loss reported on the Company's Consolidated Statements of Operations for certain equity method investment entities may differ from a mathematical calculation of net income or loss attributable to its equity interest based upon the percentage ownership of our equity interest and the net income or loss attributable to equity owners as shown on investee companies' statements of operations. Likewise, distributions from equity method investees are reported on the Consolidated Statements of Cash Flows as "return on

investment” within Operating cash flows until such time as the carrying value in an equity method investee company is reduced to zero; thereafter, such distributions are reported as “distributions in excess of cumulative earnings” within Investing cash flows. See Note 7 for additional information regarding the Company's equity method investments.

## Royalties, Related Party

The Company licenses its M-45<sup>TM</sup> and M-45-PC<sup>TM</sup> emission control technologies ("M-45 License") to Tinuum Group and realizes royalty income based upon (i) a percentage of the per-ton, pre-tax margin net of certain allocable operating expenses related to the lease or sale of an invested RC Facility that produces and sells RC under the M-45 License, (ii) a percentage of the value of the Section 45 tax credits generated related to retained RC facilities, net of certain allocable operating expenses as a result of the production and sale of RC under the M-45 License, and (iii) a percentage of the revenue, net of all direct expenses, received by Tinuum Group as a direct result of Tinuum Group's exercise of the M-45 License.

## Property and Equipment

Property and equipment is stated at cost less accumulated depreciation and includes leasehold improvements. Depreciation on assets is computed using the straight-line method over the lesser of the estimated useful lives of the related assets or the lease term (ranging from 2 to 7 years). Maintenance and repairs which do not extend the useful life of the respective asset are charged to Operating expenses as incurred. When assets are retired, or otherwise disposed of, the property accounts are relieved of costs and accumulated depreciation and any resulting gain or loss is credited or charged to income. The Company performs an evaluation of the recoverability of the carrying value of its long-lived assets to determine if facts and circumstances indicate that the carrying value of assets may be impaired and if any adjustment is warranted.

## Revenue Recognition

The Company recognizes revenues when: (i) persuasive evidence of a customer arrangement exists; (ii) the price is fixed or determinable; (iii) collectability is reasonable assured; and (iv) product delivery has occurred or services have been rendered and it is probable that performance guarantees, if any, will be met.

## Equipment sales

The Company enters into contracts that require, over a period of months, the design and construction of emissions control systems ("extended equipment contracts"). Revenues from such extended equipment contracts are recorded using the percentage of completion cost to cost method based on costs incurred to date compared with total estimated contract costs. However, if the Company does not have sufficient information to estimate either costs incurred or total estimated costs for extended equipment contracts, the completed contract method is used.

Under the completed contract method, revenues and costs from extended equipment contracts are deferred and recognized when contract obligations are substantially complete. The Company defines substantially complete as delivery of equipment and start-up at the customer site or, as applicable to DSI systems, the completion of any major warranty service period. Such costs are accumulated in the Costs in excess of billings on uncompleted contracts or Billings in excess of costs on uncompleted contracts line items in the Consolidated Balance Sheets, and typically include direct materials, direct labor and subcontractor costs, and indirect costs related to contract performance, such as indirect labor, supplies, tools and repairs. For each of the years ended December 31, 2016, 2015 and 2014, the Company did not have sufficient information to measure ongoing performance for its extended equipment contracts. Accordingly, the completed contract method of revenue recognition has been used for each of these years, and revenues and costs are deferred until the equipment is placed into service and contract obligations are substantially complete.

When multiple contracts exist with a single counterparty, the Company evaluates revenue recognition on a contract-by-contract basis. Provisions for estimated losses on uncompleted contracts are recognized when it has been determined that a loss is probable.

The Company also enters into other non-extended equipment contracts for which the Company recognizes revenues on a time and material basis as services to build equipment systems are performed or as equipment is delivered.

## Chemicals

Revenues for direct sales of chemicals and other ancillary products not provided in the performance of construction of emissions control systems (extended equipment sales) are recognized at the date of delivery to, and acceptance by, the customer.

## Consulting services and other

The Company recognizes revenues on time and material contracts as services are performed.



#### Cost of Revenue

Costs of revenue include all labor, fringe benefits, subcontract labor, chemical and coal costs, materials, equipment, supplies, travel costs and any other costs and expenses directly related to the Company's production of revenues. The Company records estimated contract losses, if any, in the period they are determined.

Warranty costs for ACI equipment systems are estimated based on historical experience and are recorded as a percentage of revenue when the equipment is substantially complete. Warranty costs, comprised of the cost of replacement materials and direct labor, are included within the Equipment sales cost of revenue line in the Consolidated Statements of Operations.

Warranty costs for DSI equipment systems could not be estimated at the time the contracts were entered into due to a lack of historical experience manufacturing DSI systems and the resulting claims history, if any, needed to determine an appropriate warranty amount. Therefore, revenue recognition on DSI equipment systems is deferred until the end of the warranty period, which is generally 12 to 24 months following substantial completion.

As warranty claims are incurred, such costs are deferred within the Costs in excess of billings on uncompleted contracts line item in the Consolidated Balance Sheets, until such time that revenues and cost of revenue are recognized. Subsequent to revenues being recognized, warranty claims are included within the Other long-term liabilities line item in the Consolidated Balance Sheets and within Cost of revenue line of the Consolidated Statements of Operations. The changes in the carrying amount of the Company's warranty obligations, which do not include amounts for DSI systems as revenues are deferred until the end of the warranty period, are included in Note 11. In some cases, a letter of credit is obtained and held to cover the period of the warranty that could be used to satisfy the obligation.

#### Payroll and Benefits

Payroll and benefits costs include direct payroll, personnel related fringe benefits, sales and administrative staff labor costs and stock compensation expense. Payroll and benefits costs exclude direct labor included in Cost of revenue.

#### Rent and Occupancy

Rent and occupancy costs include rent, insurance and other occupancy-related expenses.

#### Legal and Professional

Legal and professional costs include external legal, audit and consulting expenses.

#### General and Administrative

General and administrative costs include director fees and expenses, bad debt expense, impairments and other general costs of conducting business.

#### Research and Development Costs

Research and development costs are charged to expense in the period incurred.

The Company has entered into development and cost-sharing contracts with the U.S. Department of Energy (the "DOE"). These contracts are best-effort-basis contracts, and the Company generally includes industry cost-share partners to offset the costs incurred that are anticipated to be in excess of funded amounts from the DOE. The Company accounts for these contracts with the DOE and industry cost-share partners in accordance with accounting guidance whereby the Company recognizes amounts funded by the DOE under research-and-development-cost-sharing arrangements as an offset to the Company's aggregate research and development expense reported in the Research and development, net line in the Consolidated Statements of Operations.

#### Asset Retirement Obligations

The Company's asset retirement obligation, or "ARO liability," consists of estimated costs to remove equipment and reclaim the land associated with one research and development project. The Company estimates its ARO liability for final reclamation based upon bids obtained from independent third parties and other exit alternatives, which are adjusted for inflation, and then discounted at a credit-adjusted risk-free rate. Changes in estimates could occur due to revisions of estimated costs and changes in timing and performance of the reclamation activities. The ARO liability is included within the Other long-term liabilities line item in the Consolidated Balance Sheets and discussed further in Note 11.



### Income Taxes

The Company accounts for income taxes under the asset and liability method which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, deferred tax assets and liabilities are determined on the basis of the differences between the financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in operations in the period that includes the enactment date.

The Company recognizes deferred tax assets and liabilities and maintains valuation allowances where it is more likely than not that all or a portion of deferred tax assets will not be realized. In making such a determination, the Company considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations.

The Company records uncertain tax positions on the basis of a two-step process whereby (1) the Company determines whether it is more-likely-than-not that the tax positions will be sustained on the basis of the technical merits of the position and (2) for those tax positions that meet the more-likely-than-not recognition threshold, the Company recognizes the amount of tax benefit that is more than 50 percent likely to be realized upon ultimate settlement with the related tax authority.

The Company records interest expense due to the Company's share of Tinuum Group's equity method earnings for Refined Coal ("RC") facility leases which are treated as installment sales for tax purposes. IRS section 453A requires taxpayers using the installment method to pay an interest charge on the portion of the tax liability that is deferred under the installment method. The Company recognizes IRS section 453A interest ("453A interest") and other interest and penalties related to unrecognized tax benefits in the Interest expense line item in the Consolidated Statements of Operations.

### Stock-Based Compensation

Stock-based compensation expense is measured at the grant date based on the estimated fair value of the stock-based award and expensed on a straight-line basis over the requisite service period for the entire award. Forfeitures are recognized when incurred. These costs are recorded in the Payroll and benefits line item in the Consolidated Statements of Operations.

### Earnings (Loss) Per Share

Basic earnings (loss) per share is computed using the two-class method, which is an earnings allocation formula that determines earnings (loss) per share for common stock and any participating securities according to dividend and participating rights in undistributed earnings. The Company's restricted stock awards ("RSA's") contain non-forfeitable rights to dividends or dividend equivalents and are deemed to be participating securities. The Company did not declare any cash dividends during the years ended December 31, 2016, 2015 or 2014.

Under the two-class method, net income (loss) for the period is allocated between common stockholders and the holders of the participating securities based on the weighted-average of common shares outstanding during the period, excluding unvested RSA's ("common shares"), and the weighted-average number of unvested RSA's outstanding during the period, respectively. The allocated, undistributed income (loss) for the period is then divided by the weighted-average number of common shares and unvested RSA's outstanding during the period to arrive at basic earnings (loss) per common share and participating security for the period, respectively. Because the Company did not declare any dividends during the periods presented, and because the unvested RSA's possess substantially the same rights to undistributed earnings as common shares outstanding, there is no difference between the calculated basic earnings (loss) per share for common shares and participating securities. Accordingly, and pursuant to accounting principles generally accepted in the United States ("U.S. GAAP"), the Company has elected not to separately present basic or diluted earnings (loss) per share attributable to participating securities in the Consolidated Statements of Operations.

Diluted earnings (loss) per share is computed in a manner consistent with that of basic earnings (loss) per shares, while considering other potentially dilutive securities. Potentially dilutive securities consist of outstanding options to purchase common stock and contingent performance stock units ("PSU's") (collectively, "Potential dilutive shares"), and their dilutive effect, if any, is computed using the treasury stock method. Potential dilutive shares are excluded



from diluted earnings (loss) per share when their effect is anti-dilutive. When there is a net loss for a period, all Potential dilutive shares are anti-dilutive and are excluded from the calculation of diluted loss per share for that period.

Each PSU represents a contingent right to receive shares of the Company's common stock, and the number of shares may range from zero to two times the number of PSU's granted on the award date depending upon the price performance of the Company's common stock as measured against a general index and a specific peer group index over requisite performance periods. The

number of Potential dilutive shares related to PSU's is based on the number of shares of the Company's common stock, if any, that would be issuable at the end of the respective reporting period, assuming that the end of the reporting period is the end of the contingency period applicable to such PSU's. See Note 13 for additional information related to PSU's.

Potential dilutive shares were excluded in the diluted loss per share calculation for the year ended December 31, 2015, as their inclusion was anti-dilutive due to the Company's net loss for that year.

The following table sets forth the calculations of basic and diluted earnings (loss) per common share:

(in thousands, except per share amounts)	Years Ended December 31,		
	2016	2015	2014
Net income (loss)	\$97,678	\$(30,141)	\$1,387
Less: Undistributed income (loss) allocated to participating securities	1,105	(275)	18
Income (loss) attributable to common stockholders	\$96,573	\$(29,866)	\$1,369
Basic weighted-average number of common shares outstanding	21,931	21,773	21,554
Add: dilutive effect of equity instruments	303	—	525
Diluted weighted-average number of common shares outstanding	22,234	21,773	22,079
Earnings (loss) per share - basic	\$4.40	\$(1.37)	\$0.06
Earnings (loss) per share - diluted	\$4.34	\$(1.37)	\$0.06

The table below presents the number of Potential dilutive shares that were excluded from the calculation of diluted loss per share because their inclusion would have been anti-dilutive:

(share data in thousands)	Years Ended December 31,	
	2015	2014
Stock options	—10	—
Restricted stock awards	—163	—
Performance share units	—182	—
Total shares excluded from diluted shares outstanding	—355	—

#### Use of Estimates

The preparation of the Company's consolidated financial statements in conformity with U.S. GAAP requires the Company's management to make estimates and assumptions that affect the amounts reported in these financial statements and accompanying notes. Actual results could differ from those estimates. The Company makes significant assumptions concerning:

- revenue recognition, warranty estimates and performance guarantee accruals related to the Company's extended equipment contracts;
- the impairment, or lack thereof, of the remaining realizability of, its long-lived assets;
- stock compensation costs related to PSU and option awards;
- estimated future royalty obligations associated with the Royalty Award and other legal accruals; and
- the deferred tax assets expected to be realized in future periods and uncertain tax positions.

#### Reclassifications

Certain balances have been reclassified from prior years to conform to the current year presentation.

#### New Accounting Guidance

In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606) ("ASU 2014-09"), which provides a single comprehensive model for entities to use in accounting for revenue arising from contracts with customers and supersedes current revenue recognition guidance, including industry-specific guidance. The core principle of ASU 2014-09 is that "an entity recognizes revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. ASU



2014-09 becomes effective for reporting periods (including interim periods) beginning after December 31, 2017. Early application is permitted for annual reporting periods beginning after December 15, 2016, including interim reporting periods within that reporting period. The standard may be applied retrospectively to each prior period presented or retrospectively with the cumulative effect recognized as of the date of adoption ("modified retrospective method"). The Company anticipates adopting the standard under the modified retrospective method effective January 1, 2018, which will be reflected in its financial statements as of and for the three months ended March 31, 2018. Based on the Company's preliminary assessment of the standard, the Company has determined that the timing of revenue recognition for equipment sales may be impacted, but that revenues generated from chemical sales and consulting services will likely not be impacted. The Company is continuing its assessment, which may change its initial assessments of the impacts to its revenue streams or may identify other impacts.

In August 2014, the FASB issued ASU No. 2014-15, Presentation of Financial Statements - Going Concern (Topic 205-40), Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern that requires management to evaluate whether there are conditions or events that raise substantial doubt about an entity's ability to continue as a going concern within one year after the date that the entity's financial statements are issued, or within one year after the date the entity's financial statements are available to be issued, and to provide disclosures when certain criteria are met. This guidance is effective for the annual period ending after December 15, 2016, and for annual periods and interim periods thereafter. Early application is permitted. The Company adopted this provision as of December 31, 2016 and there was no impact to the Company's financial statements or disclosures from the adoption of this standard.

In November 2015, the FASB issued ASU 2015-17, Income Taxes (Topic 740) Balance Sheet Classification of Deferred Taxes ("ASU 2015-17"), to simplify the presentation of deferred income taxes. The amendments in ASU 2015-17 require that deferred tax liabilities and assets be classified as non-current in a classified statement of financial position. The current requirement that deferred tax liabilities and assets of a tax-paying component of an entity be offset and presented as a single amount is not affected by the amendments in the update. ASU 2015-17 is effective for fiscal years beginning after December 15, 2016, and interim periods within those years, and may be applied either prospectively to all deferred tax liabilities and assets or retrospectively to all periods presented. The Company adopted this standard effective as of January 1, 2016. There was no material impact to the Company's financial statements or disclosures from the adoption of this standard.

In January 2016, the FASB issued ASU 2016-01, Financial Instruments (Subtopic 825-10) - Overall: Recognition and Measurement of Financial Assets and Financial Liabilities ("ASU 2016-01"). This standard provides guidance on how entities measure certain equity investments and present changes in the fair value. This standard requires that entities measure certain equity investments that do not result in consolidation and are not accounted for under the equity method at fair value and recognize any changes in fair value in net income. ASU 2016-01 is effective for fiscal years beginning after December 31, 2017. The Company is currently evaluating the provisions of this guidance and assessing its impact on the Company's financial statements and disclosures. The Company does not believe this standard will have a material impact on the Company's financial statements and disclosures.

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842) ("ASU 2016-02"), which requires lessees to recognize a right of use asset and related lease liability for those leases classified as operating leases at the commencement date and have lease terms of more than 12 months. This topic retains the distinction between finance leases and operating leases. ASU 2016-02 is effective for fiscal years beginning after December 15, 2018, and interim periods within those years, and must be applied under a modified retrospective transition approach for leases existing at, or entered into after, the beginning of the earliest comparative period presented in the financial statements. The Company is currently evaluating the provisions of this guidance and assessing its impact on the Company's financial statements and disclosures.

In June 2016, the FASB issued ASU 2016-13, Financial Instruments - Credit Losses (Topic 326) Measurement of Credit Losses on Financial Instruments ("ASU 2016-13"). The main objective of ASU 2016-13 is to provide financial statement users with more decision-useful information about the expected credit losses on financial instruments and other commitments to extend credit held by a reporting entity at each reporting date. To achieve this objective, the amendments in ASU 2016-13 replace the incurred loss impairment methodology in current U.S. 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. ASU 2016-13 is effective for fiscal years beginning after December 15, 2019, including interim periods within those years, and must be adopted under a modified retrospective method approach. Entities may adopt ASU 2016-13 earlier as of the fiscal years beginning after December 15, 2018, including interim periods within those years. The Company is currently evaluating the provisions of this guidance and assessing its impact on the Company's financial statements and disclosures. The Company does not believe this standard will have a material impact on the Company's financial statements and disclosures.

In October 2016, the FASB issued ASU 2016-17, Consolidation (Topic 810) Interests Held through Related Parties That Are under Common Control ("ASU 2016-17"), which amends the consolidation guidance on how a reporting entity that is the single decision maker of a VIE should treat indirect interests in the entity held through related parties that are under common control

with the reporting entity when determining whether it is the primary beneficiary of that VIE. Under the amendments, a single decision maker is not required to consider indirect interests held through related parties that are under common control with the single decision maker to be the equivalent of direct interests in their entirety. Instead, a single decision maker is required to include those interests on a proportionate basis consistent with indirect interests held through other related parties. ASU 2016-17 is effective for fiscal years, and interim reporting periods within those years, beginning after December 15, 2016 on a retrospective basis, however, early adoption is permitted. The Company intends to adopt this standard effective as of January 1, 2017 and does not anticipate that the adoption will have a material impact on the Company's financial statements or disclosures.

In November 2016, the FASB issued ASU 2016-18, Statement of Cash Flows (Topic 230) Restricted Cash ("ASC 2016-18"), which requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. ASU 2016-18 is effective for fiscal years, and interim reporting periods within those years, beginning after December 15, 2017 on a retrospective basis, however, early adoption is permitted. The Company adopted this standard effective as of December 31, 2016. Therefore, the Consolidated Statements of Cash Flows for the years ended December 31, 2015 and 2014 were recast for the adoption of ASU 2016-18.

#### Note 2 - Restructuring

During the year ended December 31, 2016, the Company recorded restructuring charges in connection with a reduction in force, the departure of certain executive officers and management's further alignment of the business with strategic objectives. These charges related to severance arrangements with departing employees and executives as well as non-cash charges related to the acceleration of vesting of certain stock awards.

During the year ended December 31, 2015, the Company recorded restructuring charges in connection with a reduction in force, the departure of executive officers and management's further alignment of the business with strategic objectives. These charges related to severance arrangements with departing employees and executives, including non-cash charges related to the acceleration of vesting of certain stock awards. In 2015, the charges also related to the closing of the BCSI facilities and the termination of the operations of ADA Analytics, a foreign subsidiary that was involved in the development of certain data analytics and monitoring products. Furthermore, during the fourth quarter of 2015, the Company closed its fabrication facility in McKeesport, Pennsylvania and recorded restructuring charges related thereto.

During the year ended December 31, 2014, the Company recorded restructuring charges primarily related to a reduction in force, the departure of executive officers and management's alignment of the business with strategic objectives. These charges were related to severance agreements with departing employees and executives, including non-cash charges related to the acceleration of vesting of certain stock awards.

A summary of the net pretax charges incurred by segment is as follows:

(in thousands, except employee data)	Approximate Number of Employees	Pretax Charge		Total
		Reimbursements Control	All Other and Corporate	
Year ended December 31, 2016				
Restructuring charges	40	\$-1,164	\$ 881	\$2,045
Changes in estimates		—(210 )	(276 )	(486 )
Total pretax charge, net of reversals		\$-954	\$ 605	\$1,559
Year ended December 31, 2015				
Restructuring charges	162	\$-5,108	\$ 5,264	\$10,372
Changes in estimates		—(10 )	(2 )	(12 )
Total pretax charge, net of reversals		\$-5,098	\$ 5,262	\$10,360
Year ended December 31, 2014				
Restructuring charges	29	\$-1,294	\$ 2,209	\$3,503
Total pretax charge, net of reversals		\$-1,294	\$ 2,209	\$3,503

The following table summarizes the Company's utilization of restructuring accruals for the years ended December 31, 2016, 2015 and 2014:

(in thousands)	Employee Severance	Facility Closures
Beginning accrual as of January 1, 2014	\$ 29	\$ —
Expense provision <sup>(1)</sup>	3,503	—
Cash payments and other <sup>(1)</sup>	(1,842 )	—
Change in estimates <sup>(1)</sup>	—	—
Accrual as of December 31, 2014	1,690	—
Expense provision <sup>(1)</sup>	8,498	2,650
Cash payments and other <sup>(1)</sup>	(7,595 )	(1,873 )
Change in estimates <sup>(1)</sup>	(12 )	—
Accrual as of December 31, 2015	2,581	777
Expense provision <sup>(1)</sup>	2,045	—
Cash payments and other <sup>(1)</sup>	(3,898 )	(320 )
Change in estimates <sup>(1)</sup>	(276 )	(210 )
Accrual as of December 31, 2016	\$ 452	\$ 247

(1) Included within the Expense provision and Cash payments and other line items in the above table is equity-based compensation of \$0.4 million, \$3.4 million and \$1.0 million for the years ended December 31, 2016, 2015 and 2014, respectively, resulting from the accelerated vesting of modified equity-based compensation awards for certain terminated employees. Additionally, as discussed in Note 8, due to restructuring activities the Company fully impaired the carrying value of certain assets, thereby recognizing net impairment expense in the amount of \$1.9 million during the year ended December 31, 2015.

Restructuring accruals related to personnel are included within the Accrued payroll and related liabilities line item in the Consolidated Balance Sheets. Restructuring expenses related to personnel are included within the Payroll and benefits and Research and development, net line items in the Consolidated Statements of Operations. Restructuring accruals related to facilities are included within the Other current liabilities line item in the Consolidated Balance Sheets. Restructuring expenses related to facilities are included within the Rent and occupancy line item in the Consolidated Statements of Operations.

Note 3 - Property and Equipment

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The carrying basis and accumulated depreciation of property and equipment at December 31, 2016 and 2015 are:

(in thousands)	Life in Years	As of December 31,	
		2016	2015
Machinery and equipment	2-7	\$1,634	\$3,498
Leasehold improvements	5-7	1,244	2,172
Furniture and fixtures	5-7	777	927
		3,655	6,597
Less accumulated depreciation and amortization		(2,920 )	(4,557 )
Total property and equipment, net		\$735	\$2,040

Depreciation expense for the years ended December 31, 2016, 2015 and 2014 was \$0.9 million, \$1.7 million and \$1.8 million, respectively.

During the year ended December 31, 2016, the Company recorded impairments totaling approximately \$0.5 million to reduce the carrying value of certain property and equipment that the Company intended to sell at its estimated sales value, less estimated costs to sell. The property and equipment was subsequently sold at auction. No gain or loss was recognized on the sale of the property and equipment.

During the year ended December 31, 2016, the Company accelerated depreciation of approximately \$0.2 million related to property and equipment that will be no longer be in service due to the lease termination described in Note 14.

As discussed in Note 2, as part of a broader strategic restructuring of the Company's business, the Company's management approved an action to wind down the manufacturing operations of BCSI, LLC, in order to focus the Company's efforts within the DSI market on engineering. During 2015, the Company classified certain assets used in the BCSI, LLC manufacturing operations as held for sale. In doing so, the Company recognized impairment expense of approximately \$0.3 million to reduce the carrying value of the assets to their estimated sales value, less estimated costs to sell. The property and equipment was subsequently sold at auction. Proceeds from the sale of the impaired assets totaled approximately \$0.6 million. No gain or loss was recognized on the sale of the property and equipment. Also during 2015, the Company sold certain property and equipment having a net book value of approximately \$0.1 million. Proceeds from the sale totaled approximately \$0.3 million, which resulted in the recognition of a gain on the sale of approximately \$0.2 million.

The Company also closed its fabrication facility in McKeesport, Pennsylvania during 2015 and recognized \$0.8 million of expense related to the abandonment of leased facilities.

#### Note 4 - Investments

The Company did not have any investment securities related to certificates of deposit as of December 31, 2016. The Company had investment securities related to certificates of deposit in the amount of \$0.3 million as of December 31, 2015. No unrealized gains or losses were recorded as of December 31, 2015 related to these investment securities.

In November 2014, the Company acquired an 8% ownership interest in the common stock of Highview, a London, England based developmental stage company specializing in power storage, for \$2.8 million in cash (the "Highview Investment"). The Company evaluated the Highview Investment and determined that it should account for it under the cost method. As of December 31, 2016 and December 31, 2015, the Highview Investment was in the amount of \$1.0 million and \$2.8 million, respectively. No unrealized gains or losses were recorded as of December 31, 2016 and December 31, 2015 related to the Highview Investment.

The Highview Investment is evaluated for impairment based on indicators of impairment such as an event or change in circumstances that may have a significant adverse effect on the fair value of the investment. When there are no indicators of impairment present, the Company estimates the fair value of the Highview Investment only if it is practical to do so. As of December 31, 2016, the Company estimated the fair value of the Highview Investment based upon an anticipated equity raise by Highview at a price of £2.00 per share. As £2.00 per share is less than the Company's cost per share of £4.25, the Company recorded an impairment charge of \$1.8 million as of December 31,

2016, which is included in Other line item in the Consolidated Statement of Operations. As of December 31, 2015, there were no indicators of impairment, and the Company estimated that the fair value of the Highview Investment approximated the November 2014 purchase price due to the proximity of the purchase date to December 31, 2015.

## Note 5 - Costs and Billings on Uncompleted Contracts

Costs incurred on uncompleted contracts represent the gross costs as of the balance sheet dates. Billings on uncompleted contracts represent the gross billings as of the balance sheet dates. Costs and billings are netted on an individual contract basis, with contracts in a net cost position aggregated and presented as Costs in excess of billings on uncompleted contracts in the Consolidated Balance Sheets, and contracts in a net billing position aggregated and presented as Billings in excess of costs on uncompleted contracts in the Consolidated Balance Sheets. The below table shows the components of these items:

	As of December	
	31,	
(in thousands)	2016	2015
Costs incurred on uncompleted contracts (gross)	\$42,993	\$72,581
Billings on uncompleted contracts (gross)	(47,915 )	(80,152 )
	\$ (4,922 )	\$ (7,571 )
Included in the accompanying balance sheets under the following captions <sup>(1)</sup> :		
Costs in excess of billings on uncompleted contracts	\$25	\$2,137
Billings in excess of costs on uncompleted contracts	(4,947 )	(9,708 )
	\$ (4,922 )	\$ (7,571 )

<sup>(1)</sup> Amounts presented after netting of costs and billings on an individual contract basis.

When the Company determines that a contract will ultimately be completed at a loss, the Company estimates such loss and accrues the loss as a loss contract accrual in the period that the loss determination is made. Loss contract accruals of \$0.2 million and \$0.8 million as of December 31, 2016 and 2015, respectively, are included in Other current liabilities line item in the Consolidated Balance Sheets. During the years ended December 31, 2016, 2015 and 2014, the Company recorded loss contract provisions of \$0.4 million, \$0.3 million and \$0.3 million, respectively. Loss contract provisions are included within the Equipment sales cost of revenue, exclusive of depreciation and amortization line item in the Consolidated Statements of Operations.

## Note 6 - Research and Development and Government and Industry Funded Contracts

The Company has invested directly in multiple emerging technologies, such as power generation data analytics, technologies aimed at the separation, capture and control of CO<sub>2</sub> emissions related to power generation, natural gas small scale liquefaction technologies and energy storage applications through and research and development activities supported by contracts with the DOE and industry participants. The contracts with the DOE can take the form of grants or cooperative agreements and are considered financial assistance awards. The deliverables required by the DOE agreements include various technical and financial reports that the Company submits on a prescribed schedule. The agreements require the Company to perform the negotiated scope of work in agreed phases, which includes testing and demonstration of technologies.

The Company has participated in several contracts awarded by the DOE. The Company typically invoices the DOE and industry cost-share partners monthly for labor and expenditures plus estimated overhead factors, less any cost share amounts. The contracts under which the Company has performed are subject to audit, the result of which may require the Company to reimburse the DOE for disallowed costs and other adjustments. The Company has not experienced any material adverse adjustments as a result of completed government audits. However, the government audits for years ended 2010 through 2015 have not yet been finalized. The following table shows the impact to Research and development expense amounts recognized in the Consolidated Statement of Operations:

	Years Ended		
	December 31,		
(in thousands)	2016	2015	2014
Research and development expense	\$173	\$6,737	\$3,554
Less:			
DOE funding	821	1,375	1,756
Industry cost-share funding	—	—	277
Research and development expense, net	\$ (648 )	\$5,362	\$1,521

Included within the above research and development expenses during 2015 is net impairment expense of \$1.9 million for the entire carrying value of the Company's ADA Analytics' assets, as discussed in Note 2 and Note 8.

## Note 7 - Equity Method Investments

## Tinum Group, LLC

As of December 31, 2016 and 2015, the Company's ownership in Tinum Group was 42.5%. Tinum Group supplies technology, equipment and technical services to cyclone-fired and other boiler users, but its primary purpose is to put into operation facilities that produce and sell RC that lower emissions and therefore qualify for tax credits available under Section 45 of the IRC ("Section 45 tax credits"). NexGen Refined Coal, LLC ("NexGen") and GSFS Investments I Corp. ("GSFS"), an affiliate of The Goldman Sachs Group, Inc. ("GS"), own the remaining 42.5% and 15.0%, respectively of Tinum Group. GSFS' ownership interest is in the form of Class B units which provide certain preferences over ADA and NexGen as to liquidation and profit distribution, including a guaranteed 15% annual return on GSFS' unrecovered investment balance, which is calculated as the original GSFS investment, plus a 15% annual return thereon, less any distributions, including the allocation of Section 45 tax credits to the members. Additionally, on the 10 year anniversary of the date the last RC facility owned by Tinum Group or one of its subsidiaries is placed into service, but no later than December 31, 2021, if GSFS's unrecovered investment balance has not been reduced to zero, GSFS may require Tinum Group to redeem its Class B units for an amount equal to the then unrecovered investment balance, payable within 180 days of the notice of redemption. GSFS has no further capital call requirements and does not have a voting interest, but does have approval rights over certain corporate transactions. However, the Class B units do not have voting rights and ADA and NexGen each maintain a 50% voting interest in Tinum Group.

Tinum Group had been determined to be a VIE, however, the Company does not have the power to direct the activities that most significantly impact Tinum Group's economic performance and has therefore accounted for the investment under the equity method of accounting. The Company determined the voting partners of Tinum Group have identical voting rights, equity control interests and board control interests, and therefore, concluded that the power to direct the activities that most significantly impact Tinum Group's economic performance was shared.

The following tables summarize the assets, liabilities and results of operations of Tinum Group:

	As of December 31,	
(in thousands)	2016	2015
Current assets	\$24,584	\$40,860
Non-current assets	\$83,621	\$90,725
Current liabilities	\$43,117	\$60,987
Non-current liabilities	\$11,456	\$9,412
Redeemable Class B equity	\$18,250	\$30,448
Members deficit attributable to Class A members	\$26,475	\$25,175
Noncontrolling interests	\$8,907	\$5,563

  

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Gross profit	\$92,305	\$108,416	\$89,098
Operating, selling, general and administrative expenses	23,662	23,405	21,501
Income from operations	68,643	85,011	67,597
Other expenses	(8,775 )	(2,203 )	(1,830 )
Class B preferred return	(3,901 )	(6,157 )	(8,707 )
Loss attributable to noncontrolling interest	27,234	10,675	11,023
Net income available to Class A members	\$83,201	\$87,326	\$68,083
ADES equity earnings from Tinum Group	\$41,650	\$8,651	\$43,584

As shown above, the Company reported earnings from its equity investment in Tinum Group of \$41.7 million, \$8.7 million and \$43.6 million for the years ended December 31, 2016, 2015 and 2014, respectively. The difference between the Company's proportionate share of Tinum Group's net income (at its equity interest of 42.5%) as presented in the table below, and the Company's earnings from its Tinum Group equity method investment as reported on the Consolidated Statements of Operations relates to the Company receiving distributions in excess of the carrying value of the equity investment, and therefore recognizing such excess distributions as equity method earnings

in the period the distributions occur, as discussed below.

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As shown in the table below, the Company's carrying value in Tinium Group was reduced to zero for all years presented, as cumulative cash distributions received from Tinium Group exceeded the Company's pro-rata share of cumulative earnings in Tinium Group. The carrying value of the Company's investment in Tinium Group shall remain zero as long as the cumulative amount of distributions received from Tinium Group continues to exceed the Company's cumulative pro-rata share of Tinium Group's net income. For periods during which the ending balance of the Company's investment in Tinium Group is zero, the Company only recognizes equity earnings from Tinium Group to the extent that cash distributions are received from Tinium Group during the period. For periods during which the ending balance of the Company's investment is greater than zero (e.g., when the cumulative earnings in Tinium Group exceeds cumulative cash distributions received), the Company recognizes its pro-rata share of Tinium Group's earnings for the period, less any amount necessary to recover the cumulative earnings short-fall balance as of the end of the immediately preceding period. As of December 31, 2016, the Company's carrying value in Tinium Group has been reduced to zero, as cumulative cash distributions received from Tinium Group have exceeded the Company's pro-rata share of cumulative earnings in Tinium Group. If Tinium Group subsequently reports net income, the Company will not record its pro-rata share of such net income until the cumulative share of pro-rata income equals or exceeds the amount of its cumulative income recognized due to the receipt of cash distributions. Until such time, the Company will only report income from Tinium Group to the extent of cash distributions received during the period.

Thus, the amount of equity income or loss reported on the Consolidated Statement of Operations may differ from a mathematical calculation of net income or loss attributable to the equity interest based upon the factor of the equity interest and the net income or loss attributable to equity owners as shown on Tinium Group's statement of operations. Additionally, for periods during which the carrying value of the Company's investment in Tinium Group is greater than zero, distributions from Tinium Group are reported on the Consolidated Statements of Cash Flows as "Distributions from equity method investees, return on investment" within Operating cash flows. For periods during which the carrying value of the Company's investment in Tinium Group is zero, such cash distributions are reported on the Consolidated Statements of Cash Flows as "Distributions from equity method investees in excess of investment basis" within Investing cash flows.

The following table presents the Company's investment balance, equity earnings and cash distributions in excess of the investment balance for the years ended December 31, 2014 through December 31, 2016 (in thousands):

Description	Date(s)	Investment balance	ADES equity earnings (loss)	Cash distributions	Memorandum Account: Cash distributions and equity loss in (excess) of investment balance
Beginning balance	12/31/2013	\$—	\$—	\$—	\$(12,906 )
ADES proportionate share of net income from Tinnuum Group <sup>(1)</sup>	2014 activity	26,613	26,613	—	—
Recovery of cash distributions in excess of investment balance (prior to cash distributions)	2014 activity	(12,906 )	(12,906 )	—	12,906
Cash distributions from Tinnuum Group	2014 activity	(43,584 )	—	43,584	—
Adjustment for current year cash distributions in excess of investment balance	2014 activity	29,877	29,877	—	(29,877 )
Total investment balance, equity earnings (loss) and cash distributions	12/31/2014	\$—	\$43,584	\$43,584	\$(29,877 )
ADES proportionate share of net income from Tinnuum Group <sup>(1)</sup>	2015 activity	\$35,265	\$35,265	\$—	\$—
Recovery of cash distributions in excess of investment balance (prior to cash distributions)	2015 activity	(29,877 )	(29,877 )	—	29,877
Cash distributions from Tinnuum Group	2015 activity	(8,651 )	—	8,651	—
Adjustment for current year cash distributions in excess of investment balance	2015 activity	3,263	3,263	—	(3,263 )
Total investment balance, equity earnings (loss) and cash distributions	12/31/2015	\$—	\$8,651	\$8,651	\$(3,263 )
ADES proportionate share of net income from Tinnuum Group <sup>(1)</sup>	2016 activity	\$35,019	\$35,019	\$—	\$—
Recovery of cash distributions in excess of investment balance (prior to cash distributions)	2016 activity	(3,263 )	(3,263 )	—	3,263
Cash distributions from Tinnuum Group	2016 activity	(41,650 )	—	41,650	—
Adjustment for current year cash distributions in excess of investment balance	2016 activity	9,894	9,894	—	(9,894 )
Total investment balance, equity earnings and cash distributions	12/31/2016	\$—	\$41,650	\$41,650	\$(9,894 )

(1) The amounts of the Company's 42.5% proportionate share of net income as shown in the table above differ from mathematical calculations of the Company's 42.5% equity interest in Tinnuum Group multiplied by the amounts of Net Income available to Class A members as shown in the table above of Tinnuum Group's results of operations due to adjustments related to the Class B preferred return and the elimination of Tinnuum Group's earnings attributable to RCM6, of which the Company owned 24.95% during the years ended December 31, 2015 and 2014 and for the period from January 1 through March 3, 2016. As noted below, the Company sold its interest in RCM6 on March 3, 2016. As of December 31, 2016, the Company's future proportionate share of Tinnuum Group's net income must exceed approximately \$9.9 million before the Company can recognize any earnings from Tinnuum Group, unless future, non-refundable cash distributions occur, in which event such distributions would be recognized as earnings from Tinnuum Group in the Consolidated Statement of Operations.



Additional information related to Tinum Group pursuant to Regulation S-X Rule 3-09 ("Rule 3-09") of the Securities and Exchange Act of 1934 (the "Exchange Act") is included within Item 15 Exhibits and Financial Statement Schedules ("Item 15") of this Form 10-K.

**Tinum Services, LLC**

In 2010, the Company, together with NexGen, formed Tinum Services for the purpose of operating and maintaining all of the RC facilities, including those RC facilities leased or sold to third parties. The Company has determined that Tinum Services is not a VIE and has evaluated the consolidation analysis under the Voting Interest Model. The Company has a 50% voting and economic interest in Tinum Services, which is equivalent to the voting and economic interest of NexGen. Therefore, as the Company does not hold greater than 50% of the outstanding voting interests, either directly or indirectly, it has accounted for the investment under the equity method of accounting. As of December 31, 2016 and 2015, the Company's 50% investment in Tinum Services was \$4.0 million and \$4.0 million, respectively.

The following tables summarize the assets, liabilities and results of operations of Tinum Services:

	As of December 31,	
(in thousands)	2016	2015
Current assets	\$278,001	\$186,959
Non-current assets	\$3,426	\$3,704
Current liabilities	\$97,093	\$92,675
Non-current liabilities	\$1,488	\$1,366
Equity	\$7,918	\$7,935
Noncontrolling interests	\$174,928	\$88,687

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Gross loss	\$(54,644)	\$(42,496)	\$(22,168)
Operating, selling, general and administrative expenses	134,782	161,456	102,757
Loss from operations	(189,426)	(203,952)	(124,925)
Other expenses	(56)	(118)	(62)
Loss attributable to noncontrolling interest	198,464	213,746	132,237
Net income	\$8,982	\$9,676	\$7,250
ADES equity earnings from Tinum Services	\$4,491	\$4,838	\$3,625

Included within the Consolidated Statement of Operations of Tinum Services during the years ended December 31, 2016, 2015 and 2014 were losses related to VIE entities that are consolidated within Tinum Services of \$198.5 million, \$213.7 million and \$132.2 million, respectively. These losses do not impact the Company's equity earnings from Tinum Services as 100% of those losses are attributable to a noncontrolling interest and eliminated in the calculations of Tinum Services' net income attributable to the Company's interest.

For the years ended December 31, 2016 and 2015, Tinum Services did not meet the significant subsidiary test provided in Regulation S-X Rule 1-02(w) ("Rule 1-02(w)") and pursuant to Regulation S-X Rule 3-09 ("Rule 3-09"). RCM6, LLC

On February 10, 2014, the Company purchased a 24.95% membership interest in RCM6, which owned a single RC facility that produced and sold RC that qualified for Section 45 tax credits, from Tinum Group through a combination of an up-front payment and note payable to Tinum Group. Due to the payment terms of the note purchase agreement, the note payable was periodically negatively amortizing. The balance of the note payable balance as of December 31, 2015 was \$14.2 million. In addition to the upfront and note payments, the Company was also subject to quarterly capital calls and variable payments based upon differences in originally forecasted RC production as of the purchase date and actual quarterly production. During the years ended December 31, 2016, 2015 and 2014, the Company paid aggregate capital calls and variable payments totaling \$0.2 million, \$2.4 million and \$4.2 million, respectively. RCM6 was determined to be a VIE; however, the Company did not have the power to direct the activities that most significantly impact its economic performance and therefore accounted for RCM6 under the equity method of accounting.

As of December 31, 2015 and 2014, the Company's ownership in RCM6 was 24.95%. The Company's investment in RCM6 as of December 31, 2015 was \$13.3 million. On March 3, 2016, the Company sold its 24.95% membership interest in RCM6 for a cash payment of \$1.8 million and the assumption, by the buyer, of the outstanding note payable made by the Company in connection with its purchase of RCM6 membership interests from Tinum Group in February 2014. In doing so, the Company recognized a gain on the sale of \$2.1 million for the year ended December 31, 2016, which is included within the Other line item in the Consolidated Statements of Operations. As a result of the sale of its ownership interest, the Company ceased to be a member of RCM6 and, as such, is no longer subject to any quarterly capital calls and variable payments to RCM6. In addition, the Company has no future obligations related to the previously recorded note payable. However, the Company will still receive its pro-rata share of income and cash distributions through its ownership in Tinum Group based on the RCM6 RC facility lease payments made to Tinum Group.

The following tables summarize the assets and liabilities and results of operations of RCM6 for balance sheet dates and periods ended in which the Company owned a 24.95% membership interest:



	As of
	December
	31,
(in thousands)	2015
Current assets	\$12,240
Non-current assets	\$2,472
Current liabilities	\$1,489
Non-current liabilities	\$7,649
Equity	\$5,574

	January		
	1 -	Year ended	
	March	December 31,	
	3,		
(in thousands)	2016	2015	2014
Gross loss	\$(555)	\$(7,877)	\$(8,257)
Operating, selling, general and administrative expenses	360	2,178	2,123
Loss from operations	(915)	(10,055)	(10,380)
Other expenses	(52)	(641)	(666)
Net loss	\$(967)	\$(10,696)	\$(11,046)
ADES equity loss from RCM6	\$(557)	\$(4,568)	\$(4,497)

The purchase of RCM6 resulted in the Company recording a basis difference related to property, plant and equipment and identifiable intangible assets. The amount by which the total of the Company's investment in RCM6 exceeded its proportionate share of the investee's net assets, recorded within the Equity method investments line item in the Consolidated Balance Sheets as of December 31, 2015 was \$11.9 million. The difference between the Company's proportionate share of RCM6's net loss and the Company's equity losses noted above related to this depreciation and amortization. For the period from January 1 through March 3, 2016 and the years ended December 31, 2015 and 2014, the Company decreased its equity method earnings in RCM6 by \$0.3 million, \$1.9 million and \$1.7 million, respectively, due to the basis difference.

The following table details the carrying value of the Company's respective equity method investments included within the Equity method investments line item on the Consolidated Balance Sheets and indicates the Company's maximum exposure to loss:

	As of December	
	31,	
(in thousands)	2016	2015
Equity method investment in Tinum Group	\$—	\$—
Equity method investment in Tinum Services	3,959	3,968
Equity method investment in RCM6	—	13,264
Total equity method investments	\$3,959	\$17,232

The Company evaluates the investments for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment might not be recoverable. No impairments were recorded during the years ended December 31, 2016, 2015 and 2014.

The following table details the components of the Company's respective earnings or loss from equity method investments included within the Earnings from equity method investments line item on the Consolidated Statements of Operations:

	Year ended December 31,		
(in thousands)	2016	2015	2014
Earnings from Tinum Group	\$41,650	\$8,651	\$43,584
Earnings from Tinum Services	4,491	4,838	3,625
Loss from RCM6	(557)	(4,568)	(4,497)

Earnings from equity method investments \$45,584 \$8,921 \$42,712

The following table details the components of additional cash investments related to the Company's respective equity method investments included within the Consolidated Statements of Cash Flows:

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(in thousands)	Year ended December 31,		
	2016	2015	2014
Purchase of RCM6 interest from Tuum Group	\$—	\$—	\$3,153
Contributions to RCM6	223	2,398	3,478
Purchase of and contributions to equity method investments	\$223	\$2,398	\$6,631

The following table details the components of the cash distributions from the Company's respective equity method investments included within the Consolidated Statements of Cash Flows. Distributions from equity method investees are reported on the Consolidated Statements of Cash Flows as "return on investment" within Operating cash flows until such time as the carrying value in an equity method investee company is reduced to zero; thereafter, such distributions are reported as "distributions in excess of cumulative earnings" within Investing cash flows.

(in thousands)	Year ended December 31,		
	2016	2015	2014
Distributions from equity method investees, return on investment			
Tuum Group <sup>(1)</sup>	\$3,400	\$—	\$—
Tuum Services	\$4,500	\$5,019	\$2,509
Included in Operating Cash Flows	\$7,900	\$5,019	\$2,509
Distributions from equity method investees in excess of cumulative earnings			
Tuum Group	\$38,250	\$8,651	\$43,584
Included in Investing Cash Flows	\$38,250	\$8,651	\$43,584

(1) During the three months ended March 31, 2016, the Company's cumulative share of pro-rata Tuum Group income exceeded the amount of its cumulative income recognized due to cash being distributed. As such, the Company recognized \$3.4 million as "return on investment".

#### Note 8 - Acquisition

##### 2015 Acquisition

In November 2014, the Company entered into an agreement with InSyst Ltd. and ClearView Monitoring Solutions Ltd. (collectively "ClearView"), both Israel-based companies specializing in data analytics, to allow the Company the exclusive option to purchase certain assets of ClearView. The Company paid \$0.2 million related to this option, which would be applied to the future purchase price if applicable. In January 2015, the Company notified ClearView that it had elected to exercise its exclusive option to purchase certain assets of ClearView.

In March 2015, the Company acquired the certain assets of InSyst Ltd. and ClearView Monitoring Solutions Ltd., to be operated under the Company's wholly-owned subsidiary, ADA Analytics, for total cash payments of \$2.4 million, which was inclusive of value-add tax of \$0.4 million. The acquisition was accounted for under the acquisition method of accounting, which requires the total purchase consideration to be allocated to the assets acquired and liabilities assumed based on estimates of fair value. Operating results related to the acquired assets were consolidated into the Company's results of operations beginning March 6, 2015.

A summary of the purchase consideration and allocation of the purchase consideration is as follows:

	(in thousands)
Purchase consideration:	
Cash paid	\$ 2,360
Fair value of liabilities assumed:	
Accrued liabilities	10
Contingent consideration	451
Total fair value of liabilities assumed	461
Total purchase consideration	\$ 2,821

Allocation of purchase consideration	
Receivables	\$ 360
Property and equipment and other	82
Intangibles - in process research and development	2,379
Total	\$ 2,821

The transaction called for a series of contingent payments based upon the achievement of certain predetermined sales targets and the completion of certain sales transactions. These contingent payments were classified as contingent consideration. As part of the purchase price, the Company recorded a \$0.5 million liability for the contingent consideration based upon the net present value of the Company's estimate of the future payments.

During August 2015, as part of a broader strategic restructuring of the Company's business to simplify its operating structure in a manner that creates increased customer focus, better supports sales and product delivery and also aligns the Company's cost structure as the emissions control market shifts towards compliance solutions for the Federal Mercury and Air Toxics Standards ("MATS"), the Company's management approved an action to wind down operations of ADA Analytics. As a result of these actions, the Company fully impaired the carrying value of the assets and reversed the liability for the contingent consideration, thereby recognizing net impairment expense in the amount of \$1.9 million during 2015. As disclosed in Note 6, the impairment expense was included as a component of research and development expense for the year ended December 31, 2015.

#### Note 9 - Related Party Transactions

##### Accounts Receivables

The following table shows the Company's receivable balance associated with related parties as of December 31, 2016 and 2015, respectively:

(in thousands)	As of	
	December 31, 2016	2015
Receivable from related party - Tinum Group	\$1,934	\$1,918
Accounts Payable and Advanced Deposits		

The following table shows the Company's payable balance associated with related parties, exclusive of amounts owed to employees and directors in the normal course of business, as of December 31, 2016 and 2015, respectively:

(in thousands)	As of	
	December 31, 2016	2015
Payable to related party - RCM6	\$ —	\$ 270

Prior to 2014, the Company received advanced payments totaling \$10.0 million for M-45<sup>TM</sup> technology royalties from Tinum Group. As of December 31, 2016 and 2015, the Company's remaining advanced deposit balance was zero and \$3.0 million, respectively.

## Revenues

The following table shows the revenues recognized with related parties during the years ended December 31, 2016, 2015 and 2014, respectively:

(in thousands)	Years Ended	
	December 31, 2016	2015 2014
Revenues from related party - Tinum Group	\$-\$55	\$665

The Tinum Group revenues in the table above are included within the Chemicals line in the Consolidated Statements of Operations.

## Other Income

The following table shows the other income recognized with related parties during the years ended December 31, 2016, 2015 and 2014, respectively:

(in thousands)	Years Ended December		
	31, 2016	2015	2014
Royalties, related party - Tinum Group	\$6,125	\$10,642	\$6,410

The above Tinum Group royalties are included within the Royalties, related party line in the Consolidated Statements of Operations.

## Notes Payable

The following table summarizes the Company's notes payable (net of debt discount and issuance costs) classified according to payment terms, all of which are with related parties:

(in thousands)	Related Party	As of December 31, 2016
Short-term note payable		
Credit Agreement, net of discount	Franklin Mutual	\$-\$12,676
Total Short-term borrowings		—12,676
Current portion of long-term borrowings		
RCM6 note payable, net of discount	Tinum Group	—1,207
DSI Business Owner note payable	DSI Business Owner	—630
Total Current portion of long-term borrowings		—1,837
Total Short-term and current portion of long-term borrowings		—14,513
Long-term borrowings		
RCM6 note payable, net of discount	Tinum Group	—13,023
DSI Business Owner note payable	DSI Business Owner	—489
Total Long-term borrowings		—13,512
Total Borrowings		\$-\$28,025
Credit Agreement		

On October 22, 2015, the Company entered into a credit agreement for a \$15.0 million short-term loan with Franklin Mutual Quest Fund and MFP Investors LLC (the "Lenders"), and Wilmington Trust, National Association, as the administrative agent and collateral agent ("Administrative Agent") (the "Credit Agreement"), which was subsequently amended in 2016 as discussed below. Under the original terms and conditions, the Credit Agreement matured on April 22, 2016, subject to a three month extension at the Company's option to the extent certain conditions are met. The Credit Agreement bore interest at an annual rate equal to 10.5% and was subject to various prepayment and other premiums if certain events, including a change in control, occur. The Company received net proceeds of \$13.5 million and recorded debt discount and debt issuance costs of \$1.5 million. The debt discounts and debt issuance costs were amortized to interest expense using the effective interest method over the life





of the Credit Agreement. The net proceeds were being used to fund working capital needs and for general operating purposes of the Company and its subsidiaries.

All obligations of the Company under the Credit Agreement were unconditionally guaranteed by each of the Company's wholly-owned domestic subsidiaries (other than ADA Analytics, LLC) and were secured by perfected security interests in substantially all of the assets of the Company and the guarantors, subject to certain agreed upon exceptions.

The Lenders were beneficial owners of Common Stock in the Company. The Credit Agreement was approved by the Board and the Audit Committee as a related party transaction.

In connection with the Credit Agreement, and the Company's pledge and assignment to the Collateral Agent for all of ADA's equity interests in Tinum Services, the Lenders required that NexGen consent to a pledge. The Company entered into an Indemnity Agreement with NexGen whereby ADES and ADA agreed to indemnify NexGen from and against any and all losses, claims, damages, liabilities, costs, fees or expenses, which may arise in connection with the Company pledging its Tinum Services equity interests. The Indemnity Agreement was approved by the Board and the Audit Committee as a related party transaction.

On February 8, 2016, the Company entered into the first amendment to the Credit Agreement ("First Amendment") that extended the SEC filings date to March 30, 2016. On March 30, 2016, the Company entered into the second amendment to the Credit Agreement ("Second Amendment"). The Second Amendment extended the maturity date to July 8, 2016, extended the Company's filing date deadline related to its 2015 SEC filings to April 20, 2016, increased the stated interest rate from 10.5% to 15.0% and increased the minimum cash balance requirement from \$3.0 million to \$3.5 million. The Company incurred approximately \$0.6 million in fees related to the Second Amendment.

On June 30, 2016, the Company, the required Lenders under the Credit Agreement and the Administrative Agent agreed to terminate the Credit Agreement (the "Payoff Letter") prior to the maturity date of July 8, 2016, effective upon the Company's \$9.9 million prepayment, which amount included the total unpaid principal balance of the loans and advances made to or for the benefit of the Company, together with all accrued but unpaid interest, and the total amount of all fees, costs, expenses and other amounts owed by the Company thereunder, including a prepayment premium. The \$9.9 million prepayment amount was paid on June 30, 2016 (the "Payoff Date"). The Payoff Letter included a waiver by the Lenders for a portion of the 4% prepayment premium required by the terms of the Credit Agreement.

#### Tinum Group - RCM6 Note Payable

The Company acquired membership interests in RCM6 from Tinum Group in February 2014 through an up-front payment and a note payable (the "RCM6 Note Payable"). Due to the payment terms of the note purchase agreement, the RCM6 Note Payable periodically added interest to the outstanding principal balance. The stated rate associated with the note was 1.65% and the effective rate of the note at inception was 20%. Due to the difference between the stated rate and the effective rate, the note payable was carried at a discount of \$7.6 million as of December 31, 2015. As described in Note 7, on March 3, 2016, the Company sold its 24.95% membership interest in RCM6 and, as a result, the Company had no future obligations related to the previously recorded RCM6 Note Payable.

#### DSI Business Owner

As of December 31, 2014, the Company terminated the consulting portion of the agreements with the DSI Business Owner. However, according to the terms of the remaining agreements, the Company was required to make all remaining payments structured as a note payable through the third quarter of 2017. In February 2016, the Company entered into an agreement with the DSI Business Owner and settled the remaining amounts owed as of the date of the agreement of approximately \$1.1 million for \$0.3 million, which was paid during the first quarter of 2016. The difference between the remaining amounts owed and the settlement amount has been included within the Gain on settlement of note payable and licensed technology line item in the Consolidated Statements of Operations for the year ended December 31, 2016.

#### Highview Long-term License Agreement

During 2014, the Company entered into an exclusive, ten-year agreement ("License Agreement") with Highview to utilize certain licensed technology. Pursuant to the License Agreement, the Company recorded a long-term licensed technology asset and related obligation. As of December 31, 2015, the Company's obligation under the long-term licensing agreement was approximately \$1.6 million.

On June 15, 2016, the Company entered into an agreement with Highview to terminate the License Agreement in exchange for a one-time payment by the Company of £0.2 million (approximately \$0.2 million). Per the agreement, payment of the termination fee, if any, will only be settled by relinquishing shares of Highview currently owned by the Company equal to £0.2 million. As a result of terminating the License Agreement, the Company wrote off the licensed technology asset, reduced the corresponding long-term liability to the amount of the one-time payment, and recognized a gain of approximately \$0.2 million. The gain on the settlement of the Highview license technology obligation is included in the Other income line on the Company's Consolidated Statement of Operations for the year ended December 31, 2016.

#### Clearview

As discussed in Note 8, on November 20, 2014, the Company entered into an agreement with InSyst Ltd. and ClearView Monitoring Solutions Ltd., both Israel-based companies specializing in data analytics, to allow the Company the exclusive option to purchase certain assets of ClearView. The Company paid \$0.2 million related to this option. Additionally, from November 20, 2014 through the date of the acquisition, the Company paid certain operating costs of Clearview. During the year ended December 31, 2014, the Company recorded expenses of \$0.2 million related to these payments within the General and administrative line in the Consolidated Statements of Operations. During 2015, prior to the acquisition, the Company recorded expenses of \$0.2 million related to these payments within the General and administrative line in the Consolidated Statements of Operations.

#### Arch Coal License

In June 2010, the Company entered into a Development and License Agreement and executed a Securities Subscription and Investment Agreement with Arch Coal, Inc. ("Arch"), a related party as discussed below, pursuant to which the Company licensed, on an exclusive, non-transferable basis, the use of certain of its technology to enhance coal by a proprietary treatment process. The Company received a non-refundable license fee payment from Arch in the amount of \$2.0 million and incurred non-reimbursable costs associated with this agreement in the amount of \$0.3 million. However, as the agreement does not specify an end date related to the completion of the agreement, the Company has recorded the non-reimbursable costs in the Deposits line item within Other Long-term assets and the non-refundable license fee payment in the Deferred revenue line item in Other long-term liabilities, as shown in Note 11.

#### Board of Director Matters

An Arch designee holds one seat on the Board. The appointment of one designee to the Board was made pursuant to a 2003 Subscription and Investment Agreement, as amended to reflect the effect of the Company's two-for-one stock split in March 2014, whereby the Company's management agreed to make available one seat on the Board for an Arch designee and to vote all shares and proxies they are entitled to vote in favor of such designee for so long as Arch continues to hold at least 200,000 shares of our common stock.

From May 2014 through September 2014, a member of the Board entered into a consulting agreement with the Company to assist in the Restatement process and received compensation of \$0.1 million during this period related to the services provided. In addition, as required by the Company's related-party transaction policy, the above noted agreement was approved by the Company's Audit Committee before being recommended to the Board for approval and was then approved by the disinterested members of the Board. In addition, this individual subsequently served as the Company's Chief Financial Officer from June 2015 through June 2016.

Refer to Note 7 for a discussion of transactions entered into with the Company's equity investees.

#### Note 10 - Fair Value Measurements

##### Fair Value of Financial Instruments

The carrying amounts of financial instruments, including cash and cash equivalents, accounts receivable, accounts payable, deposits and accrued expenses, approximate fair value due to the short maturity of these instruments. Accordingly, these instruments are not presented in the table below. The following table provides the estimated fair values of the remaining financial instruments:

(in thousands)	As of December 31, 2016		As of December 31, 2015	
	Carrying Value	Fair Value	Carrying Value	Fair Value
<b>Financial Instruments:</b>				
<b>Investment securities:</b>				
Investment securities, restricted, long-term	\$—	\$—	\$336	\$336
Cost method investment	\$1,016	\$1,016	\$2,776	\$2,776
<b>Borrowings and Notes Payable</b>				
Short-term borrowings, net of discount and deferred loan costs, related party	\$—	\$—	\$12,676	\$12,676
Current portion of notes payable, related parties (1)	\$—	\$—	\$1,837	\$1,457
Long-term portion of notes payable, related parties	\$—	\$—	\$13,512	\$13,273
Highview technology license payable	\$207	\$207	\$519	\$519
Highview technology license payable, long-term	\$—	\$—	\$1,038	\$1,038
Stock appreciation rights, liability-classified equity award	\$—	\$—	\$742	\$742

(1) The fair value related to the DSI business owner note payable amounts as of December 31, 2015 was determined using the settlement agreement amount of \$0.3 million, as described in Note 9.

#### Concentration of credit risk

The Company's financial instruments that are exposed to concentrations of credit risk consist primarily of cash and cash equivalents and restricted cash. The Company holds such financial instruments at two financial institutions as of December 31, 2016. If those institutions were to be unable to perform their obligations, the Company would be at risk regarding the amount of investment in excess of the federal deposit insurance corporation limits (\$250 thousand) that would be returned to the Company.

#### Assets and Liabilities Measured at Fair Value on a Recurring Basis

The estimated fair values of investment securities are described below. Refer to Note 4 for additional information regarding the Company's investment securities.

Fair value is defined as the price that would be received from the sale of an asset or paid to transfer a liability in an orderly transaction between market participants as of the measurement date. The Company uses the hierarchy prescribed in the accounting guidance for fair value measurements, based upon the available inputs to the valuation and the degree to which they are observable or not observable in the market. The three levels in the hierarchy are as follows:

- Level 1 Inputs - Quoted prices (unadjusted) for identical assets or liabilities in active markets that are accessible as of the measurement date.
- Level 2 Inputs - Inputs other than quoted prices within Level 1 that are observable either directly or indirectly, including but not limited to, quoted prices in markets that are not active, quoted prices in active markets for similar assets or liabilities and observable inputs other than quoted prices such as interest rates or yield curves.
- Level 3 Inputs - Unobservable inputs reflecting the Company's own assumptions about the assumptions that market participants would use in pricing the asset or liability, including assumptions about risk.

Financial instruments carried and measured at fair value on a recurring basis are presented in the table below according to the fair value hierarchy described above. There were no financial instruments carried and measured at fair value on a recurring basis as of December 31, 2016.

(in thousands)	As of December 31, 2015			
	Fair Value			
	Measurement Using			Fair Value
Level 1	Level 2	Level 3		
Assets:				
Investment securities, restricted, long-term		\$-\$336	\$	-\$ 336
Total assets at fair value		\$-\$336	\$	-\$ 336
Liabilities:				
Stock appreciation rights, liability-classified equity award		\$-\$742	\$	-\$ 742
Total liabilities at fair value		\$-\$742	\$	-\$ 742

The estimated fair value of certificates of deposit investments securities were estimated to be equal to the deposit value of the investment due to the market interest rates and relative short term nature of the instrument. The Company's experience with these types of investments and the expectations of the current investments held is that they will be satisfied at the current carrying amount. These securities were classified as Level 2.

#### Assets and Liabilities Measured at Fair Value on a Non-Recurring Basis

During December 2014 and March 2015, the Company loaned a total of \$1.0 million to an independent technology development company exploring energy storage to provide financing to pursue emissions technology projects, bearing annual interest of 8%. Interest and principal were payable at maturity in March 2018. Subsequent to the second loan disbursement, the Company became aware that the independent technology development company exploring energy storage was not awarded contracts that would have utilized their emissions technology. The Company also became aware that without these contracts, the ability of the independent third party to repay these loans was doubtful. As a result, the Company has recorded an allowance against the entire principal balance of the notes receivable, reversed accrued interest and put the note on non-accrual status.

During the fourth quarter of 2015, the Company recorded impairments totaling approximately \$0.3 million to reduce the carrying value of certain property and equipment that the Company intended to sell at its estimated sales value, less estimated costs to sell. The property and equipment was subsequently sold at auction. Proceeds from the sale of the impaired assets totaled approximately \$0.6 million. No gain or loss was recognized on the sale of the property and equipment.

Also during the fourth quarter of 2015, the Company sold certain property and equipment having a net book value of approximately \$0.1 million. Proceeds from the sale totaled approximately \$0.3 million, which resulted in the recognition of a gain on the sale of approximately \$0.2 million.

During the year ended December 31, 2016, the Company recorded impairments totaling approximately \$0.5 million to reduce the carrying value of certain property and equipment that the Company intended to sell at its estimated sales value, less estimated costs to sell. The property and equipment was subsequently sold at auction. No gain or loss was recognized on the sale of the property and equipment. Additionally, the Company recorded an impairment of approximately \$0.8 million included within Equipment sales cost of revenue for the year ended December 31, 2016. As discussed in Note 4, during the fourth quarter of 2016, the Company recorded an impairment charge of approximately \$1.8 million to reduce the carrying value of its cost method investment to its estimated fair value. The fair value measurements represent Level 3 measurements as they are based on significant inputs not observable in the market.

## Note 11 - Supplemental Financial Information

## Supplemental Balance Sheet Information

The following table summarizes the components of Prepaid expenses and other assets and Other assets as presented in the Consolidated Balance Sheets:

(in thousands)	As of	
	December 31, 2016	2015
Other current assets:		
Prepaid expenses	\$1,169	\$2,117
Inventory	16	189
Other	172	—
	\$1,357	\$2,306
Other long-term assets:		
Deposits	\$263	\$414
Intangibles	696	1,941
Other long-term assets	323	341
	\$1,282	\$2,696

The following table details the components of Other current liabilities and Other long-term liabilities as presented in the Consolidated Balance Sheets:

(in thousands)	As of	
	December 31, 2016	2015
Other current liabilities:		
Accrued consultant incentives	\$—	\$369
Accrued interest	618	1,042
Accrued losses on equipment contracts	183	759
Taxes payable	244	521
Deferred revenue	76	682
Warranty liabilities	287	1,197
Deferred rent	369	—
Asset retirement obligation	1,312	1,248
Other	928	1,577
	\$4,017	\$7,395
Other long-term liabilities:		
Deferred rent	\$38	\$767
Advance deposit, related party	—	2,981
Deferred revenue, related party	2,000	2,000
Other long-term liabilities	—	2,604
	\$2,038	\$8,352

The tables below detail components of Other current liabilities as presented above:

The changes in the carrying amount of the Company's warranty obligations, which do not include amounts for DSI systems, as revenues are deferred until the end of the warranty period, were as follows:

(in thousands)	As of December 31,	
	2016	2015
Balance, beginning of year	\$1,197	\$152
Warranties accrued, net	89	1,337
Warranty claims	(899 )	(292 )
Change in estimate related to previous warranties accrued	(100 )	—
Balance, end of year	\$287	\$1,197

Included within Other current liabilities is the Company's asset retirement obligation. Changes in the Company's asset retirement obligations were as follows:

(in thousands)	As of December 31,	
	2016	2015
Asset retirement obligation, beginning of year	\$1,248	\$1,188
Accretion	64	60
Asset retirement obligations, end of year	\$1,312	\$1,248

#### Supplemental Consolidated Statements of Operations Information

The following table details the components of Interest expense in the Consolidated Statements of Operations:

(in thousands)	Years Ended December 31,		
	2016	2015	2014
453A interest	\$2,490	\$4,639	\$3,371
Interest on RCM6 note payable, related party	263	2,468	2,245
Credit agreement interest	1,884	1,180	—
Other	429	115	109
	\$5,066	\$8,402	\$5,725

The following table details the components of Other in the Consolidated Statements of Operations:

(in thousands)	Years Ended December 31,		
	2016	2015	2014
Gain on sale of equity method investment	\$2,078	\$ —	—
Gain on settlement of note payable and licensed technology	1,019	—	—
Impairment of cost method investment	(1,760 )	—	—
Gain on termination of sales-type lease	891	—	—
Other	235	494	26
	2,463	494	26

#### Note 12 - Stockholders Equity

The Company has two classes of capital stock authorized, common stock and preferred stock, which are described as follows:

##### Preferred Stock



The Board is authorized to provide out of the unissued shares of Preferred Stock and to fix the number of shares constituting a series of Preferred Stock and, with respect to each series, to fix the number of shares and designation of such series, the voting powers, if any, the preferences and relative, participating, option or other special rights, if any, and any qualifications,

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limitations or restrictions thereof, of the shares of such series. As of December 31, 2016 and 2015, there were no shares of Preferred Stock outstanding.

#### Common Stock

Holders of common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders. Additionally, holders of common stock are entitled to receive dividends when and if declared by the Board, subject to any statutory or contractual restrictions on payment of dividends and to any restrictions on the payment of dividends imposed by the terms of any outstanding shares of preferred stock.

Upon dissolution, liquidation or the sale of all or substantially all of the Company's assets, after payment in full of any amounts required to be paid to creditors and to the holders of preferred stock having liquidation preferences, if any, the holders of shares of common stock will be entitled to receive the Company's remaining assets for distribution on a pro rata basis.

#### Dividends

The Company is limited in its ability to pay dividends without concurrently increasing its letters of credit related to the Royalty Award, further discussed in Note 14. Should the Company pay dividends, the payment of such dividends will be dependent upon earnings, financial condition and other factors considered relevant by the Board and will be subject to limitations imposed under Delaware law.

#### Activity

On March 14, 2014, the Company completed a two-for-one stock split of the Company's common stock, which was effected in the form of a common stock dividend. All share amounts have been retroactively adjusted for the split.

### Note 13 - Stock-Based Compensation

#### The Plans

The Company currently has several stock and option plans, including the 2005 Directors' Compensation Plan (the "2005 Plan"), the Amended and Restated 2007 Equity Incentive Plan, as amended (the "2007 Plan"), the Amended and Restated 2010 Non-Management Compensation and Incentive Plan, as amended (the "2010 Plan") and the Profit Sharing Retirement Plan, which is a plan qualified under Section 401(k) of the Internal Revenue Code (the "401(k) Plan") as described below. These plans allow the Company to issue stock-based awards, including common stock, restricted stock, stock options and other rights and benefits under the plans to employees, directors and non-employees.

**The 2005 Plan** - During 2005, the Company adopted the 2005 Plan, which authorized the issuance of shares of common stock and the grant of options to purchase shares of common stock to non-management directors. Under the 2005 Plan, the award of stock is limited to not more than 2,000 shares per individual per year, and the grant of options is limited to 10,000 per individual in total. The aggregate number of shares of common stock reserved for issuance under the 2005 Plan totals 180,000 shares (100,000 in the form of stock awards and 80,000 in the form of options). These stock options vest in three equal annual installments beginning one year after the grant date. The 2005 Plan terminated during 2015.

**The 2007 Plan** - During 2007, the Company adopted the 2007 Plan, as amended and restated on July 1, 2013 and amended on July 19, 2012 and February 12, 2014, with two additional amendments, approved by the Board on February 13, 2014 and

June 5, 2015. The 2007 Plan permits grants to employees, directors and non-employees of shares of common stock, restricted stock, stock options, cash awards and other rights and benefits under the plan. The maximum annual grant limit for a non-management director on an annual basis is 50,000 shares. The maximum awards available to be granted from the 2007 Plan on an annual basis to any other individual is 400,000 shares. The total number of shares authorized for issuance under the 2007 Plan is 3.6 million.

The Compensation Committee of the Board has also approved annual long-term incentive awards for executive officers under the 2007 Plan. The awards vest based on the grantee's continuous service with the Company,

performance measures or a combination of both. Each PSU represents a contingent right to receive shares of the Company's common stock if the Company meets certain performance measures over the requisite period. Vesting of the PSU's, if at all, occurs no later than January 2 after the conclusion of the third year of the performance period, subject to the grantee's continuous service and the achievement of certain pre-established performance goals. Amounts vested are measured as of December 31st, immediately prior to the end of the service period, unless the PSU's vest sooner at the target amount as a result of certain transactions pursuant to Section 11 of the 2007 Plan.

The number of shares of common stock a participant receives will be increased (up to 200 percent of target levels) or reduced (down to zero) based on the level of achievement of performance goals. The number of PSU's that may be earned by a

participant is determined at the end of the performance period based on the relative placement of the Company's total stockholder return ("TSR") for that period with approximately 75% of the award based on the relative performance of the Company's TSR performance compared to the respective TSRs of a specified group of peer companies and the remaining portion of the award based on the Company's TSR performance compared to the Russell 3000 Index.

The 2010 Plan - During 2010, the Company adopted the 2010 Plan which permits grants of awards to employees, which may be shares, rights to purchase restricted stock, bonuses of restricted stock, or other rights or benefits under the plan. The Company reserved 600,000 shares of its common stock for these purposes. The Plan was amended and restated as of July 19, 2012 to make non-material changes to assure Internal Revenue Code Section 409A compliance.

The 401(k) Plan - In 2009, the Company revised its 401(k) Plan to allow the issuance of shares of its common stock to employees to satisfy its obligation to match employee contributions under the terms of the plan in lieu of matching contributions in cash. The Company reserved 600,000 shares of its common stock for this purpose. The value of common stock issued as matching contributions under the plan is determined based on the per share market value of the Company's common stock generally on quarterly authorization dates. Activity related to the 401(k) Plan is included in Note 15.

Collectively, these plans are called the "Stock Plans."

#### Expense

Restricted Stock - Restricted stock is typically granted with vesting terms of three or five years. The fair value of Restricted Stock Awards ("RSA's") is determined based on the closing price of the Company's common stock on the authorization date of the grant multiplied by the number of shares subject to the stock award. Compensation expense for RSA's is generally recognized over the entire vesting period on a straight-line basis.

Stock Options - Stock options generally vest over three years and have a contractual limit of five years from the date of grant to exercise. The fair value of stock options granted is determined on the date of grant using the Black-Scholes option pricing model and the related expense is recognized on a straight-line basis over the entire vesting period. The following table indicates the weighted-average assumptions that were used related to the awards granted for the years ended December 31, 2016, 2015 and 2014, respectively:

	Years Ended		
	December 31,		
	2016	2015	2014
Stock options granted:			
Risk-free interest rate	1.3 %	1.8 %	1.6 %
Dividend yield	— %	— %	— %
Volatility	78.8%	74.5%	80.4%
Expected term (in years)	2.6	5.0	5.0

The Company uses historical data to estimate inputs used in the Black-Scholes option pricing model.

Risk-free interest rate - The risk-free interest rate for stock options granted during the period was determined by using a zero-coupon U.S. Treasury rate for the periods that coincided with the expected terms listed above.

Dividends - As historically no dividends have been paid, no dividend yield was included in the calculations.

Expected volatility - To calculate expected volatility, the historical volatility of the Company's common stock was used.

Expected term - The Company's expected term of options was based upon historical exercise behavior and consideration of the options' vesting and contractual terms.

Stock Appreciation Rights - Stock Appreciation Rights ("SAR's") generally vest over three years and have a contractual limit of five years from the date of grant to exercise. The fair value of SAR's granted is determined on the date of grant using the Black-Scholes option pricing model and the related expense is recognized on a straight-line basis over the derived service period of the respective awards. During 2015, the Company granted a SAR award, and as settlement of the award was out of the control of the Company, the awards were classified as liability-based equity awards and were recorded at the estimated fair value at the grant and remeasured as a liability-based award as of each reporting period. This SAR award was converted to a stock option as

of June 30, 2016 as discussed below. The following table indicates the weighted-average assumptions that were used related to the awards granted for the year ended December 31, 2015. No SAR's were granted during the year ended December 31, 2016.

	Year ended December 31, 2015	
SAR's granted:		
Risk-free interest rate	1.8	%
Dividend yield	—	%
Volatility	74.5	%
Expected term (in years)	5.0	

The Company uses historical data to estimate inputs used in the Black-Scholes option pricing model.

Risk-free interest rate - The risk-free interest rate for SAR's granted during the period was determined by using a zero-coupon U.S. Treasury rate for the periods that coincided with the expected terms listed above.

Dividends - As historically no dividends have been paid, no dividend yield was included in the calculations.

Expected volatility - To calculate expected volatility, the historical volatility of the Company's common stock was used.

Expected term - The Company's expected term of SAR's was based upon consideration of the contractual term of the Company's SAR's of 5 years.

PSU's - Compensation expense is recognized for PSU awards on a straight-line basis over a 3-year service period based on the estimated fair value at the date of grant using a Monte Carlo simulation model. The following table indicates the weighted-average assumptions that were used related to the awards granted for the years ended December 31, 2015 and 2014. No PSU's were granted during the year ended December 31, 2016.

	Years Ended December 31, 2015		2014	
PSUs granted:				
Risk-free interest rate	1.0	%	0.8	%
Dividend yield	—	%	—	%
Volatility	64.3	%	74.5	%
Performance period (in years)	3.0		3.0	

The Company uses historical data to estimate inputs used in the Monte Carlo pricing model.

Risk-free interest rate - The risk-free interest rate for PSU's granted during the period was determined by using a zero-coupon U.S. Treasury rate for the periods that coincided with the expected terms listed above.

Dividends - As historically no dividends have been paid, no dividend yield was included in the calculations.

Expected volatility - To calculate expected volatility, the historical volatility of the Company's common stock was used.

Performance period - The Company's performance period is based upon the vesting term of the Company's PSU awards.

The Company recorded the following compensation expense related to the Stock Plans:

(in thousands)	Years Ended		
	December 31,		
	2016	2015	2014
RSA expense	\$2,021	\$2,909	\$2,612
Stock option expense	285	658	117
SAR expense	106	742	—
PSU expense	456	2,895	1,983
Total stock-based compensation expense (1)	2,868	7,204	4,712

(1) Amounts for the years ended December 31, 2016, 2015 and 2014 do not reflect an income tax benefit as a result of a valuation allowance on the Company's deferred tax assets.

The Company recorded stock-based compensation expense related to awards to Directors in the General and administrative expense line and all other awards within the Payroll and benefit expense line in the Consolidated Statements of Operations.

During the years ended December 31, 2016, 2015 and 2014 the Company modified the terms of awards granted to 27, 37, and 17 employees, respectively, in connection with its restructuring plans and termination of the impacted employees discussed in Note 2. These modifications resulted in the accelerated vesting and incremental expense related to certain performance-based awards and restricted stock awards. As a result, during 2016, 2015 and 2014 the Company recognized incremental stock-based compensation of \$0.4 million, \$3.4 million and \$1.0 million respectively, which was included in the Payroll and benefits line item in the Consolidated Statements of Operations.

The amount of unrecognized compensation cost as of December 31, 2016, and the expected weighted-average period over which the cost will be recognized is as follows:

(in thousands)	As of December 31, 2016	
	Unrecognized Compensation Cost	Expected Weighted-Average Period of Recognition (in years)
RSA expense	\$1,335	0.98
Stock option expense	732	0.53
PSU expense	137	0.63
Total unrecognized stock-based compensation expense	\$2,204	0.81

A summary of the status and activity of non-vested RSA's is presented in the following table:

(in thousands, except for share and per share amounts)	For the Years Ended December 31.					
	2016	2015		2014		
	Shares	Weighted-Average Grant Date Fair Value	Shares	Weighted-Average Grant-Date Fair Value	Shares	Weighted-Average Grant-Date Fair Value
Non-vested at beginning of year	134,708	\$ 8.49	209,921	\$ 13.59	263,989	\$ 9.05
Granted	363,758	\$ 7.46	127,943	\$ 14.97	112,643	\$ 24.74
Vested	(175,956)	\$ 11.96	(165,796)	\$ 17.51	(118,364)	\$ 15.75
Forfeited <sup>(1)</sup>	(25,163 )	\$ 15.58	(37,360 )	\$ 19.30	(48,347 )	\$ 9.49
Non-vested at end of year	297,347	\$ 8.03	134,708	\$ 8.49	209,921	\$ 13.59

(1) Included within the 2015 forfeited / canceled units are RSA's related to a former executive that were clawed back. The Company recognized \$0.1 million within Other Income line item on the Consolidated Statement of Operations related to these awards.





The weighted-average grant-date fair value of RSA's granted or modified during the years ended December 31, 2016, 2015, and 2014 was \$2.7 million, \$1.9 million, and \$2.8 million, respectively. The total fair value of RSA's vested during the years ended December 31, 2016, 2015 and 2014 was \$2.1 million, \$2.9 million and \$1.9 million, respectively.

During the years ended December 31, 2016, 2015 and 2014, the Company accelerated the vesting and expense recognition of 42,852, 95,088 and 55,106 RSA's granted to 27, 37 and 17 employees, respectively, in accordance with severance agreements. As a result, during 2016, 2015 and 2014, the Company recognized incremental stock-based compensation of \$0.3 million, \$1.2 million and \$1.0 million, respectively, which was included in the Payroll and benefits line item in the Consolidated Statements of Operations.

#### Stock Options

A summary of option activity under the Plans is presented below:

(in thousands, except for share and per share amounts)	Number of Options Outstanding and Exercisable	Weighted- Average Exercise Price	Aggregate Intrinsic Value	Weighted- Average Remaining Contractual Term (in years)
For the year ended December 31, 2014				
Options outstanding, January 1, 2014	317,576	\$ 5.07		
Options granted	30,000	\$ 20.67		
Options exercised	(260,126)	) \$ 4.30		
Options expired / forfeited	(13,250)	) \$ 6.90		
Options outstanding, December 31, 2014	74,200	\$ 13.76	\$ 670	3.0
Options vested and exercisable as of December 31, 2014	34,199	\$ 8.44	\$ 491	1.6
For the year ended December 31, 2015				
Options outstanding, January 1, 2015	74,200	\$ 13.76		
Options granted	56,250	\$ 13.87		
Options exercised	—	\$ —		
Options expired / forfeited	(24,200)	) \$ 7.59		
Options outstanding, December 31, 2015	106,250	\$ 15.22	\$ —	3.8
Options vested and exercisable as of December 31, 2015	82,915	\$ 14.04	\$ —	3.9
For the year ended December 31, 2016				
Options outstanding, January 1, 2016	106,250	\$ 15.22		
Options granted <sup>(1)</sup>	546,196	\$ 11.10		
Options exercised	—	\$ —		
Options expired / forfeited	(20,000)	) \$ 16.90		
Options outstanding, December 31, 2016	632,446	\$ 11.61	\$ 183	4.0
Options vested and exercisable as of December 31, 2016	247,780	\$ 13.30	\$ 69	3.4

Included in options granted are 243,750 awards granted that were initially granted on a contingent basis and became exercisable as a result of the automatic expiration of the same number of Stock Appreciation Rights, as a result of stockholder approval of Amendment No. 4 of the 2007 Plan. See "Stock Appreciation Rights" section below for a discussion of the provisions of the exchange and incremental expense recognized.

The weighted-average grant-date fair value of options granted during the years ended December 31, 2016, 2015, and 2014 was \$0.5 million, \$0.8 million, and \$0.6 million, respectively. The total intrinsic value of options exercised during the years ended December 31, 2016, 2015 and 2014 was zero, zero and \$4.9 million, respectively. The total fair value of shares issued as a result of options exercised (measured as of the date of exercise) during the years ended December 31, 2016, 2015 and 2014 was zero, zero and \$6.1 million, respectively.

Cash flows resulting from excess tax benefits, if any, are classified as part of cash flows from financing activities. Excess tax benefits are realized tax benefits from tax deductions for vested RSA's, settled PSU's and exercised options in excess of the deferred tax asset attributable to stock compensation costs for such equity awards. The Company recorded no excess tax benefits for the years ended December 31, 2016, 2015, and 2014.

During 2015, approximately \$0.5 million of stock-based compensation expense was recognized as a result of granting an executive officer stock options which were immediately vested, with an exercise price of \$13.87 per option.

SAR's

A summary of SAR activity under the Plans is presented below:

(in thousands, except for share and per share amounts)	Number of SAR's Outstanding and Exercisable	Weighted- Average Exercise Price	Aggregate Intrinsic Value	Weighted- Average Remaining Contractual Term (in years)
For the year ended December 31, 2015				
SAR's outstanding as of January 1, 2015	—	\$ —		
Granted	243,750	\$ 13.87		
Exercised	—	\$ —		
Expired / forfeited	—	\$ —		
SAR's outstanding as of December 31, 2015	243,750	\$ 13.87	\$	—4.5
SAR's vested and exercisable as of December 31, 2015	43,750	\$ 13.87	\$	—
For the year ended December 31, 2016				
SAR's outstanding as of January 1, 2016	243,750	\$ 13.87		
Granted	—	\$ —		
Exercised	—	\$ —		
Expired / forfeited	(243,750 )	\$ 13.87		
SAR's outstanding as of December 31, 2016	—	\$ —	\$	—
SAR's vested and exercisable as of December 31, 2016	—	\$ —	\$	—

In June 2016, the Company's stockholders approved Amendment No. 4 to the 2007 Plan, which triggered an automatic expiration of the Stock Appreciation Rights and an equal number of stock options being exercisable and no longer granted on a contingent basis. Upon approval, all existing SAR's expired under this provision. The Company recorded incremental expense of \$0.1 million to stock-based compensation related to the change in fair value of the SAR's prior to the reclassification date. Upon reclassification, the impact to Additional paid-in capital was a \$0.9 million increase. The Company had no SAR's outstanding as of December 31, 2016.

PSU's

A summary of the status and activity of non-vested PSU's is presented in the following table:

(in thousands, except for share and per share amounts)	For the Years Ended December 31.					
	2016		2015		2014	
	Units	Weighted-Average Grant-Date Fair Value	Units	Weighted-Average Grant-Date Fair Value	Units	Weighted-Average Grant-Date Fair Value
Non-vested at beginning of year	169,334	\$ 26.38	142,357	\$ 30.65	89,578	\$ 26.04
Granted <sup>(1)</sup>	—	\$ —	69,218	\$ 20.10	57,547	\$ 37.45
Vested <sup>(1)</sup>	(119,818)	\$ 26.87	(13,763 )	\$ 30.52	—	\$ —
Forfeited / Canceled <sup>(1) (2)</sup>	—	\$ —	(28,478 )	\$ 30.44	(4,768 )	\$ 26.04
Non-vested at end of year	49,516	\$ 25.20	169,334	\$ 26.38	142,357	\$ 30.65

(1) The number of units shown in the table above are based on target performance. The final number of shares of common stock issued may vary depending on the achievement of market conditions established within the awards, which could result in the actual number of shares issued ranging from zero to a maximum of two times the number of units shown in the above table.

(2) Included within the 2015 forfeited / canceled units are PSU's related to a former executive that were clawed back. The Company recognized \$0.2 million within Other Income line item on the Consolidated Statement of Operations related to these awards.

The weighted-average grant date fair value of PSU's granted during the years ended December 31, 2016, 2015, and 2014 was zero, \$1.4 million, and \$2.2 million, respectively. The PSU's granted will remain unvested until the third anniversary date of their issuance, at which time the actual number of vested shares will be determined based upon the actual price performances of the Company's common stock relative to a broad stock index and a peer group performance index.

During the years ended December 31, 2016, 2015, and 2014, the Company modified and accelerated certain PSU's that were granted to former executive officers in 2013, 2014, and 2015. The Company recorded incremental expense of \$0.1 million, \$2.1 million, and \$0.2 million in the Payroll and benefits line item in the Consolidated Statement of Operations.

The following table shows the PSUs that were settled by issuing the Company's common stock relative to a peer group performance index and broad stock index.

Year of Grant	Net Number of Shares Issued upon Vesting	Shares Withheld to Settle Tax Withholding Obligations	TSR Multiple Range		Russell 3000 Multiple	
			Low	High	Low	High
For the year ended December 31, 2016						
2013	38,706	1,572	0.63	1.00	—	—
2014	11,487	—	0.63	0.63	—	—
2015	13,529	—	0.50	0.50	—	—
For the year ended December 31, 2015						
2013	8,768	3,954	1.75	1.75	2.00	2.00
2014	2,506	1,145	0.63	0.75	—	0.75

Other Matters

Cash received from the exercise of stock options for the years ended December 31, 2016, 2015 and 2014 was zero, zero, and \$0.2 million, respectively. There were no other cash receipts during these years from the exercise of other share-based compensation arrangements.



Note 14 - Commitments and Contingencies  
Legal Proceedings

The Company is involved in certain legal actions, described below. The outcomes of these legal actions are not within the Company's complete control and may not be finalized for prolonged periods of time. In the described actions, the claimants seek monetary damages and other penalties. In accordance with U.S. GAAP, the Company records a liability in the Consolidated Financial Statements for loss contingencies when a loss is known or considered probable and the amount can be reasonably estimated. In the described lawsuits, the Company has entered into settlement agreements, with the claimants setting forth the specific or maximum amount of monetary damages required to settle each action. In the described government investigation, the Company has reached agreement in principle with regard to the amount of monetary damages required to settle such action. Therefore, such amounts are probable and reasonably estimable. The Company cannot predict the timing of final resolution or the final outcome of any pending legal proceedings as described in the paragraphs below, nor can it provide any assurance that the ultimate resolution of any such matter will not have a material adverse effect on the Company's consolidated financial position, results of operations or cash flows.

Securities class action lawsuit: *United Food and Commercial Workers Union v. Advanced Emissions Solutions, Inc.*, No. 14-cv-01243-CMA-KMT (U.S. District Court, D. Colo.)

A class action lawsuit against ADES and certain of its current and former officers was filed in May 2014 in the federal court in Denver, Colorado alleging that ADES and other defendants misrepresented to the investing public the Company's financial condition and its financial controls to artificially inflate and maintain the market price of ADES's common stock. In May 2016, the parties reached an agreement in principle to settle this litigation, and on June 30, 2016, the parties entered into a Stipulation and Agreement of Settlement to resolve the action in its entirety. On February 10, 2017, we received an order and final judgment that the lawsuit was settled, and the entire case has been dismissed with prejudice.

The settlement agreement for this case contains no admission of liability, and all of the defendants in this litigation have expressly denied, and continue to deny, all allegations of wrongdoing or improper conduct. The Company's insurance carriers funded the full settlement in November 2016. However, until an order and final judgment of the lawsuit having been settled was received, the funded settlement did not relieve the Company's recorded liability. As of December 31, 2016, the Company had a recorded liability of \$4.0 million in connection with the Denver Settlement as the losses in connection with this matter were probable and reasonably estimable under U.S. GAAP. The liability was originally recorded as of June 30, 2016 in the Legal settlements and accruals line item of the Consolidated Balance Sheet. As of December 31, 2016, the Company also had a recorded receivable of \$4.0 million in connection with the Denver Settlement as the Company's insurance carriers funded the full settlement but final judgment was not received as December 31, 2016.

Stockholder derivative lawsuits: *In Re Advanced Emissions Solutions, Inc. Shareholder Derivative Litigation*, No. 2014CV-30709 (District Court, Douglas County, Colorado) (consolidated actions).

In June and July 2014, stockholder derivative actions were filed in the Douglas County District Court and in the Colorado District Court for the City and County of Denver against certain of the Company's current and former officers and directors, along with the Company as a "nominal defendant." In May 2016, the parties reached an agreement in principle to settle this stockholder derivative action, and on September 30, 2016, the parties entered into a Stipulation and Agreement of Settlement to resolve the action in its entirety. The Stockholder Derivative Settlement was approved and the case was closed on January 4, 2017.

The settlement agreement for this case contained no admission of liability, and all of the defendants in this stockholder derivative action have expressly denied, and continue to deny, all allegations of wrongdoing or improper conduct. The Company's insurance carriers funded the full settlement in January 2017.

As of December 31, 2016, the Company had a recorded liability of \$0.6 million in connection with the Derivative Settlement as the losses in connection with this matter were probable and reasonably estimable under U.S. GAAP. The liability was originally recorded as of June 30, 2016 in the Legal settlements and accruals line item of the Consolidated Balance Sheet. As of December 31, 2016, the Company also had a recorded receivable in connection

with the Derivative Settlement of \$0.6 million, which was originally recorded as of June 30, 2016, as the Company's insurance carriers subsequently funded the fee award in January 2017.

### SEC Inquiry

On April 7, 2014, the SEC Staff informed the Company that it had initiated the SEC Inquiry to determine if violations of the federal securities laws had occurred, and in September 2014 the SEC issued a formal order of investigation. The SEC Inquiry generally pertains to the restatement of the Company's financial statements and internal controls processes, as described in Note 2 to the Consolidated Financial Statements of the Company included in the Annual Report on Form 10-K for the fiscal year ended December 31, 2014. The Company cooperated with the SEC by providing information and documents to the SEC on an ongoing basis. In July 2016, the SEC Staff communicated to the Company that it would recommend to the SEC that it authorize a settlement with the Company on terms that include payment of a civil monetary penalty of \$0.5 million. This penalty will not be funded by the Company's insurance carriers. The SEC must approve the SEC Staff recommendation and any final settlement or relief. As a result of the communication from the SEC Staff, the Company recorded a liability as of June 30, 2016 for the payment of monetary penalties in connection with the SEC Inquiry in the amount of \$0.5 million as the losses in connection with this matter were both probable and reasonably estimable under U.S. GAAP. The recorded liability was based on an agreement in principle with SEC Staff subject to approval by the SEC. The liability was recorded in the Legal settlements and accruals line item on the Consolidated Balance Sheets. The expense recognized related to this accrual was included in the Other line item in the Consolidated Statements of Operations for the year ended December 31, 2016.

### Settlement and Royalty Indemnity

In August 2008, Norit International N.V. f/k/a Norit N.V. ("Norit") filed a lawsuit against the Company asserting claims for misappropriation of trade secrets and other claims related to the Company's ADA Carbon Solutions, LLC joint venture ("Carbon Solutions") that built an activated carbon manufacturing plant (the "Red River Plant"). In August 2011, the Company and Norit entered into a settlement agreement whereby the Company paid amounts related to the non-solicitation breach of contract claim, and ADA was also required to pay additional damages related to certain future revenues generated from the equity method investment through the second quarter of 2018 (the "Royalty Award"). Payments of amounts due under the Royalty Award for each quarter are payable three months after such quarter ends. In October 2011, an arbitration panel endorsed and confirmed the terms of the settlement agreement. Additionally, during November 2011, the Company entered into an Indemnity Settlement Agreement whereby the Company agreed to settle certain indemnity obligations asserted against the Company related to the Norit litigation and relinquished all of its equity interest in Carbon Solutions and amended the Intellectual Property License Agreement dated October 1, 2008 between the Company and Carbon Solutions. In the event that the Company declares or otherwise issues a dividend to any or all of its stockholders prior to January 1, 2018, other than repurchases of common stock under employee stock plans, the Company must increase its letter of credit amounts as collateral for payments due to Norit, equal to 50% of the aggregate fair market value of such dividends. Additionally, the first time that the Company achieves earnings in excess of \$20.0 million for a fiscal year ended prior to January 1, 2018, the Company must also increase its letter of credit amounts as collateral by \$5.0 million for payments due to Norit. However, the maximum total letter of credit increase related to the combination of dividends or earnings is \$7.5 million. As such, upon the filing of this Report, the Company will increase its letter of credit by \$5.0 million. During the fourth quarter of 2016, the Company revised its estimate for future Royalty Award payments based in part on an updated forecast provided to the Company from Carbon Solutions. This forecast included a material reduction in estimated future revenues generated at the Red River Plant. Based primarily on the updated forecast, the Company recorded a \$4.0 million reduction to its Royalty Award accrual as of December 31, 2016.

The following table summarizes the Company's legal settlements and accruals as described above, which are presented in the Consolidated Balance Sheets:

	As of December	
	31,	
(in thousands)	2016	2015
Settlement and Royalty Indemnification	\$5,656	\$6,502
Legal settlements	5,050	—
Legal settlements and accruals, current	10,706	6,502
Settlement and Royalty Indemnification, long-term	5,382	13,797



Total legal settlements and accruals \$16,088 \$20,299

Future amounts to be paid related to the Royalty Award may differ from current estimates due to future adjusted sales of activated carbon from the Red River Plant.

The receivables related to the Denver Settlement and the Stockholder Derivative Action are shown with the Receivables, net line item in the Consolidated Balance Sheets in the same amounts as the respective liabilities.

#### Other Commitments and Contingencies

##### Tinuum Group

The Company also has certain limited obligations contingent upon future events in connection with the activities of Tinuum Group. The Company, NexGen and two entities affiliated with NexGen have provided GSFS with limited guaranties (the "Tinuum Group Party Guaranties") related to certain losses it may suffer as a result of inaccuracies or breach of representations and covenants. The Company also is a party to a contribution agreement with NexGen under which any party called upon to pay on a Tinuum Group Party Guaranty is entitled to receive contribution from the other party equal to 50% of the amount paid. No liability or expense provision has been recorded by the Company related to this contingent obligation as the Company believes that it is not probable that a loss will occur with respect to Tinuum Group Party Guaranties.

##### Consultant Obligation

On January 1, 2012, the Company entered into a residual payment agreement with a former consultant who was involved in the development and deployment of RC technologies. Pursuant to the agreement, the Company was required to make annual payments based upon Tinuum Group's RC production and sale from January 1, 2012 through June 30, 2015. These expenses were recorded within the Legal and professional fees line item in the Consolidated Statements of Operations and were recorded as RC production occurred. During the years ended December 31, 2015 and 2014, the Company recorded expenses under this agreement of \$0.3 million and \$1.4 million, respectively. In January 2016, the Company made the final payment of approximately \$0.3 million related to this obligation.

##### Line of Credit

In September 2013, ADA, as borrower, and the Company, as guarantor, entered into the 2013 Loan and Security Agreement with a bank (the "Lender") for an aggregate principal amount of \$10 million that was secured by certain amounts due to the Company from certain Tinuum Group RC leases (the "Line of Credit"). The Line of Credit was amended nine times from the period from December 2, 2013 through November 25, 2016, most notably to extend the maturity date with each amendment. In addition, during this period, the Lender also granted 10 waivers related to various transactions and obligations to provide financial information to the Lender. Covenants in the Line of Credit included a borrowing base limitation that was based on a percentage of the net present value of ADA's portion of payments due to Tinuum Group from the RC leases. The Line of Credit also contained other affirmative and negative covenants and customary indemnification obligations of ADA to the Lender and provided for the issuance of letters of credit provided that the aggregate amount of the letters of credit plus all advances then outstanding did not exceed the calculated borrowing base. The Company guarantees the obligations and agreements of ADA under the Line of Credit. Amounts outstanding under the Line of Credit bear interest payable monthly at a rate per annum equal to the higher of 5% or the "Prime Rate" (as defined in the Line of Credit) plus 1%. As a result of various covenant violations, the Company had no borrowing availability under the Line of Credit from inception through November 29, 2016. On November 30, 2016, ADA, as borrower, the Company, as guarantor, and the Lender entered into the Tenth Amendment of 2013 Loan and Security Agreement (the "Tenth Amendment"). The Tenth Amendment increases the Line of Credit to \$15 million from \$10 million, extends the maturity date of the Line of Credit to September 30, 2017, permits the Line of Credit to be used as collateral (in place of restricted cash) for letters of credit related to equipment projects, the Royalty Award and certain other agreements, additionally secures the Line of Credit with amounts due to the Company from an additional existing Refined Coal facility lease, which amounts also now factor into the borrowing base limitation, and amends certain financial covenants. Pursuant to the Tenth Amendment, the Company was required to, among other things, pay a new origination fee of \$0.1 million and associated legal preparation fees of the Lender, maintain a deposit account with the Lender with a minimum balance of \$6.0 million initially and \$3.0 million after certain conditions are met, and maintain minimum trailing twelve month EBITDA (earnings before interest, taxes, depreciation and amortization as defined in the Tenth Amendment) of \$24.0 million. As of December 31, 2016, there were no outstanding amounts under the Tenth Amendment, nor were any amounts drawn during 2016. However, due to outstanding letters of credits offsetting the line, the Company's borrowing availability has been reduced to \$13.2 million as of December 31, 2016.



Letters of Credit

The Company has letters of credit ("LOC") with two financial institutions related to equipment projects, the Royalty Award and certain other agreements. The following tables summarize the LOC outstanding and related collateral reported in the Consolidated Balance Sheets:

As of December 31, 2016

(in thousands)	LOC Outstanding	Utilization of LOC Availability	Restricted Cash	Restricted cash, long-term	Investment securities, restricted, long-term
Contract performance - equipment systems	\$1,855	\$ 1,776	\$ 86	\$ —	\$ —
Royalty award	7,150	—	7,150	—	—
Other	6,500	—	6,500	—	—
Total LOC outstanding	\$15,505	\$ 1,776	\$ 13,736	\$ —	\$ —

As of December 31, 2015

(in thousands)	LOC Outstanding	Utilization of LOC Availability	Restricted Cash	Restricted cash, long-term	Investment securities, restricted, long-term
Contract performance - equipment systems	\$5,556	—	\$ 728	\$ 4,830	\$ —
Royalty award	6,150	—	—	6,150	—
Other	328	—	—	—	336
Total LOC outstanding	\$12,034	\$ —	\$ 728	\$ 10,980	\$ 336

Restricted balances may exceed the letters of credit outstanding due to interest income earned on the restricted assets. The following tables summarizes the expiration periods of the letters of credit based on the ultimate maturity date of the letters of credit as of December 31, 2016:

Expiration of Letters of Credit  
as of December 31, 2016

(in thousands)	Less than 1 year	1-3 years	4-5 years	After 5 years
Letters of credit	\$10,855	\$4,650	\$ —	\$ —

Performance Guarantee on Equipment Systems

In the normal course of business related to ACI and DSI systems, the Company may guarantee certain performance thresholds during a discrete performance testing period that do not extend beyond six months from the initial test date, the commencement of which is determined by the customer. Performance thresholds include such matters as the achievement of a certain level of mercury removal and other emissions based upon the injection of a specified quantity of a qualified activated carbon or other chemical at a specified rate given other plant operating conditions, and availability of equipment and electric power usage. In the event the equipment fails to perform as specified during the testing period, the Company may have an obligation to correct or replace the equipment. In the event the level of mercury removal is not achieved, the Company may have a "make right" obligation within the contract limits. During 2015, the Company began working to modify and correct two performance guarantee issues related to EC systems that were installed during 2015. No revenue was recognized on these two contracts until the performance guarantees were resolved and contract obligations were substantially complete. During the third quarter of 2016, the Company passed performance testing on both systems and revenues on both systems were recognized. As a result of the resolution of the performance guarantees, the Company incurred approximately \$0.9 million of costs on the ACI systems to pass the performance guarantees. Additional performance guarantee claims, if incurred, would be included within the Equipment sales cost of revenue line of the Consolidated Statements of Operations.

Purchase Obligations

The Company does not have any future purchase obligations as of December 31, 2016.

DOE Audits

Certain of the Company's completed and current contracts awarded by the DOE and related industry participants remain subject to adjustments as a result of future government audits. The Company's historical experience with these audits has not resulted in significant adverse adjustments to amounts previously received; however the audits for the years 2010 and later have not been finalized.

Operating Lease Obligations

The Company leases office, warehouse and laboratory space in Highlands Ranch, Colorado under operating leases. As of December 31, 2016, the Company leased approximately 52,869 square feet under approximately 3 leases. Original lease terms ranged from 4 to 7 years. Certain of these leases have options permitting renewals for additional periods. In addition to minimum fixed payments, a number of leases contain annual escalation clauses which are related to increases in the inflation index.

In December 2016, the Company entered into a lease termination related to its leased office spaced, in which the Company paid a \$0.3 million lease termination fee. The lease termination is effective February 2017.

Also in December 2016, the Company entered into a new office lease in Highlands Ranch, Colorado effective February 2017.

Annual minimum commitments under the leases as of December 31, 2016 are as follows:

Years Ending December 31,	Operating Lease Commitments (in thousands)
2017	\$ 290
2018	268
2019	174
2020	55
Thereafter	—
Total	\$ 787

Rent expense incurred for the years ended are as follows:

	Years Ended December 31,		
(in thousands)	2016	2015	2014
Rent expense	\$847	\$1,838	\$1,531

Note 15 - Defined Contributions Savings Plan

The Company has an employee retirement plan (the "401(k) Plan") that provides eligible employees of the Company an opportunity to accumulate retirement funds. The Company makes discretionary matching contributions to the 401(k) Plan in the form of cash or historically in the form of its common stock. The following table presents the amount the Company recognized as expense within the Payroll and benefits line item in the Consolidated Statements of Operations:

	Years Ended December 31,		
(in thousands)	2016	2015	2014
401(k) employer expense	\$173	\$439	\$509

Due to the Restructuring discussed in Note 2, there was a decrease in employer expense related to the 401(k) Plan for the year ended December 31, 2016.

## Note 16 - Income Taxes

The provision for income taxes consists of the following:

(in thousands, except for rate)	Years Ended December 31,		
	2016	2015	2014
Current portion of income tax expense (benefit):			
Federal	\$—	\$—	\$—
State	458	20	296
	458	20	296
Deferred portion of income tax (benefit) expense:			
Federal	(61,396 )	—	—
State	—	—	—
	(61,396 )	—	—
Total income tax (benefit) expense	\$(60,938)	\$20	\$296
Effective tax rate	(166 )%	— %	18 %

A reconciliation of expected federal income taxes on income from operations at statutory rates with the expense (benefit) for income taxes is as follows:

(in thousands)	Years Ended December 31,		
	2016	2015	2014
Federal statutory rate	\$12,859	\$(10,542)	\$ 589
State income taxes, net of federal benefit	987	(781 )	31
Disallowed compensation	—	—	721
Permanent differences	84	35	52
Tax credits	(2,419 )	(38,998 )	(25,607)
Valuation allowances	(72,359 )	50,066	23,794
Changes in state effective rates	(125 )	(243 )	716
Stock-based compensation	36	487	—
Other	(1 )	(4 )	—
(Benefit) expense for the provision for income taxes	\$(60,938)	\$20	\$ 296

Deferred income taxes are provided for the effects of temporary differences between the tax basis of an asset or liability and its reported amount in the accompanying Consolidated Balance Sheets. These temporary differences result in taxable or deductible amounts in future years. Details of the Company's deferred tax assets and liabilities are summarized as follows:

(in thousands)	As of December	
	2016	2015
Deferred tax assets		
Settlement and Royalty Indemnification	\$4,264	\$7,807
Deferred revenues and loss contract provisions	268	2,899
Employee related liabilities	3,796	4,598
Intangible assets	1,518	1,733
Equity method investments	12,326	7,500
Net operating loss carryforward	13,341	23,193
Tax credits	99,903	97,484
Deposits on contracts	—	1,146
Other	2,109	2,118
Total deferred tax assets	137,525	148,478
Less valuation allowance	(75,910 )	(148,269 )
Deferred tax assets	61,615	209
Less: Deferred tax liabilities		
Property and equipment and other	(219 )	(209 )
Total deferred tax liabilities	(219 )	(209 )
Net deferred tax assets	\$61,396	\$—

For 2016, the Company recorded an income tax benefit of \$60.9 million compared to an income tax expense of zero for 2015. The income tax benefit for 2016 was primarily due to the \$61.4 million reversal of the valuation allowance of the Company's net deferred tax assets.

Accounting for income taxes requires that companies assess whether a valuation allowance should be recorded against their deferred tax asset based on an assessment of the amount of the deferred tax asset that is "more likely than not" to be realized. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount that is more likely than not to be realized.

The Company assesses the valuation allowance recorded against deferred tax assets at each reporting date. The determination of whether a valuation allowance for deferred tax assets is appropriate requires the evaluation of positive and negative evidence that can be objectively verified. Consideration must be given to all sources of taxable income available to realize the deferred tax asset, including, as applicable, the future reversal of existing temporary differences, future taxable income forecasts exclusive of the reversal of temporary differences and carryforwards, taxable income in carryback years and tax planning strategies. In estimating taxes, the Company assesses the relative merits and risks of the appropriate tax treatment of transactions taking into account statutory, judicial, and regulatory guidance.

The Company has historically recorded a valuation allowance for all of its deferred tax assets, primarily due to its historical three-year cumulative loss position. However, the Company concluded that, as of December 31, 2016, it is more likely than not the Company will generate sufficient taxable income within the applicable NOL and tax credit carry-forward periods to realize \$61.4 million of its net deferred tax assets and, therefore, reversed \$61.4 million of the valuation allowance after utilizing \$11.0 million during the current year. This conclusion was reached after weighing all of the evidence and determining that the positive evidence outweighed the negative evidence. The positive evidence considered by management in arriving at its conclusion to partially reverse the valuation allowance includes factors such as: (1) emergence from the previous three-year cumulative loss position during the fourth quarter of 2016, (2) completion of four consecutive quarters of profitability and (3) forecasts of continued future profitability. These forecasts are based under several potential scenarios materially derived from currently contracted business within the RC segment that support the partial utilization of deferred tax assets attributable to temporary differences that do not expire and federal NOLs and tax credits prior to their expiration between 2031 through 2036.

As a result of the partial reversal, the Company's net deferred tax assets were \$61.4 million as of December 31, 2016, net of a valuation allowance of \$75.9 million. As of December 31, 2015, the Company had recorded a valuation allowance against the net deferred tax assets of \$148.3 million to reflect the estimated amount of deferred tax assets

that may not be realized. During 2016, the Company's valuation allowance decreased by \$72.4 million primarily due to the partial release of the previously recorded full valuation allowance.

The following table presents the approximate amount of federal and state net operating loss carryforwards and federal tax credit carryforwards available to reduce future taxable income, along with the respective range of years that the net operating loss and

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tax credit carryforwards would expire if not utilized:

(in thousands)	As of December 31,		
	2016	Beginning expiration year	Ending expiration year
Federal net operating loss carryforwards	\$31,699	2031	2036
State net operating loss carryforwards	\$57,600	2021	2036
Federal tax credit carryforwards	\$99,879	2031	2036

The following table sets forth a reconciliation of the beginning and ending unrecognized tax benefits on a gross basis for the years ended December 31, 2016, 2015 and 2014:

(in thousands)	Years Ended		
	December 31, 2016	2015	2014
Balance as of January 1	\$ —	\$ —	—
Increases for tax positions of current year	54	—	—
Balance as of December 31	54	—	—

The Company did not record any adjustments or recognize interest expense for uncertain tax positions for the years ended December 31, 2016, 2015 and 2014. Interest and penalties related to uncertain tax positions are accrued and included in the Interest expense line item in the Consolidated Statements of Operations. Additionally, the Company recognizes interest expense related to tax treatment of RC facilities at Tinum Group in the Interest expense line item in the Consolidated Statements of Operations. Additional information related to these interest amounts is included in Note 11.

The Company files income tax returns in the U.S. and in various states. The Company is no longer subject to U.S. federal examinations by tax authorities for years before 2013. The Company is generally no longer subject to State and local examinations by tax authorities for years before 2012.

#### Note 17 - Business Segment Information

Operating segments are defined as components of an enterprise about which separate financial information is available that is evaluated regularly by a company's chief operating decision maker ("CODM"), or a decision making group, in deciding how to allocate resources and in assessing financial performance. As of December 31, 2016, the Company's CODM was the Company's CEO. The Company's operating and reportable segments are organized by products and services provided.

As of December 31, 2016, the Company has two reportable segments: (1) Refined Coal ("RC"); and (2) Emissions Control ("EC").

The business segment measurements provided to and evaluated by the CODM are computed in accordance with the principles listed below:

The accounting policies of the operating segments are the same as those described in the summary of significant accounting policies except as described below.

Segment revenue includes the Company's equity method earnings and losses from the Company's equity method investments. Segment revenue also includes the Company's royalty earnings from Tinum Group and income related to sales-type leases.

Segment operating income (loss) includes the Company's equity method earnings and losses from the Company's equity method investments, royalty earnings from Tinum Group (including depreciation and amortization expense) and gains related to sales of equity method investments. However, segment operating income (loss) excludes Payroll and benefits, Rent and occupancy, Legal and professional fees, and General and administrative ("Corporate general and administrative expenses") unless otherwise specifically included, as the Company does not allocate those amounts between segments.

All items not included in operating income, except as noted below, are excluded from the RC and EC segments.

As of December 31, 2016 and December 31, 2015, substantially all of the Company's material assets are located in the U.S. and all significant customers are either U.S. companies or the U.S. Government. The following table presents the Company's operating segment results for the years ended December 31, 2016, 2015 and 2014:



(in thousands)	Years Ended December 31,		
	2016	2015	2014
Revenues:			
Refined Coal:			
Earnings in equity method investments	\$45,584	\$8,921	\$42,712
Consulting services	—	55	665
Royalties, related party	6,125	10,642	6,410
	51,709	19,618	49,787
Emissions Control:			
Equipment sales	46,949	60,099	12,044
Chemicals	3,025	888	391
Consulting services	648	1,697	3,823
	50,622	62,684	16,258
Total segment reporting revenues	\$102,331	\$82,302	\$66,045
Adjustments to reconcile to reported revenues:			
Refined Coal:			
Earnings in equity method investments	\$(45,584)	\$(8,921)	\$(42,712)
Royalties, related party	(6,125)	(10,642)	(6,410)
	(51,709)	(19,563)	(49,122)
Total reported revenues	\$50,622	\$62,739	\$16,923
Segment reporting operating income (loss)			
Refined Coal <sup>(1)</sup>	\$51,264	\$12,131	\$42,094
Emissions Control <sup>(2)</sup>	7,334	(7,583)	(13,348)
Total segment operating income	\$58,598	\$4,548	\$28,746

(1) Included within the RC segment operating income for the year ended December 31, 2016 is a \$2.1 million gain on the sale of RCM6 and for the years ended December 31, 2016 and 2015, 453A interest expense of \$2.5 million and \$4.6 million, respectively, and interest expense related to the RCM6 note payable of \$0.3 million and \$2.5 million, respectively.

(2) Included within the EC segment operating income for the year ended December 31, 2016 is a \$0.9 million gain related to a termination of a sales-type lease.

A reconciliation of reportable segment income to the Company's consolidated net income is as follows:

(in thousands)	Years Ended December 31,		
	2016	2015	2014
Segment income			
Total reported segment operating income	\$58,598	\$4,548	\$28,746
Adjustments to reconcile to net income (loss) attributable to the Company			
Corporate payroll and benefits	(9,415 )	(14,842 )	(12,621 )
Corporate rent and occupancy	(1,187 )	(707 )	(694 )
Corporate legal and professional fees	(8,230 )	(15,199 )	(9,514 )
Corporate general and administrative	(3,811 )	(3,640 )	(3,980 )
Corporate depreciation and amortization	(608 )	(578 )	(354 )
Corporate interest (expense) income, net	(2,334 )	24	74
Other income (expense), net	3,727	273	26
Income tax benefit (expense)	60,938	(20 )	(296 )
Net income (loss)	\$97,678	\$(30,141)	\$1,387

Corporate general and administrative expenses include certain costs that benefit the business as a whole but are not directly related to one of our segments. Such costs include but are not limited to accounting and human resources staff, information systems costs, legal fees, facility costs, audit fees and corporate governance expenses.

Segment assets are as follows as of the dates presented:

(in thousands)	As of December 31,	
	2016	2015
Assets:		
Refined Coal	\$6,310	\$19,507
Emissions Control	24,551	31,467
All Other and Corporate	76,435	9,801
Consolidated	\$107,296	\$60,775

Note 18 - Major Customers

Revenues from unaffiliated customers who represent 10% or more of the Company's revenues in any one year were as follows:

Customer	Revenue Type	Segment(s)	Years Ended December 31,		
			2016	2015	2014
A	Equipment sales	EC	21%	3%	—%
B	Equipment sales, Consulting services	EC	14%	16%	37%
C	Equipment sales, Consulting services, Other	EC	1%	2%	24%
D	Consulting services	EC	—%	11%	8%
E	Equipment sales	EC	—%	15%	—%

## Note 19 - Quarterly Financial Results (unaudited)

Summarized quarterly results for the two years ended December 31, 2016 and December 31, 2015, respectively, are as follows:

(in thousands, except per share data)	For the Quarter Ended			
	December 31, 2016	September 30, 2016	June 30, 2016	March 31, 2016
Revenues	\$3,604	\$ 15,710	\$8,951	\$22,357
Cost of revenues, exclusive of operating expenses shown below	3,478	13,259	5,769	17,311
Other operating expenses	5,388	5,364	7,794	8,357
Operating loss	(5,262 )	(2,913 )	(4,612 )	(3,311 )
Earnings from equity method investments	15,518	10,735	13,754	5,577
Royalties, related party	2,203	2,064	669	1,189
Other income (expenses), net	1,698	(1)309	(1,852 )	974
Income before income tax expense	14,157	10,195	7,959	4,429
Income tax (benefit) expense	(61,673 )	(2)583	99	53
Net income	\$75,830	\$ 9,612	\$7,860	\$4,376
Earnings per common share – basic	\$3.45	\$ 0.44	\$0.36	\$0.20
Earnings per common share – diluted	\$3.39	\$ 0.43	\$0.35	\$0.20
Weighted-average number of common shares outstanding				
Basic	21,693	21,740	21,875	21,849
Diluted	22,061	22,098	22,187	22,177

(1) During the fourth quarter of 2016, the Company revised its estimate for future Royalty Award payments based on an updated forecast provided to the Company from Carbon Solutions. Based primarily on the updated forecast, the Company recorded a \$4.0 million reduction to its Royalty Award accrual.

(2) During the fourth quarter of 2016, the Company released \$61.4 million of the valuation allowance related to the deferred tax assets that resulted in an income tax benefit of \$61.7 million. See further discussion in Note 16.

(in thousands, except per share data)	For the Quarter Ended			
	December 31, 2015	September 30, 2015	June 30, 2015	March 31, 2015
Revenues	\$13,202	\$ 12,885	\$ 14,895	\$21,757
Cost of revenues, exclusive of operating expenses shown below	7,224	10,610	14,003	15,715
Other operating expenses	13,113	12,264	18,670	12,940
Operating loss	(7,135 )	(9,989 )	(17,778 )	(6,898 )
Earnings (loss) from equity method investments	3,788	(41 )	4,860	314
Royalties, related party	2,876	3,273	2,299	2,194
Other expenses, net	(2,568 )	(1,853 )	(1,765 )	(1,698 )
Loss before income tax expense	(3,039 )	(8,610 )	(12,384 )	(6,088 )
Income tax (benefit) expense	(131 )	44	63	44
Net loss	\$(2,908 )	\$(8,654 )	\$(12,447 )	\$(6,132 )
Loss per common share – basic	\$(0.13 )	\$(0.40 )	\$(0.57 )	\$(0.28 )
Loss per common share – diluted	\$(0.13 )	\$(0.40 )	\$(0.57 )	\$(0.28 )
Weighted-average number of common shares outstanding				
Basic	21,676	21,687	21,715	21,696
Diluted	21,676	21,687	21,715	21,696

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure  
None.

#### Item 9A. Controls and Procedures

##### Evaluation of Disclosure Controls and Procedures

As required by Rule 13a-15(b) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), we have evaluated, under the supervision of and with the participation of our management, including our principal executive officer and principal financial officer, the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this annual report. Our disclosure controls and procedures are designed to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Based upon this evaluation, our principal executive officer and principal financial officer concluded that our disclosure controls and procedures were effective as of December 31, 2016.

##### Changes in Internal Control Over Financial Reporting

There has been no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the fourth quarter of 2016 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

##### Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with generally accepted accounting principles. The 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 our assets;
2. Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of our management and directors; 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 our financial statements.

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

Under the supervision of, and with the participation of our management, including the principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework and criteria established in Internal Control-Integrated Framework in 2013, issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2016.

##### Remediation Efforts Related to Past Material Weaknesses

As reported in Item 9A of our Annual Report on Form 10-K for the fiscal year ended December 31, 2015, various material weaknesses existed in our control structure as of December 31, 2014 and December 31, 2015. As of December 31, 2016, we have implemented the following remediation steps that have been deemed effective for the fiscal year ended December 31, 2016:

• We have created and implemented accounting policies, procedures and related control activities to support the financial reporting process.

• We have implemented communication processes designed to allow all personnel and third parties to understand and carry out their internal control responsibilities. We assessed the completeness and accuracy of the data used in the execution of our controls to support the effective operation of the controls.

• We performed an evaluation related to the design and effectiveness of all controls.



We created and maintained effective disclosure controls and procedures over financial reporting allowing the Company to prepare disclosures in the time frame prescribed for financial reporting by the SEC related to the 2016 periodic filings.

We have created and maintained effective information technology general controls to support automated controls and IT functionality related to logical access, and change management around all key financial applications and systems.

- We have designed and implemented controls related to all key third parties providing IT support services.

We ensured controls were effective for a sufficient period of time during 2016 if the control had not already been implemented prior to the beginning of the fiscal year. We have developed and implemented control design and effectiveness monitoring processes and established a formal schedule for reporting to the Board.

During 2015 and 2016, we designed and implemented controls that remediated material weaknesses in our internal control over financial reporting identified as of December 31, 2015. These controls were in place for a sufficient period of time to conclude on the effectiveness of the controls as of December 31, 2016.

Hein & Associates LLP, an independent registered public accounting firm, has issued an attestation report on our internal control over financial reporting as of December 31, 2016 and its report is included herein.



REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders  
Advanced Emissions Solutions, Inc. and Subsidiaries

We have audited Advanced Emissions Solutions, Inc. and subsidiaries' internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013. Advanced Emissions Solutions, Inc. and subsidiaries' 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 conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). 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, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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 (a) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (b) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (c) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

Board of Directors and Stockholders  
Advanced Emissions Solutions, Inc. and Subsidiaries

In our opinion, Advanced Emissions Solutions, Inc. and subsidiaries maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of Advanced Emissions Solutions, Inc. and subsidiaries as of December 31, 2016 and 2015, and the related consolidated statements of operations, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2016 and our report dated March 13, 2017 expressed an unqualified opinion.

/s/ Hein & Associates LLP

Denver, Colorado  
March 13, 2017

Item 9B. Other Information

None.

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### PART III

#### Item 10. Directors, Executive Officers, and Corporate Governance

The information required by this Item concerning the Company's Directors, Executive Officers, and corporate governance is incorporated by reference to the information provided under the captions "Proposal 1 - Election of Directors," "Information about Executive Officers," and "Corporate Governance" in our definitive proxy statement for the 2017 annual meeting of stockholders to be filed within 120 days from December 31, 2016.

The information required by this Item concerning compliance with Section 16(a) of the Securities Exchange Act of 1934 is incorporated by reference to the information provided under the caption "Section 16(a) Beneficial Ownership Reporting Compliance" in our definitive proxy statement for the 2017 annual meeting of stockholders to be filed within 120 days from December 31, 2016.

#### Item 11. Executive Compensation

The information required by this Item is incorporated by reference to the information provided under the captions "Executive Compensation" and "Director Compensation" in our definitive proxy statement for the 2017 annual meeting of stockholders to be filed within 120 days from December 31, 2016.

#### Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this Item concerning security ownership of certain beneficial owners and management is incorporated by reference to the information provided under the caption "Security Ownership of Certain Beneficial Owners and Management" in our definitive proxy statement for the 2017 annual meeting of stockholders to be filed within 120 days from December 31, 2016.

#### Item 13. Certain Relationships and Related Transactions and Director Independence.

The information required by this Item is incorporated by reference to the information provided under the captions "Certain Relationships and Related Transactions" and "Corporate Governance" in our definitive proxy statement for the 2017 annual meeting of stockholders to be filed within 120 days from December 31, 2016.

#### Item 14. Principal Accountant Fees and Services.

The information required by this Item is incorporated by reference to the information provided under the captions "Independent Registered Public Accounting Firm" and "Audit Committee Preapproval Policy and Procedures" in our definitive proxy statement for the 2017 annual meeting of stockholders to be filed within 120 days from December 31, 2016.

Item 15. Exhibits and Financial Statement Schedules.

(a) The following consolidated financial statements of Advanced Emissions Solutions, Inc., are filed as part of this Report under Item 8:

(1) Financial Statements – see Index to Consolidated Financial Statements in Item 8;

Financial Statement Schedules – All schedules are omitted because the required information is not applicable or is (2) not present in amounts sufficient to require submission of the schedule or because the information required is included in the Consolidated Financial Statements and Notes thereto; and

(3) Exhibits – Those exhibits required by Item 601 of Regulation S-K and by paragraph (b) below.

(b) The following exhibits are filed as part of this Report or, where indicated, were heretofore filed and are hereby incorporated by reference:

Exhibit No.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date
3.1	Second Amended and Restated Certificate of Incorporation of Advanced Emissions Solutions, Inc.	10-Q	000-54992	3.1	August 9, 2013
3.2	Bylaws of Advanced Emissions Solutions, Inc.	10-Q	000-54992	3.2	August 9, 2013
3.3	Amendment #1 to the Bylaws of Advanced Emissions Solutions, Inc., dated as of July 23, 2014	8-K	000-54992	3.1	July 29, 2014
3.4	Amendment No. 2 to the Bylaws of Advanced Emissions Solutions, Inc., dated as of January 4, 2017	8-K	001-37822	3.1	January 10, 2017
3.5	Certificate of Designation, Preferences, and Rights of Series A Junior Participating Preferred Stock of Advanced Emissions Solutions, Inc.	8-K	000-54992	3.1	February 2, 2015
4.1	Form of Specimen Common Stock Certificate	10-Q	000-54992	4.1	August 9, 2013
4.2	Registration Rights Agreement between ADA-ES, Inc. and Arch Coal, Inc. dated March 23, 2010	10-Q	000-50216	4.1	May 13, 2010
10.1	Profit Sharing Retirement Plan Adoption Agreement**	S-8	333-159715	4.1	June 3, 2009
10.2	American Funds Distributors, Inc. Non-standardized 401(K) Plan**	S-8	333-159715	4.1	June 3, 2009
10.3	American Funds Distributors, Inc. Defined Contribution Prototype Plan and Trust**	S-8	333-159715	4.2	June 3, 2009
10.4	Employer Stock Addendum to Trust Agreement**	S-8	333-159715	4.4	June 3, 2009
10.5	Conformed copy of Amended and Restated 2007 Equity Incentive Plan, as amended by Amendment Nos. 1-4*,**				
10.6	Forms of agreements for use under the Amended and Restated 2007 Equity Incentive Plan, as amended**	10-K	000-54992	10.10	February 29, 2016
10.7	Amended and Restated 2010 Non-Management Compensation and Incentive Plan**	10-K	000-50216	10.31	March 15, 2012
10.8	Forms of agreements for use under the Amended and Restated 2010 Non-Management Compensation and Incentive Plan, as amended**	10-K	000-54992	10.12	April 19, 2016
10.9	General Amendment of Company Plans as of August 6, 2013**	10-Q	000-54992	10.64	November 12, 2013
10.10	Form of Employment Agreement among each of Christine B. Amrhein (dated July 18, 2011), Jonathan R. Lagarenne (dated May 31, 2012), and L. Heath Sampson (dated August 27, 2014), ADA-ES, Inc. and Advanced Emissions Solutions, Inc., as amended**	10-K	000-54992	10.19	February 29, 2016
10.11	Form of Amendment to Employment Agreement dated August 26, 2014 between each of Christine B. Amrhein	8-K	000-54992	10.67	September 2, 2014

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	and Sharon M. Sjostrom and ADA-ES, Inc. and Advanced Emissions Solutions, Inc.** Rider to Employment Agreement dated August 27, 2014						September 2, 2014
10.12	between Heath Sampson and ADA-ES, Inc. and Advanced Emissions Solutions, Inc.**	8-K	000-54992	10.66			
10.13	Form of Amendment to Employment Agreement dated September 19, 2014 between Jonathan R. Lagarenne and ADA-ES, Inc. and Advanced Emissions Solutions, Inc.**	8-K	000-54992	10.69			September 22, 2014

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Exhibit No.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date
10.14	Employment Agreement dated March 1, 2003 between Sharon M. Sjostrom and ADA Environmental Solutions, LLC (assigned to ADA-ES, Inc.)**	10-K	000-50216	10.34	March 27, 2007
10.15	Amendment to Employment Agreement dated August 26, 2014 between Sharon M. Sjostrom and ADA-ES, Inc. and Advanced Emissions Solutions, Inc.**	8-K	000-54992	10.67	September 2, 2014
10.16	Waiver and Release Agreement between Jonathan R. Lagarenne and Advanced Emissions Solutions, Inc.**	10-K	000-54992	10.31	February 29, 2016
10.17	Waiver and Release Agreement between Christine B. Amrhein and Advanced Emissions Solutions, Inc.*, **				
10.18	Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC dated May 27, 2011, by and among Clean Coal Solutions, LLC, ADA-ES, Inc., GSFS Investments I Corp. and NexGen Refined Coal, LLC***	10-Q/A	000-50216	10.33	September 28, 2011
10.19	The First Amendment to the Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC, by and among Clean Coal Solutions, LLC, ADA-ES, Inc., GSFS Investments I Corp. and NexGen Refined Coal, LLC dated September 9, 2011	10-Q	000-50216	10.89	November 14, 2011
10.20	Second Amendment to the Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC by and among ADA-ES, Inc., NexGen Refined Coal, LLC and GSFS Investments I Corp. dated July 31, 2012	10-Q	000-50216	10.59	November 9, 2012
10.21	Contribution Agreement dated May 27, 2011 between ADA-ES, Inc. and NexGen Refined Coal, LLC	10-Q	000-50216	10.87	August 12, 2011
10.22	Amended and Restated Limited Liability Company Operating Agreement by and between ADA-ES, Inc., NexGen Refined Coal, LLC and Clean Coal Solutions Services, LLC dated November 20, 2013	10-K	000-54992	10.38	February 29, 2016
10.23	Amended and Restated License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated October 30, 2009	10-K	000-50216	10.77	August 16, 2010
10.24	First Amendment to the Amended and Restated License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated as of August 4, 2010	10-Q	000-50216	10.81	March 28, 2011
10.25	Second Amendment to Amended and Restated License Agreement by and between ADA-ES, Inc. and Clean Coal Solutions, LLC dated as of July 23, 2013***	10-Q	000-54992	10.63	November 12, 2013
10.26	Technology Sublicense Agreement between ADA-ES, Inc., Clean Coal Solutions, LLC, and GS RC Investments LLC dated June 29, 2010	10-Q	000-50216	10.74	August 16, 2010
10.27	Amendment to Technology Sublicense Agreement between ADA-ES, Inc., GS RC Investments, LLC, and Clean Coal Solutions, LLC dated November 21, 2011***	10-K	000-54992	10.44	February 29, 2016

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10.28	Amendment #2 to Technology Sublicense Agreement between ADE-ES, Inc, GS RC Investments, LLC, and Clean Coal Solutions, LLC dated December 15, 2011	10-K	000-50216	10.49	March 15, 2012
10.29	Exclusive Right to Lease Agreement dated May 27, 2011 between Clean Coal Solutions, LLC and GSFS Investments I Corp***	10-Q/A	000-50216	10.84	September 28, 2011
10.30	ADA-ES, Inc. Limited Guaranty for the benefit of GSFS Investments I Corp. dated May 27, 2011	10-Q	000-50216	10.86	August 12, 2011
10.31	ADA-ES, Inc. Limited Guaranty for the benefit of GS RC Investments LLC dated November 21, 2011	10-K	000-50216	10.44	March 15, 2012
10.32	ADA-ES, Inc. Limited Guaranty for the benefit of GS RC Investments LLC dated December 15, 2011	10-K	000-50216	10.5	March 15, 2012
10.33	M-45 Technology License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated July 27, 2012***	10-K	000-54992	10.57	February 29, 2016
10.34	Development and License Agreement with Arch Coal, Inc. dated June 25, 2010***	10-K	000-54992	10.62	February 29, 2016



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Exhibit No.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date
10.35	US Department of Energy Cooperative Agreement No. DE-FE0004343 "Evaluation of Solid Sorbents as an Industrial Retrofit Technology for Carbon Dioxide Capture", dated September 30, 2010	10-Q	000-50216	10.80	November 12, 2010
10.36	Undertaking and Assumption Agreement by and among Advanced Emissions Solutions, Inc., ADA-ES, Inc., and ADA Environmental Solutions, LLC dated as of July 1, 2013	10-Q	000-54992	10.62	November 12, 2013
10.37	Settlement Agreement by and among ADA-ES, Inc., ADA Environmental Solutions, LLC, Norit Americas, Inc. and Norit International N.V. f/k/a Norit N.V. dated August 29, 2011	10-Q	000-50216	10.88	November 14, 2011
10.38	Indemnity Settlement Agreement between ADA-ES, Inc., ADA Environmental Solutions, LLC and Energy Capital Partners, LLC, Energy Capital Partners I, LP, Energy Capital Partners I-A, LP, Energy Capital Partners I-B IP, LP and Energy Capital Partners I (Crowfoot IP), LP and ADA Carbon Solutions, LLC (f/k/a Crowfoot Development, LLC), ADA Carbon Solutions (Red River), LLC (f/k/a Red River Environmental Products, LLC), Morton Environmental Products, LLC, Underwood Environmental Products, LLC, Crowfoot Supply Company, LLC, and Five Forks Mining, LLC dated November 28, 2011	10-K	000-50216	10.45	March 15, 2012
10.39	2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of September 19, 2013	10-K	000-54992	10.69	February 29, 2016
10.40	First Amendment and Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado as of December 2, 2013	10-K	000-54992	10.7	February 29, 2016
10.41	Second Amendment to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of April 3, 2014	10-K	000-54992	10.71	February 29, 2016
10.42	Second Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of April 22, 2014	10-K	000-54992	10.72	February 29, 2016
10.43	Third Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of June 30, 2014	10-K	000-54992	10.73	February 29, 2016
10.44	Third Amendment and Fourth Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of	10-K	000-54992	10.74	February 29, 2016

	September 20, 2014				
10.45	Fourth Amendment and Fifth Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of December 15, 2014	10-K	000-54992	10.75	February 29, 2016
10.46	Fifth Amendment and Sixth Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of May 29, 2015	10-K	000-54992	10.76	February 29, 2016
10.47	Sixth Amendment and Seventh Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of September 30, 2015	10-K	000-54992	10.77	February 29, 2016

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Exhibit No.	Description	Form File No.	Incorporated by Reference Exhibit	Filing Date
10.48	Seventh Amendment and Eighth Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of May 31, 2016	10-Q 001-37822	10.3	August 9, 2016
10.49	Eighth Amendment and Ninth Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of August 29, 2016	8-K 001-37822	10.1	September 1, 2016
10.50	Ninth Amendment and Tenth Waiver to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of November 25, 2016*			
10.51	Tenth Amendment to 2013 Loan and Security Agreement by and among ADA-ES, Inc., Advanced Emissions Solutions, Inc., and CoBiz Bank d/b/a Colorado Business Bank in the State of Colorado dated as of November 30, 2016*			
21.1	Subsidiaries of Advanced Emissions Solutions, Inc.*			
23.1	Consent of Hein & Associates LLP*			
23.2	Consent of Hein & Associates LLP*			
31.1	Certification of Chief Executive Officer of Advanced Emissions Solutions, Inc. Pursuant to 17 CFR 240.13a-14(a) or 17 CFR 240.15d-14(a)*			
31.2	Certification of Principal Financial Officer of Advanced Emissions Solutions, Inc. Pursuant to 17 CFR 240.13a-14(a) or 17 CFR 240.15d-14(a)*			
32.1	Certification of Chief Executive Officer and Principal Financial Officer of Advanced Emissions Solutions, Inc. Pursuant to 18 U.S.C Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002*			
101	The following financial statements, formatted in XBRL: (i) Consolidated Balance Sheets as of December 31, 2016 and 2015, (ii) Consolidated Statements of Operations for the Years ended December 31, 2016, 2015 and 2014, (iii) Consolidated Statements of Changes in Stockholders' Equity (Deficit) for the Years ended December 31, 2016, 2015 and 2014, (iv) Consolidated Statements of Cash Flows for the Years ended December 31, 2016, 2015 and 2014; and (v) Notes to the Consolidated Financial Statements. The information in Exhibit 101 is "furnished" and not "filed" as provided in Rule 401 of Regulation S-T.			

Notes:

\*- Filed herewith.

\*\* - Management contract or compensatory plan or arrangement.

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– Portions of this exhibit have been omitted pursuant to a request for confidential treatment. The non-public information has been separately filed with the Securities and Exchange Commission.

Filings for the Company were made under the name ADA-ES, Inc. (File No. 000-50216) prior to July 1, 2013, the effective date of our reorganization, and under the name Advanced Emissions Solutions, Inc. (File No. 000-54992) starting on July 1, 2013. Filings for the Company were made under the name Advanced Emissions Solutions, Inc. (File No. 001-37822) starting on July 6, 2016.

(c) The following financial statements are included in this report pursuant to Regulation S-X Rule 3-09:

(1) Tinium Group, LLC and Subsidiaries;

a. Consolidated Financial Statements, December 31, 2016, 2015 and 2014 (With Independent Auditors' Report Thereon);

TINUUM GROUP, LLC AND SUBSIDIARIES

CONSOLIDATED FINANCIAL STATEMENTS

As of December 31, 2016 and 2015

And for the Years Ended December 31, 2016, 2015 and 2014

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INDEPENDENT AUDITOR'S REPORT

To the Board of Members  
Tinuum Group, LLC

We have audited the accompanying consolidated balance sheets of Tinuum Group, LLC and subsidiaries (the "Company") as of December 31, 2016 and 2015, and the related consolidated statements of operations, members' equity, and cash flows for each of the three years in the period ending December 31, 2016. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States) and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Tinuum Group, LLC and subsidiaries as of December 31, 2016 and 2015, and the results of their operations and their cash flows for each of the three years in the period ending December 31, 2016, in conformity with accounting principles generally accepted in the United States of America.

/s/ Hein & Associates LLP

Denver, Colorado  
March 6, 2017

TINUUM GROUP, LLC AND SUBSIDIARIES  
 CONSOLIDATED BALANCE SHEETS  
 As of December 31, 2016 and 2015  
 (in thousands)

## ASSETS

	2016	2015
<b>CURRENT ASSETS</b>		
Cash	\$10,897	\$6,183
Accounts receivable	3,790	16,861
Related party receivables	—	4,560
Inventory	9,857	10,167
Prepaid royalties and other assets	40	3,089
Total current assets	24,584	40,860
<b>NON-CURRENT ASSETS</b>		
Fixed assets, net	68,469	76,788
Deferred tax assets	1,189	217
Other assets, net	13,963	13,720
Total non-current assets	83,621	90,725
<b>TOTAL ASSETS</b>	<b>\$108,205</b>	<b>\$131,585</b>

The following table presents certain assets of the consolidated variable interest entities (VIEs), which are included in the Consolidated Balance Sheets above. The assets in the table below include those assets that can only be used to settle obligations of consolidated VIEs, presented on the following page, and are in excess of those obligations. Additionally, the assets in the table below include third-party assets of consolidated VIEs only and exclude intercompany balances that eliminate in consolidation.

Assets of consolidated VIEs to be used to settle obligations of consolidated VIEs

	2016	2015
<b>ASSETS</b>		
Cash	\$6,213	\$3,366
Accounts receivable	526	269
Inventory	8,830	8,604
Non-current assets	2,684	2,473
<b>TOTAL ASSETS</b>	<b>\$18,253</b>	<b>\$14,712</b>

Statement continues on the next page

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





TINUUM GROUP, LLC AND SUBSIDIARIES  
CONSOLIDATED BALANCE SHEETS  
As of December 31, 2016 and 2015  
(in thousands)

LIABILITIES AND MEMBERS' EQUITY

	2016	2015
<b>CURRENT LIABILITIES</b>		
Accounts payable and accrued liabilities	\$7,164	\$21,952
Related party payables	5,734	5,904
Deferred revenue	30,219	29,131
Line of credit	—	4,000
Total current liabilities	43,117	60,987
<b>NON-CURRENT LIABILITIES</b>		
Secured promissory note	6,794	7,535
Deferred revenue - long-term	3,188	798
Asset retirement obligation	1,474	1,079
Total non-current liabilities	11,456	9,412
<b>TOTAL LIABILITIES</b>	54,573	70,399
<b>TEMPORARY CLASS B PREFERRED EQUITY</b>	18,250	30,448
<b>OTHER MEMBERS' EQUITY</b>		
Members' equity attributable to Class A Members	26,475	25,175
Noncontrolling interests	8,907	5,563
Total members' equity	35,382	30,738
<b>TOTAL LIABILITIES AND MEMBERS' EQUITY</b>	\$108,205	\$131,585

The following table presents certain liabilities of consolidated VIEs, which are included in the Consolidated Balance Sheets above. The liabilities in the table below include third-party liabilities of consolidated VIEs only and exclude intercompany balances that eliminate in consolidation. The liabilities also exclude intercompany amounts where creditors have recourse against the general credit of Tinum Group, LLC. However, the secured promissory note has a limited guarantee provided by Tinum Group, LLC.

Liabilities of consolidated VIEs for which creditors do not have recourse against the general credit of Tinum Group, LLC

	2016	2015
<b>LIABILITIES</b>		
Accounts payable and accrued liabilities	\$4,864	\$1,489
Secured promissory note	6,794	7,535
Non-current liabilities	401	114
<b>TOTAL LIABILITIES</b>	\$12,059	\$9,138

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



TINUUM GROUP, LLC AND SUBSIDIARIES  
CONSOLIDATED STATEMENTS OF OPERATIONS  
For the Years Ended December 31, 2016, 2015 and 2014  
(in thousands)

	2016	2015	2014
REVENUES			
Coal sales	\$ 186,176	\$ 533,365	\$ 412,449
Rents	120,400	153,931	113,769
Other	2,407	8,201	7,032
Total revenues	308,983	695,497	533,250
COST OF SALES (exclusive of depreciation shown separately below)			
Coal purchases	186,152	533,466	412,449
Chemicals	7,941	23,271	15,238
Site and production fees	15,934	19,286	9,614
Royalties and broker fees	6,651	11,058	6,851
Total cost of sales	216,678	587,081	444,152
GROSS PROFIT	92,305	108,416	89,098
OPERATING EXPENSES	7,637	10,586	7,190
SELLING, GENERAL AND ADMINISTRATIVE EXPENSES	11,492	9,571	11,681
DEPRECIATION AND AMORTIZATION EXPENSE	4,533	3,248	2,630
Income from operations	68,643	85,011	67,597
OTHER EXPENSE			
Other expense, net	5,903	823	370
Interest expense	447	160	34
Total other expense	6,350	983	404
INCOME BEFORE STATE INCOME TAXES	62,293	84,028	67,193
State income tax expense	2,425	1,220	1,426
NET INCOME	59,868	82,808	65,767
Class B holders preferred return	(3,901 )	(6,157 )	(8,707 )
Loss attributable to noncontrolling interests	27,234	10,675	11,023
NET INCOME AVAILABLE TO CLASS A MEMBERS	\$ 83,201	\$ 87,326	\$ 68,083

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



TINUUM GROUP, LLC AND SUBSIDIARIES  
CONSOLIDATED STATEMENTS OF MEMBERS' EQUITY  
Years Ended December 31, 2016, 2015 and 2014  
(in thousands)

	Other Members Equity (Deficit)			Total Other Members' Equity (Deficit)
	Temporary Class B Members	Class A Members	Noncontrolling Interest	
BALANCES, JANUARY 1, 2014	\$ 63,071	\$(52,178)	\$ —	\$(52,178)
Class B holders preferred return	8,707	—	—	—
Member contributions	—	—	16,548	16,548
Member distributions	(15,383 )	(89,806 )	—	(89,806 )
Reclassification of member equity	(10,874 )	10,874	—	10,874
Net income available to Class A Members	—	68,083	—	68,083
Net loss attributable to noncontrolling interest	—	—	(11,023 )	(11,023 )
BALANCES, DECEMBER 31, 2014	\$ 45,521	\$(63,027)	5,525	\$(57,502)
Class B holders preferred return	6,157	—	—	—
Member contributions	—	—	10,713	10,713
Member distributions	(3,053 )	(17,301 )	—	(17,301 )
Reclassification of member equity	(18,177 )	18,177	—	18,177
Net income available to Class A Members	—	87,326	—	87,326
Net loss attributable to noncontrolling interest	—	—	(10,675 )	(10,675 )
BALANCES, DECEMBER 31, 2015	\$ 30,448	\$25,175	5,563	\$30,738
Class B holders preferred return	3,901	—	—	—
Member contributions	—	—	30,578	30,578
Member distributions	(14,700 )	(83,300 )	—	(83,300 )
Reclassification of member equity	(1,399 )	1,399	—	1,399
Net income available to Class A Members	—	83,201	—	83,201
Net loss attributable to noncontrolling interest	—	—	(27,234 )	(27,234 )
BALANCES, DECEMBER 31, 2016	\$ 18,250	\$26,475	\$ 8,907	\$35,382

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

TINUUM GROUP, LLC AND SUBSIDIARIES  
CONSOLIDATED STATEMENTS OF CASH FLOWs  
For the Years Ended December 31, 2016, 2015 and 2014  
(in thousands)

	2016	2015	2014
CASH, BEGINNING OF YEAR	\$6,183	\$3,870	\$11,663
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>			
Net income	59,868	82,808	65,767
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	4,533	3,248	2,630
Loss on sale of assets	5,905	859	643
Amortization of prepaid royalties	3,012	3,540	2,136
Accretion of asset retirement obligation	122	94	151
Settlement of asset retirement obligation	(108)	(126)	(250)
Deferred state taxes	(972)	180	(397)
Effects of changes in operating assets and liabilities:			
Accounts receivable	13,071	(12,845)	(2,247)
Related party receivables	4,560	425	(4,108)
Prepaid expenses and other assets	(211)	(13,689)	357
Inventory	310	(672)	(8,335)
Accounts payable and accrued liabilities	(14,788)	16,334	3,109
Related party payables	943	772	(3,107)
Deferred revenue	3,478	(43,178)	27,284
Net cash provided by operating activities	79,723	37,750	83,633
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>			
Capital expenditures for fixed assets	(2,846)	(30,061)	(9,789)
Net cash used in investing activities	(2,846)	(30,061)	(9,789)
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>			
Borrowings (repayments) under secured promissory note, net	(741)	534	7,001
Borrowings under line of credit	—	4,000	—
Repayments under line of credit	(4,000)	—	—
Noncontrolling member contributions	30,578	10,713	13,912
Noncontrolling member contribution receivable	—	(269)	—
Members' distributions	(98,000)	(20,354)	(102,550)
Net cash used in financing activities	(72,163)	(5,376)	(81,637)
NET INCREASE (DECREASE) IN CASH	4,714	2,313	(7,793)
CASH, END OF YEAR	\$10,897	\$6,183	\$3,870
<b>SUPPLEMENTAL DISCLOSURE</b>			
Cash paid for interest	\$454	\$121	\$36
Cash paid for taxes	2,936	1,024	1,453
<b>NON-CASH TRANSACTIONS</b>			
Capital expenditures included in current liabilities	\$1,113	\$1,995	\$4,122

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Asset retirement obligation recorded	381	299	253
Non cash distribution of membership interest	—	—	2,636

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



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NOTE 1 - SIGNIFICANT ACCOUNTING POLICIES

Tinum Group, LLC, formerly known as Clean Coal Solutions, LLC, (together with its subsidiaries, “Tinum” or “the Company”) develops, manages and leases facilities used in the production of reduced emissions fuel (“REF Facilities”). The production of reduced emissions fuel (a/k/a refined coal) via these REF Facilities qualifies for production tax credits that are available under Section 45 of the Internal Revenue Code (“PTCs”). The value of the PTC is adjusted annually based on inflation adjustment factors published in the Federal Register. The 2016, 2015 and 2014 PTC rates were \$6.810, \$6.710, and \$6.601 per ton of reduced emissions fuel produced, respectively.

Tinum is owned 42.5% by ADA-ES, Inc. (“ADA”), 42.5% by NexGen Refined Coal, LLC (“NexGen”) (collectively, Class A Members), and 15% by GSFS Investments I Corp. (“GSFS” or the “Class B Member”). ADA, NexGen, and GSFS are collectively referred to herein as the “Members.”

Tinum placed in service two REF Facilities prior to January 1, 2010 and 26 additional REF Facilities prior to January 1, 2012. Each REF Facility has demonstrated the required emission reductions from the production of reduced emissions fuel to qualify for PTCs. The reduced emissions fuel produced at these REF Facilities is burned at coal-fired generation stations (the owner of which is a “Generator”) and is expected to continue to qualify for PTCs for a period of ten years following the applicable placed in service date (expiring at certain dates in 2019 and 2021, respectively).

At December 31, 2016 and 2015, respectively, 13 and 12 REF Facilities were under lease with third party investors who use the facilities to produce reduced emissions fuel. The leased REF Facilities are located at coal-fired generation stations throughout the United States.

Tinum has also produced reduced emissions fuel from REF Facilities for the benefit of its Members. As of December 31, 2016 and December 31, 2015, respectively, zero and five of the REF Facilities were producing reduced emissions fuel for the Members.

Tinum Services, LLC (“TS”), formerly known as Clean Coal Solutions Services, LLC operates and maintains the REF Facilities under respective operating and maintenance agreements. TS is owned 50% each by ADA and NexGen and is not consolidated with the accounts of Tinum. Lessees of REF Facilities, and Tinum for retained REF Facilities, pay TS, subject to certain limitations, a fee for procuring certain patented and proprietary chemical additives, and an operating fee necessary for the production of reduced emissions fuel, and for the other operating and maintenance costs associated with the REF Facilities.

Basis of Presentation

The accompanying consolidated financial statements are presented in accordance with accounting principles generally accepted in the United States (“GAAP”). The accompanying consolidated financial statements include the accounts of the Company and several variable interest entities (“VIEs”) for which Tinum is the primary beneficiary. An entity is referred to as a VIE if it meets the criteria outlined in ASC 810 - Consolidation (“ASC 810”), which are: (i) the entity has equity that is insufficient to permit the entity to finance its activities without additional subordinated financial support from other parties; or (ii) the entity has equity investors that cannot make significant decisions about the entity’s operations or that do not absorb their proportionate share of the entity’s expected losses or expected returns.

The Company consolidates a VIE when it has both the power to direct the activities that most significantly impact the VIE's economic performance and a right to receive benefits or the obligation to absorb losses of the entity that could be potentially significant to the VIE (i.e., it is the primary beneficiary).

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All intercompany balances and transactions have been eliminated in consolidation.

#### Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Management bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances. Significant estimates include the assumption that the Company's REF facilities can be utilized after the expiration of the Section 45 tax credit period. Ultimate realization of assets and settlement of liabilities in the future could differ from those estimates.

#### Cash

The carrying value approximates fair value due to the short-term nature of these instruments. The Company maintains its cash in accounts with a financial institution. These accounts at times may exceed federally insured limits. The Company has not experienced any losses in these accounts. The Company believes it is not exposed to any significant credit risk related to cash.

#### Accounts Receivable

Accounts receivable consist primarily of lease payments due from lessees of the REF Facilities. The carrying amount of accounts receivable may be reduced by a valuation allowance that reflects management's best estimate of amounts that will not be collected. Under the Company's lease agreements, interest can accrue on delinquent balances. No interest on delinquent balances was recorded for the years ended December 31, 2016, 2015 and 2014, respectively. Any allowance for doubtful accounts is based on management's assessment of the collectability of specific customer accounts and the aging of the accounts receivable. If there is a deterioration of a major customer's credit worthiness or actual defaults are higher than the historical experience, management's estimates of the recoverability of amounts due the Company could be adversely affected. As of December 31, 2016 and 2015, no allowance for doubtful accounts was considered necessary.

#### Inventory

Inventory is comprised primarily of feedstock coal and chemicals used in the production of reduced emissions fuel at REF Facilities owned and operated by Tinuum. Inventory is valued at average cost.

#### Prepaid Royalties

In November 2011, Tinuum entered into an exclusive technology license agreement with ADA to use M-45<sup>TM</sup> technology for producing reduced emissions fuel which entitles ADA to certain royalty payments. The Company made prepaid royalty payments totaling \$10.0 million to ADA, according to the terms of the M-45<sup>TM</sup> technology license agreement. Royalty payments have been applied to the prepaid royalty balance through 2016. As of December 31, 2016 the prepaid royalty balance was reduced to zero. See Note 10 for further discussion of the future royalty payment commitments.

Fixed Assets

Fixed assets are stated at historical cost and consist of major additions and improvements less accumulated depreciation. Expenditures for major renewals and improvements are capitalized, while maintenance and repair costs that do not significantly improve the related asset or extend its useful life are charged to expense as incurred. For financial reporting purposes, depreciation is calculated using the straight-line method over

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the estimated useful lives of the assets ranging from 3 to 20 years. Depreciation expense was \$4,528, \$3,243, and \$2,625, for the years ended December 31, 2016, 2015 and 2014, respectively.

The Company records a liability for asset retirement obligations (“ARO”) equal to the fair value of the estimated cost to retire a REF Facility. The ARO liability is initially recorded in the period in which the obligation meets the definition of a liability, which is generally when a REF Facility is installed at a generation station. The ARO liability is estimated by the Company based on legal removal requirements and using anticipated future inflation rates. When the liability is initially recorded, the Company increases the carrying amount of the related long-lived asset by an amount equal to the original liability. The liability is increased over time to reflect the change in its present value, and the capitalized cost is depreciated over the useful life of the related long-lived asset. The ARO liability is removed when the Company is relieved of its removal obligation due to either completion of the removal activities at a generation station or a transfer of the responsibility for the REF Facility removal to a third party. The Company reevaluates the adequacy of its recorded ARO liability at least annually. Actual costs of asset retirements such as removing the REF Facility from a generation station and related site restoration are charged against the related liability. Any difference between costs incurred upon settlement of an ARO and the recorded liability is recognized in Other expense as a gain or loss in the Company’s Statements of Operations.

#### Intangible Assets

Tinum has two exclusive licenses from ADA for the patented and proprietary “CyClean™” and “M-45™” technologies related to the production of reduced emissions fuel. The patents underlying the CyClean™ technology license expire beginning in 2021; however, the license agreement includes potential future patents related to the technology. The costs associated with the exclusive CyClean™ license are included in Other assets and are being amortized over the useful economic life of the technology, or approximately 14 years, using the straight-line method. Amortization expense was \$5 for each of the years ended December 31, 2016, 2015 and 2014.

#### Impairment of Long-Lived Assets

The Company reviews long-lived assets for impairment whenever events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the fair value of the assets. Assets to be disposed of are reported at the lower of carrying amount or fair value less costs to sell. At December 31, 2016 and 2015, there were no such impairments.

#### Revenue Recognition

##### Lease Revenue

Lease revenue is recognized based on the earning of payments under the terms of the respective REF Facilities’ lease agreements. Depending on the lease agreement, the Company may receive fixed lease payments or a combination of fixed and contingent lease payments. Contingent lease payments are determined periodically based on the actual amount of reduced emissions fuel production during such period. Prepaid lease payments are received upon execution of certain lease agreements and are recorded as deferred revenue. Deferred revenue is amortized into revenue in accordance with the amortization period of the respective lease agreement.

Coal Sales

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In connection with the operation of REF Facilities by the Company, the Company purchases and takes title to feedstock coal under purchase agreements with each respective Generator or other supplier of feedstock coal. The Company purchases the chemicals from third party vendors and applies them to the feedstock coal to produce reduced emissions fuel in its REF Facilities. The reduced emissions fuel is sold by the Company, under reduced emissions fuel sale agreements, to a Generator or to another third party at the Company's discretion, as permitted under the applicable Generator agreements. The Company performs reduced emissions fuel recertification or redetermination testing periodically as required by Section 45 with respect to production at each of its REF Facilities. During the years ended December 31, 2016, 2015 and 2014 the Company sold all of its reduced emissions fuel and unrefined coal (coal untreated but part of the reduced emissions fuel process) to third parties that used the fuel to generate electricity, and recorded such amounts as coal sales.

#### Income Taxes

The Company, with the consent of its Members, has elected to be taxed under applicable sections of federal and state income tax law as a limited liability company treated as a partnership for income tax purposes. As a result of this election, no federal income taxes are incurred by the Company. Instead, the Members are liable for income taxes on their pro rata share of the Company's income, deductions, losses, and credits.

In certain states, the Company is taxed based upon shareholder equity or other enterprise considerations. In these instances, the Company records and pays the applicable tax directly to the state agency. Deferred income taxes are provided for temporary differences arising from differences between the financial statement amount and tax basis of assets and liabilities existing at each balance sheet date, using enacted tax rates anticipated to be in effect when the related taxes are expected to be paid. A valuation allowance is established if it is more likely than not that a deferred tax asset will not be realized. The Company includes interest and penalties related to state tax as a component of income tax expense. As of December 31, 2016, the Company's tax years of 2013 through 2015 are subject to examination by the applicable taxing authorities.

The Company applies the Financial Accounting Standards Board's ("FASB") requirements related to accounting for uncertain tax positions. During the years ended December 31, 2016, 2015 and 2014, the Company has concluded that there are no significant uncertain tax positions that would require recognition or disclosure in the financial statements. As of December 31, 2016 and 2015, respectively, the Company made no provision for interest or penalties related to uncertain positions.

#### Reclassifications

Certain reclassifications have been made to the prior years' financial statements to conform to the current year presentation. These reclassifications had no effect on previously reported results of operations or member's equity.

#### Recent Accounting Pronouncements

In May 2014, the FASB issued Accounting Standards Update ("ASU") 2014-09, Revenue from Contracts with Customers. As amended by ASU 2015-14, the ASU is effective for public companies for annual reporting periods beginning after December 15, 2017. The FASB has recently issued several other amendments to the standard, including clarification on accounting for licenses of intellectual property and identifying performance obligations. Under the new standard, revenue is recognized when a customer obtains control of promised goods or services and is recognized in an amount that reflects the consideration which the entity expects to receive in exchange for those goods

and services. In addition, the standard requires disclosure of the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers.



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The guidance permits two methods of adoption to meet the new standard: retrospectively to each prior reporting period presented (full retrospective method), or retrospectively with the cumulative effect of initially applying the guidance recognized at the date of initial application (cumulative catch-up transition method). We currently anticipate adopting the standard using the full retrospective method. While we continue to assess the potential impacts of the standard, we anticipate that the most significant impact will be on our revenues from technology license fees. Under the new revenue standard licensing fees are generally recognized at a point in time as compared to our current practice of recognizing them over time. We expect the revenues from coal sales to remain substantially unchanged. Lease revenues are specifically excluded from the revenue standard.

The FASB issued Accounting Standards Update No. 2015-02, Consolidation - Amendments to the Consolidation Analysis (Topic 810), during the first quarter of 2015 and issued No. 2016-17 Consolidation (Topic 810) as an amendment in October 2016. Once effective, the ASU will apply to the consolidation assessment of all entities. The standard is effective for reporting entities with fiscal periods beginning after December 15, 2016. The Company has assessed the impact of the ASU on its consolidation analysis and believes that the consolidation conclusions will not differ from the Company's current consolidation methodology.

In February 2016, the FASB issued ASU 2016-02 Leases (Topic 842) which is intended to increase transparency and comparability of accounting for lease transactions. The ASU will require all leases to be recognized on the balance sheet as lease assets and lease liabilities. Lessor accounting remains similar to the current model, but is updated to align with certain changes to the lessee model (i.e., certain definitions, such as initial direct costs, have been updated) and the new revenue recognition standard. Lease classifications by lessors are similar; operating, direct financing, or sales-type. Lessees will need to recognize a right-of-use asset and a lease liability for virtually all of their leases. The liability will be equal to the present value of lease payments. The asset value will be based on the liability, subject to adjustment, such as for initial direct costs. For income statement purposes, the FASB retained a dual model, requiring leases to be classified as either operating or finance. Classification will be based on criteria that are largely similar to those applied in current lease accounting, but without explicit thresholds. The ASU will require both quantitative and qualitative disclosures regarding key information about leasing arrangements.

The standard is effective for the Company for fiscal years beginning after December 15, 2018. Early adoption is permitted. The new standard must be adopted using a modified retrospective transition, and provides for certain practical expedients. Transition will require application of the new guidance at the beginning of the earliest comparative period presented. Management is currently evaluating the effect of this ASU on its financial statements and disclosures. We currently expect to adopt this standard in conjunction with the revenue standard beginning January 1, 2018. However, we may determine not to adopt the standard prior to the required effective date. We anticipate this standard will have a significant impact on our consolidated financial statements. The most significant impact will relate to our operating leases associated with our REF Facilities.

In June 2016, ASU 2016-13, Financial Instruments-Credit Losses was issued. The ASU introduces new accounting models for expected credit losses on financial instruments and applies to: (1) loans, accounts receivable, trade receivables and other financial assets measured at amortized cost, (2) loan commitments and certain other off-balance sheet credit exposures, (3) debt securities and other financial assets measured at fair value and (4) beneficial interests in securitized financial assets. We do not expect this standard to have a material impact on the Company's consolidated financial statements.

NOTE 2 - FIXED ASSETS

Reduced Emissions Fuel Facilities

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Reduced emissions fuel production facilities and their related components represent the 28 REF Facilities that were placed in service by the Company in 2009 and 2011, and have demonstrated the qualified emissions reductions to qualify for PTCs. REF Facilities are stated at historical cost. Depreciation is calculated using the straight-line method over a 20-year period.

Under the site license agreements between Tinuum and the Generators, Tinuum may be required to return the site upon which the REF Facility is located at a generation station (“Site”) to its original condition at the end of the applicable contract period. In instances where the applicable agreements place this responsibility on the Company, the Company has recorded a liability for an ARO equal to the fair value of the estimated cost to retire the REF Facility and return each Site to its original condition. The ARO liability was estimated by the Company using estimated and historic facility removal costs and anticipated future inflation rates. This estimated future value was discounted to its present value using the Company’s credit-adjusted risk-free rate. The carrying value of the asset is depreciated on a straight-line basis over the remaining estimated life of the REF Facility asset group. The ARO liability is increased over time to reflect the change in its present value, and the capitalized cost is depreciated over the useful life of the site license. In subsequent periods, the Company is required to make adjustments to AROs based on changes in the estimated fair values of the obligations. Corresponding increases in asset book values are depreciated over the remaining useful life of the related site license. Uncertainties as to the probability, timing, or amount of cash flows associated with AROs may affect management’s estimates of fair value. For the years ended December 31, 2016, 2015, and 2014, the Company recorded \$122, \$94, and \$151 of accretion expense, respectively.

The following table describes changes to the Company’s ARO liability for the years ended December 31, 2016 and 2015:

	2016	2015
Beginning balance	\$1,079	\$812
Liabilities incurred	381	299
Accretion	122	94
Settlement of obligations	(108)	(126)
Ending balance	\$1,474	\$1,079

#### Site Infrastructure and Improvements

Site infrastructure and improvements consists of Site improvements, modular structures and other structural Site specific components installed at various REF Facility locations. These assets are recorded at historical cost and are depreciated using the straight-line method over estimated useful lives of 9 to 20 years.

#### Furniture, Fixtures and Equipment

Furniture, fixtures, and equipment is comprised of office furniture and fixtures and office equipment, including those under capital lease. These assets are recorded at cost and depreciated using the straight-line method with estimated useful lives ranging from 3 to 20 years.

The following table summarizes the components of gross and net carrying amounts for fixed assets as of December 31, 2016 and 2015:



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	2016	2015
REF Facilities and related equipment	\$84,083	\$88,507
Site infrastructure and improvements	2,948	3,433
Furniture, fixtures and equipment	1,019	986
Other	477	527
	88,527	93,453
Accumulated depreciation	(20,058)	(16,665)
Fixed assets, net	\$68,469	\$76,788

#### NOTE 3 – INVENTORY

Inventory is comprised primarily of feedstock coal and chemicals used in the production of reduced emissions fuel at REF Facilities owned and operated by the Company. Inventory is valued at average cost. The Company assesses the inventory valuation on a monthly basis and reduces the value for any obsolete inventory. No valuation allowance was considered necessary as of December 31, 2016 and 2015.

	2016	2015
Feedstock coal	\$9,723	\$9,814
Chemicals	134	353
Total	\$9,857	\$10,167

#### NOTE 4 – LEASING ACTIVITIES

The Company has entered into several types of transaction structures with third party investors. Each of the agreements contains terms such that the payments received are recognized by the Company as operating lease revenues as they are earned. Payments under the agreements may be described as fixed and contingent rents, member interest purchase payments, or asset purchase payments, depending on the particular transaction structure.

Ten of the REF Facilities leased to third parties are under lease with a related party as of December 31, 2016 and 2015, respectively. These leases generally have terms that extend to the date ten years after the placed in service date for the particular REF Facility, subject to earlier termination by the lessee at periodic intervals or upon the occurrence of specified events.

Under certain REF Facility leases an initial deposit of prepaid rents may be received. Any prepayments received are recorded as deferred revenue and are amortized into revenue under the straight-line method over the amortization period defined in the respective lease agreement. As of December 31, 2016 and 2015, the Company has recorded \$33,407 and \$29,929, respectively, of deferred revenue related to rents.

An REF Facility Asset Purchase Agreement was entered into with a third party (“Purchaser”) in February 2013. Under this agreement, Tinuum received prepaid rents from the Purchaser which were amortized and recognized as lease revenue over a 36-month term. As part of the agreements a Put-Call Agreement was entered into which grants the Purchaser the option to put the REF Facility back to Tinuum under certain circumstances. In October 2015, Tinuum

was notified of the Purchaser's intent to put the REF Facility back to Tinuum, effective in April 2016. As a result of the put, no additional gain or loss was recognized and all

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previously recognized revenues were not impacted.

In February 2014, the Company sold 99.8% of the member interests of one of its subsidiaries, RCM6, LLC (“RCM6”). RCM6 owns a single REF Facility. A portion (49.9%) of the member interests was purchased by parties related to or controlled by ADA, NexGen, and Republic Financial Corporation (“Republic”). The remaining 49.9% was sold to an unrelated third party. The sale of the member interests in RCM6 was under identical terms and relative to their proportionate interests for all purchasers. Effective March 3, 2016, the unrelated third party purchased the interests held by ADA and NexGen (including interests previously acquired by NexGen from Republic) resulting in the unrelated third party owning 99.8% of member interests in RCM6. The Company retains its 0.2% member interest.

Under the RCM6 Member Interest Purchase Agreements (“MIPA”), the Company received prepayments at closing which were to be amortized through the first quarter of 2017. As part of the 2016 purchase of membership interests between the owners, the amortization period was extended through the fourth quarter of 2017. The agreement calls for additional payments to be made quarterly by the owners of the member interests of RCM6 through 2021. These payments are recorded as lease revenues in the Company’s consolidated financial statements.

Simultaneously with the sale by the Company of the member interests, RCM6 entered into agreements for the purchase of feedstock coal, the sale of reduced emissions fuel, the provision of coal yard services and site license (the “RCM6 Agreements”) with a Generator. The RCM6 Agreements are required for the on-going production and sale of reduced emissions fuel by RCM6 at its current location. Under the RCM6 Agreements, the Company also entered into a guarantee agreement whereby Tinuum guaranteed, on behalf of RCM6, \$15.0 million of its obligations under the RCM6 Agreements (“Guarantee Agreement”), including payment obligations and obligations to indemnify the Generator. The Guarantee Agreement expires six years after the expiration of the Agreements. No liabilities have been recorded related to the Guarantee Agreement by the Company as of December 31, 2016 and 2015, respectively.

During 2016 the Company created two additional limited liability companies, Green River RC218, LLC and Red River RC220, LLC, (together “River LLCs”) in which the Company owns a 1% member interest and an unrelated third party owns the remaining 99%. The River LLCs lease REF Facilities from the Company which are utilized in the production of reduced emissions fuel. The agreements for the River LLCs call for payments to be made quarterly, subject to deferral in certain circumstances, by the owners of the member interests of the River LLCs through 2021. The River LLCs simultaneously entered into agreements for the purchase of feedstock coal, the sale of reduced emissions fuel, the provision of coal yard services and site licenses (the “River Agreements”) with a Generator. These River Agreements are required for the on-going production and sale of reduced emissions fuel by the River LLCs. In connection with these River Agreements, the Company also entered into guarantee agreements whereby Tinuum guaranteed, on behalf of the River LLCs, each of their obligations under the River Agreements, including payment obligations and obligations to indemnify the Generator. No liabilities have been recorded related to the Guarantee Agreement by the Company as of December 31, 2016 and 2015, respectively.

The following is a schedule of periodically renewable fixed lease payments to be paid by lessees to the Company through December 31, 2021, assuming no postponement of scheduled payments, no modifications of leases, non-renewals or early lease terminations. Future REF Facility lease payments, including any eliminated in consolidation, do not include contingent lease amounts which are based on the levels of reduced emissions fuel production:





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2017	\$ 116,170
2018	130,235
2019	133,892
2020	123,000
Thereafter	86,450