

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

FORM 10-K

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

For the fiscal year ended December 31, 2020
or

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

Commission file number 001-36103

TECOGEN INC.

(Exact name of Registrant as specified in its charter)

Delaware
(State or Other Jurisdiction of Incorporation or Organization)

45 First Avenue
Waltham, Massachusetts 02451
(Address of Principal Executive Offices)

04-3536131
(IRS Employer Identification No.)

(781) 466-6400
Registrant's telephone number, including area code

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

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

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

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

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

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. Yes No

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

As of June 30, 2020, the last day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the voting and non-voting common equity held by non-affiliates was: \$25,611,519. Solely for purposes of this disclosure, shares of common stock held by executive officers and directors of the registrant as of such date have been excluded because such persons may be deemed to be affiliates. This determination of executive officers and directors as affiliates is not necessarily a conclusive determination for any other purposes.

As of March 9, 2021, 24,850,261 shares of common stock, \$.001 par value per share, of the registrant were issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

None

CAUTIONARY NOTE CONCERNING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K and the documents incorporated herein by reference contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (*"Securities Act"*), Section 21E of the Securities Exchange Act of 1934, as amended (*"Securities Exchange Act"*), the Private Securities Litigation Reform Act of 1995 and other federal securities laws that involve a number of risks and uncertainties. Forward-looking statements generally can be identified by the use of forward-looking terminology such as "anticipates," "believes," "contemplates," "continues," "could," "estimates," "expects," "intends," "may," "plans," "predicts," "pro forma," "potential," "seeks," "should," "target," or other variations thereof (including their use in the negative), or by discussions of strategies, plans or intentions. All statements, other than statements of historical fact, included in this report regarding our strategy, future operations, future financial position, future revenues, projected costs, prospects and plans and objectives of management are forward-looking statements.

The outcome of the events described in these forward-looking statements is subject to known and unknown risks, uncertainties and other factors that may cause us, our customers' or our industry's actual results, levels of activity, performance or achievements expressed or implied by these forward-looking statements to differ. See *"Item 1A. Risk Factors," "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations," and "Item 1. Business,"* as well as other sections in this report that discuss some of the factors that could contribute to these differences.

In addition, such forward-looking statements are necessarily dependent upon assumptions and estimates that may prove to be incorrect. Although we believe that the assumptions and estimates reflected in such forward-looking statements are reasonable, we cannot guarantee that our plans, intentions, or expectations will be achieved. The information contained in this report, including the section discussing risk factors, identifies important factors that could cause such differences.

The cautionary statements made in this report are intended to be applicable to all related forward-looking statements wherever they appear in this report. The forward-looking statements made in this Annual Report on Form 10-K relate only to events as of the date of which the statements are made. Except as required by law, we undertake no obligation to update or release any forward-looking statements as a result of new information, future events, or otherwise, and assume no obligation to update the reasons why actual results could differ materially from those anticipated in such forward-looking statements.

This report also contains or may contain market data related to our business and industry any such market data may include projections that are based on certain assumptions. If these assumptions turn out to be incorrect, actual results may differ from the projections based on these assumptions. As a result, our markets may not grow at the rates projected by this data, or at all. The failure of these markets to grow at these projected rates may have a material adverse effect on our business, results of operations, financial condition, and the market price of our common stock.

TECOGEN INC.

ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2020

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Item 1. Business**The Company**

Tecogen Inc. (together with its subsidiaries, “we,” “our,” or “us,” or “Tecogen”) designs, manufactures, markets, and maintains high efficiency, ultra-clean cogeneration products including natural gas engine-driven combined heat and power, air conditioning systems, and water heaters for residential, commercial, recreational and industrial use. We are known for cost efficient, environmentally friendly and reliable products for distributed power generation that, through patented technology, nearly eliminate criteria pollutants and significantly reduce a customer’s carbon footprint. We were incorporated in the State of Delaware on September 15, 2000.

We have one wholly-owned subsidiary American DG Energy, Inc. (“ADGE”), and we own a 51% interest in American DG New York, LLC (“ADGNY”), a joint venture. ADGE and ADGNY distribute, own, and operate clean, on-site energy systems that produce electricity, hot water, heat and cooling. ADGE owns the equipment that it installs at a customer’s facility and sells the energy produced by its systems to the customer on a long-term contractual basis. We are also developing ultra-low emissions technologies using our patented Ultra® technology for the automotive market and other mobile applications, including forklifts. See “Our Products - Ultra Low-Emissions Technology” below for a more in-depth discussion of our Ultra emissions technology.

Our operations are comprised of two business segments:

- our Products and Services segment, which designs, manufactures and sells industrial and commercial cogeneration systems at our customers’ facilities; and
- our Energy Production segment, which sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term sales agreements we enter into with customers.

Recent Developments*COVID-19 Update*

During the first quarter of fiscal 2020, a novel strain of coronavirus (“COVID-19”) began spreading rapidly throughout the world, prompting governments and businesses to take unprecedented measures in response. Such measures included restrictions on travel and business operations, temporary closures of businesses, and quarantines and shelter-in-place orders. The COVID-19 pandemic has significantly curtailed global economic activity and caused significant volatility and disruption in global financial markets. The COVID-19 pandemic and the measures taken by U.S. Federal, state and local governments in response have materially adversely affected and could in the future materially adversely impact our business, results of operations, financial condition and stock price. The impact of the pandemic remains uncertain and will depend on the growth in the number of infections, fatalities, the duration of the pandemic, steps taken to combat the pandemic, and the development and availability of effective treatments.

Significant portions of our business are deemed “essential services” under various state shelter-in-place orders, and we have been able to maintain critical manufacturing and service operations. We have made every effort to keep our employees who operate our business safe and minimize unnecessary risk of exposure to the virus, and as part of our pandemic response plan, during a relatively short period in April our sales, engineering, and select administrative functions were operated remotely while our manufacturing team continued to function at our manufacturing facility. Our service centers continued to operate due to our essential services designation, however from time to time our service personnel have been unable to perform maintenance services for customers that temporarily ceased or reduced operations at facilities served by our equipment, and certain customers closed their operations, reducing the amount of energy produced and sold to customers during these periods. During the pandemic we have also experienced slower payments from certain customers. These business interruptions resulted in reductions in service and installation revenue, energy production revenue, and margins in the affected portions of our business.

Payroll Protection Loans

On April 17, 2020, we obtained a loan in the amount of \$1,874,200 under the Paycheck Protection Program pursuant to the Coronavirus Aid, Relief, and Economic Security Act (“CARES Act”) through Webster Bank. The loan is guaranteed by the United States Small Business Administration (“SBA”) and, subject to certain limitations, to the extent that the loan is used for payroll, rent, or utilities during the applicable Covered Period following the disbursement of the loan, the loan may be forgiven by the SBA.

On January 19, 2021, we received a letter dated January 12, 2021 from Webster Bank, NA confirming that the Paycheck Protection Program Loan granted to us pursuant to the CARES Act in the original principal amount of \$1,874,200 together with all accrued interest thereon was forgiven in full as of January 11, 2021.

On February 5, 2021, we obtained a Paycheck Protection Program Second Draw unsecured loan through Webster Bank, N.A. in the amount of \$1,874,269 in connection with the Paycheck Protection Program pursuant to the CARES Act. The loan is guaranteed by the SBA. We intend to use the loan proceeds for payroll, rent, utilities and other operating expenses, and expect to apply for forgiveness of the loan balance as permitted under the CARES Act. See Note 10. *Note Payable and Revolving Line of Credit, Bank.*

Energy Sales Agreements

On December 14, 2018, we entered into agreements relating to the sale of two energy purchase agreements and related energy production systems for \$2 million and on March 5, 2019 entered into agreements relating to the sale of six energy purchase agreements and related energy production systems for \$5 million. In connection with the sale, we entered into agreements to provide billing and asset management services and operations and maintenance services for agreed fees for the duration of the energy purchase agreements, pursuant to which we guarantee certain minimum collections and are entitled to receive fifty percent of the excess of collections over agreed minimum thresholds.

ADGE Merger

On May 18, 2017, our stockholders approved the acquisition of ADGE in a stock for stock merger together with the issuance of the stock by us in the transaction ("Merger"). As a result of the Merger, we acquired 100% of the outstanding common shares of ADGE and ADGE became our wholly-owned subsidiary. See Note 4. *"Acquisition of American DG Energy, Inc."* of the Notes to the Consolidated Financial Statements for further information.

Overview of Our Business

We design, manufacture, market and maintain high efficiency, ultra-clean cogeneration products including natural gas engine-driven combined heat and power, air conditioning systems, refrigeration compressors, and water heaters for residential, commercial, recreational and industrial use. We provide cost efficient, environmentally friendly and reliable products for distributed power generation that, through patented technologies, nearly eliminate criteria pollutants and significantly reduce a customer's carbon footprint. Our products are expected to run on Renewable Natural Gas (RNG) as it is introduced into the US gas pipeline infrastructure.

Our natural gas-powered cogeneration systems (also known as combined heat and power or "CHP") are efficient because they drive electric generators or compressors, which reduce the amount of electricity purchased from the utility while recovering the engine's waste heat for water heating, space heating, and/or air conditioning at the customer's building.

We manufacture four types of CHP products:

- Cogeneration units that supply electricity and hot water;
- Chillers that provide air-conditioning and hot water marketed under the TECOCHILL[®] brand name;
- Refrigeration compressors with natural gas engine drives; and
- High-efficiency water heaters marketed under the Ilios[®] brand name.

All of these are standardized, modular, CHP products that reduce energy costs, carbon emissions, and dependence on the electric grid. Tecogen's products allow customers to produce power on-site in parallel with the electric grid or stand alone when no utility grid is available via an inverter-based black-start capability. Because our CHP systems also produce clean, usable heat energy, they provide economic advantages to customers who can benefit from the use of hot water, chilled water, air conditioning and heating.

We also sell energy in the form of electricity, heat, hot water and cooling to customers under long-term energy sales agreements (with standard terms of 10 to 15 years). The typical sales model is to install and own energy systems in customers' buildings and sell the energy produced by those systems back to the customers at a cost set by a negotiated formula in customer contracts. We call this our "On-Site Utility" business, or our Energy Production segment.

Traditional customers for our cogeneration and chiller systems include hospitals, nursing homes, schools, universities, health clubs, spas, hotels and motels, office and retail buildings, food and beverage processors, multi-unit residential buildings, laundries, ice rinks, swimming pools, factories, municipal buildings, indoor agriculture, and military installations; however, the economic feasibility of using our systems is not limited to these customer types. Our refrigeration compressors are applied primarily to industrial applications that include cold storage, wineries, dairies, ice rinks and food processing. Market drivers include the price of natural gas, local electricity rates, environmental regulations, and governmental energy policies, as well as customers' desire to become more environmentally responsible.

Through our factory service centers in California, Connecticut, Florida, Massachusetts, Michigan, New Jersey, New York, and Toronto, Canada, our specialized technical staff maintains our products via long-term service contracts. To date we have shipped over 3,000 units, some of which have been operating for almost 35 years. We established a service center in Toronto, Canada in August 2020 to support our existing population of chillers and cogeneration units and 26 units sold in the area during 2020 to serve public housing facilities.

Our CHP technology uses low-cost, mass-produced engines, which we modify to run on natural gas. In the case of our mainstay cogeneration and chiller products, the engines have proven to be cost-effective and reliable. In 2009, in response to the changing regulatory requirements for stationary engines, our research team developed an economically feasible process for removing air pollutants from the engine exhaust. This technology's U.S. and foreign patents were granted beginning in October 2013 with other domestic and foreign patents granted or applications pending. Branded Ultera®, the ultra-clean emissions technology repositions our engine driven products in the marketplace, making them comparable environmentally with other technologies such as fuel cells, but at a much lower cost and greater efficiency. Because of this breakthrough design for emissions control, multiple Tecogen natural gas-fueled CHP modules fitted with the patented Ultera control technology have been permitted to the current regulatory limits in the Los Angeles area. In 2018, a group of natural gas engine-generators up fitted with the Ultera system were successfully permitted in the same Los Angeles region to unrestricted operation, the first natural gas engines to do so without operating time limits or other exemption. These engines were permitted to levels matching the California Air Resources Board ("CARB") stringent 2007 emissions requirements, the same emissions standard used to certify fuel cells, and the same emissions levels as a state-of-the-art central power plant. We now offer our Ultera emissions control technology as an option on all our products or as a stand-alone application for the retrofitting of other rich-burn spark-ignited reciprocating internal combustion engines such as the engine-generators described above.

Our products are designed as compact modular units that are intended to be installed in multiples when utilized in larger CHP plants. The majority of our CHP modules are installed in multi-unit sites with applications ranging up to 12 units. This approach has significant advantages over utilizing single larger units, allowing building placement in constrained urban settings and redundancy to mitigate service outages. Redundancy is particularly relevant in regions where the electric utility has formulated tariff structures that include high "peak demand" charges. Such tariffs are common in many areas of the country, and are applied by such utilities as Southern California Edison, Pacific Gas and Electric, Consolidated Edison of New York, and National Grid of Massachusetts. Because these tariffs are assessed based on customers' peak monthly demand charge over a very short interval, typically only 15 minutes, a brief service outage for a system comprised of a single unit can create a high demand charge, and therefore be highly detrimental to the monthly savings of the system. For multiple unit sites, the likelihood of a full system outage that would result in a high demand charge is dramatically reduced, consequently, these customers have a greater probability of capturing peak demand savings.

Our CHP products are sold directly to customers by our in-house marketing team, and by established sales agents and representatives.

We install, own, operate and maintain complete distributed generation, or DG systems (or energy systems), and other complementary systems at customer sites, and sell electricity, hot water, heat and cooling energy under long-term contracts at prices guaranteed to the customer to be below conventional utility rates. As of December 31, 2020 we had 34 operational energy systems, representing an aggregate of approximately 2,220 kilowatts of electrical capacity from cogeneration units and 880 cooling ton capacity from chillers (kilowatts is a measure of electric power capacity of our cogeneration machines; tonnage is a measure of the cooling capacity of our chillers). The capacity of both system categories has been reduced from 2019 because of the sale of approximately 30% of the our DG fleet in late 2018 and early 2019 and, the reduction in customer sites due to contract expirations, permanent customer site closings and reduced energy consumption by certain customers due to temporary facilities closings due to COVID-19 impact.

Our operations are comprised of two business segments. Our Products and Services segment designs, manufactures and sells industrial and commercial cogeneration systems as described above. Our Energy Production segment sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term sales agreements.

Products and Services

Our Products and Services segment which designs, manufactures and sells industrial and commercial cogeneration systems as described above, represented 93.5% and 90.6% of our consolidated revenues for the years ended December 31, 2020 and 2019, respectively. See Note 17 "Segments" of the Notes to the Consolidated Financial Statements. Our products and services are described below.

Our Products

We manufacture natural gas engine-driven cogeneration systems, heat pumps, and chillers, all of which are CHP products that deliver more than one form of energy. Our cogeneration products are all standard, modular units that come pre-packaged from our factory for ease of installation at a customer's site. The package incorporates the engine, generator, heat-recovery equipment, system controls, electrical switchgear, emission controls, and a data controller for remote monitoring and data transmission; minimizing the cost and complexity of installing the equipment at a site. This packaged, modular system simplifies CHP technology for small to mid-sized customers who typically are less experienced with the implementation and benefits of a CHP system.

Traditionally, our cogeneration systems and most of our chillers have utilized the same engine, the TecoDrive 7400 model. This is an engine modified by us to use natural gas fuel. In 2017, we introduced a new, slightly larger engine into certain products with advanced features, including improved efficiency and an advanced ignition system. The CHP products utilizing the new engine are the InVerde e+[®] and the TecoPower[®] models CM-60 and CM-75. The new engine and the older TecoDrive model share custom features that enhance durability and efficiency, many of which date from our extensive research with engine manufacturers and the gas industry, including the Gas Research Institute. For the Ilios water heater, we introduced a technologically advanced Ford engine that is enhanced for industrial applications.

Our commercial product lines include:

- the InVerde e+[®] and TecoPower[®] cogeneration units;
- TECOCHILL[®] air-conditioning and refrigeration chillers;
- Tecofrost[®] gas engine-driven refrigeration compressors;
- Ilios[®] high-efficiency water heaters; and
- Ultera[®] emissions control technology.

InVerde Cogeneration Units

Our premier cogeneration product has been the InVerde, a 100-kW CHP system that not only provides electricity and hot water, but also satisfies the growing customer demand for operation during a utility outage, commonly referred to as "black-start" capability. Our exclusively licensed microgrid technology (see "Intellectual Property" below) enables our InVerde CHP products to provide backup power in the event of power outages that may be experienced by local, regional, or national grids. In 2017, we introduced an extensively redesigned version of the unit, the InVerde e+, which includes a state of the art power conversion system, more effective acoustic treatment, and the larger, more efficient engine. The InVerde e+ includes variations with power ratings from 50kW to 125kW.

The InVerde e+ incorporates an inverter, which converts direct current, or DC, electricity to alternating current, or AC. With an inverter, the engine and generator can run at variable speeds, which maximizes efficiency at varying loads. The inverter then converts the generator's variable output to the constant-frequency power required by customers in 50 or 60 Hertz.

This inverter technology was developed originally for solar and wind power generation. We believe that the InVerde is the first commercial engine-based CHP system to use an inverter. Electric utilities accept inverter technology as "safe" by virtue of its certification to the Underwriters Laboratory interconnection standard 1741. Our InVerde has earned this certification which qualifies our product for a much simpler permitting process nationwide and is mandatory in some areas such as New York City and California, a feature we consider to be a competitive advantage. The inverter also improves the CHP system's efficiency at partial load, when less heat and power are needed by the customer.

In 2018, the InVerde e+ was certified to the more technically advanced UL 1741SA. The "SA" or "smart inverter" certification is for systems incorporating more advanced safety features and operating modes which can help support the grid on demand when strained. Upcoming SA requirements will require additional certification primarily involving standard communication protocols which will be available to the utility when enlisting grid support. We believe future utility programs which involve command and control of smart inverter assets on their grid will be an important change in how distributed generation is valued by utilities and may offer additional revenue to our customers.

The InVerde's black-start feature addresses a crucial demand from commercial and institutional customers who are increasingly concerned about utility grid blackouts and brownouts, natural disasters, security threats, and antiquated utility infrastructure. Multiple InVerde units can operate collectively as a stand-alone microgrid, which is a group of interconnected loads served by one or more power sources. The InVerde is equipped with software that allows a cluster of units to seamlessly share the microgrid load without complex controls; a proprietary cost advantage for multiple modules at a single location.

The InVerde CHP system was developed in 2007 and began shipping in 2008. Our largest InVerde installation utilizes 12 units, which supply 1.2 MW of on-site power and about 8.5 million Btu/hr of heat (700,000 Btu/hr per unit).

TECOGEN Cogeneration Units

Our TECOGEN cogeneration system is the original model introduced in the 1980s. It is available in sizes of 60 kW and 75 kW and is capable of producing up to 500,000 Btu/hr of hot water. This technology is based on a conventional single-speed generator. It is meant only for grid-connected operation and is not universally accepted by utilities for interconnection, in contrast to the InVerde. Although this cogeneration product has the longest legacy and largest installed population, much of its production volume has been supplanted by the InVerde and its broader array of product features. In 2017, we introduced an upgraded version of the 60kW and 75kW models under the new name TecoPower. The key features of the TecoPower models are the larger engine with improved efficiency, advanced ignition system, more effective acoustic aftertreatment, and the ability to operate even at the very low gas supply pressures in New York City with a pressure booster.

TECOHILL Chillers

Our TECOCHILL natural gas engine-driven chillers are available in capacities ranging from 25 to 400 tons, with the smaller units air-cooled and the larger ones water-cooled. The engine drives a compressor that makes chilled water, while the engine's free waste heat can be recovered to satisfy the building's needs for heat or hot water. This process is sometimes referred to as "mechanical" cogeneration, as it generates no electrical power, and the equipment does not have to be connected to the utility grid.

A gas-fueled chiller provides enough air conditioning to avoid most of the utility's seasonal peak charges for electric usage and capacity. In summer, when electric rates are at their highest, natural gas is "off-peak" and quite affordable, allowing TECOCHILL[®] customers to avoid typically higher summer-time "peak-usage" electric rates. Gas-fueled chillers also free up the building's existing electrical capacity to use for other loads and can operate on minimal electric load in case of electric grid blackout; a key feature for customers concerned about load demand on backup power generators.

Tecofrost Gas Engine Refrigeration Compressors

In 2019, we introduced the Tecofrost line of gas-engine driven refrigeration compressors. This product was developed in collaboration with an established manufacturer of conventional electric-driven refrigeration compressors, the Vilter division of the Emerson Electric Company. Under our agreement with Vilter, their factory supplies the basic compressor skid to Tecogen whereby we add the engine-drive, controls and heat recovery systems which we sell. In industrial settings, the common method of cooling, especially in sub-freezing spaces and processes, utilizes several of these compressors arrayed in groups that distribute compressed ammonia through the facility in piping networks. These applications include cold storage, bottling operations, ice making, wineries, and many industrial processes. The Tecofrost product offers the same benefits as our Tecochill chillers, a substantially reduced operating cost in supplanting low cost natural gas for expensive electricity while providing hot water at no additional cost for onsite processes. With the waste heat utilization, the carbon footprint of the process is substantially reduced from the conventional electric alternative.

The low-emissions capability of Ultera and the dramatic increase in natural gas availability and reduction in pricing in recent years has significantly improved the viability of the Tecofrost product line much like our chillers.

Ilios High-Efficiency Water Heaters

We have developed several heat pumps under the Ilios brand name including a High Efficiency ("HE") Air-Source Water Heater, HE Water-Sourced Water Heater, and HE Air-Sourced "Split System" Water Heater. Our water heater products operate like an electric heat pump, but use a natural gas engine instead of an electric motor to power the system. The Ilios[®] high-efficiency water heater uses a heat pump which captures warmth from outdoor air even if it is moderately cool outside. Heat pumps work somewhat like a refrigerator, but in reverse. Refrigerators extract heat from inside the refrigerator and move it outside the refrigerator while heat pumps extract heat from outside and move it indoors.

The gas engine's waste heat is recovered and used in the process, unlike its electric counterpart, which runs on power that has already lost its waste heat. This means that the heat being captured from outdoors is supplemented by the engine's waste heat, which increases the efficiency of the process. The net effect is that an Ilios heat pump's efficiency surpasses that of conventional boilers for water heating. Gas engine heat pumps can deliver efficiencies in excess of 200%.

Similarly, if used for space heating, the engine-powered heat pump is more efficient than an electric heat pump because heat is recovered and used for other building processes. The product's higher efficiency translates directly to lower fuel consumption and, for heavy use customers, significantly lowers operating costs when compared with conventional equipment.

In 2013, a water-sourced model of the heat pump was added to our product line. This heat pump captures heat from a water source such as a geothermal well or from a pre-existing chilled water loop in the facility; the latter configuration provides simultaneous heating and cooling benefits, doubling the effect.

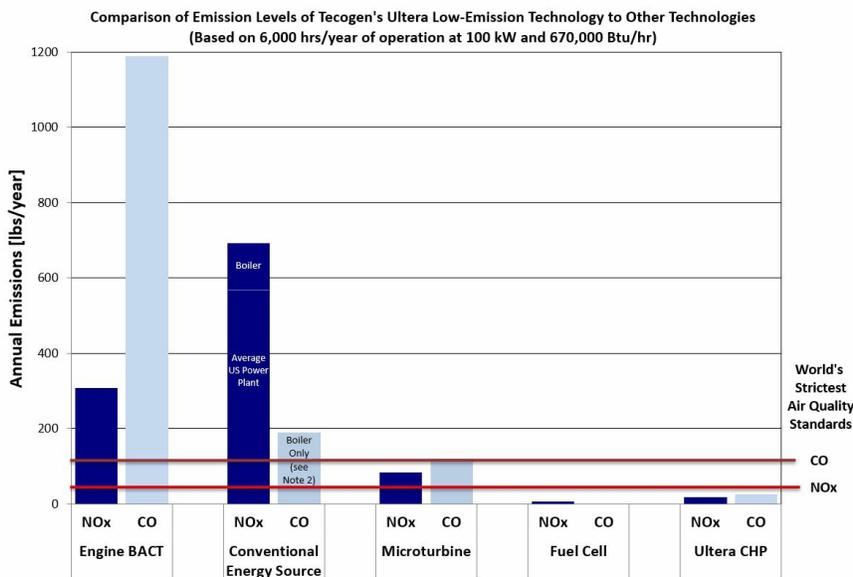
Following on the success of the water-sourced model, in early 2015 a 'split system' Ilios model was introduced. The new split system offers increased flexibility because its air-source evaporator package can be installed remotely. The engine driven heat pump, which is contained in a small acoustic enclosure, can be located within a building's mechanical space while the quiet air-source evaporator package can be installed on a roof or in any outdoor space. The outdoor evaporator component is connected to the indoor heat pump via refrigerant lines, therefore eliminating all freeze protection issues in colder climates. All of the water being heated remains inside the conditioned space, eliminating the need for a costly isolation heat exchanger and additional pumps, which simplifies installation and increases efficiency because it can operate at a lower delivery temperature.

The heat pump water heater serves as a boiler, producing hot water for drinking and washing, space heating, swimming pools, or other building loads. Energy cost savings to the customer depend on the climate. Heat pumps in general, whether gas or electric, perform best in moderate weather conditions although the performance of the Ilios water-source heat pump is not impacted by weather or climate conditions. In a typical building, the Ilios heat pump is added on to an existing heating or water heating system and operates as many hours as possible. The conventional boiler is left in place but serves mainly as a backup when the heat pump's engine is down for maintenance or when the heat pump cannot meet the building's peak heating load. In areas where low electric rates make CHP less economical, the Ilios heat pump may be a financially attractive alternative because its economics depend only on natural gas rates. In some areas with high electric rates, the Ilios option may have advantages over CHP; for example, where it is hard to connect to the utility grid or where the building's need for electricity is too low for CHP to be economically advantageous.

Ultra Low-Emissions Technology

All of our CHP products are available with the patented Ultra[®] low-emissions technology as an equipment option. This breakthrough technology was developed in 2009 and 2010 as part of a research effort partially funded by the California Energy Commission and Southern California Gas Company. The objective was to bring our natural-gas engines into compliance with California's stringent air quality standards.

The chart below compares emission levels of our Ultra technology to other technologies. As of December 31, 2020, our Ultra CHP and fuel cell technologies are the only technologies that we know of which comply with California's air quality standards for CO and NO_x, represented in the chart by the colored horizontal lines, shown as the world's strictest air quality standards on the lower right of the chart.



(5) (2) (4) (4) (3) (1)

(1) California has the strictest air quality standards for engines in the world
 (2) Conventional Energy Source is U.S. power plant and gas boiler. Average U.S. power plant NOx emission rate of 0.9461 lb/MWh from (USEPA eGrid 2012). CO data not available. Gas boiler efficiency of 78% (www.eia.gov) with emissions of 20 ppm NOx @ 3% O₂ (California Regulation SCAQMD Rule 1146.2 and <50 ppmv CO @ 3% O₂ (California Regulation SCAQMD BACT).
 (3) Tecogen emissions based upon actual third party source test data.
 (4) Microturbine and Fuel Cell emissions from EPA CHP Partnership - Catalog of CHP Technologies- March 2013.
 (5) Stationary Engine BACT as defined by SCAQMD.

Through development of a two-stage catalyst emission treatment system, we were able to meet or exceed the strict air quality regulations with a solution that is cost-effective, robust, and reliable. Inclusion of the patent-protected Ultra low-emissions technology as an option keeps our CHP systems compliant with air quality regulations. The first commercial CHP units equipped with Ultra low-emissions technology shipped to a California utility in 2011. We conducted three validation programs for this technology:

1. **Third-party laboratory verification.** The AVL California Technology Center, a long-standing research and technology partner with the international automotive industry, confirmed our results in their state-of-the-art dynamometer test cell, which was outfitted with sophisticated emissions measurement equipment.
2. **Verifying longevity and reliability in the field.** By equipping one of our 75 kW units, already operating at a customer location in Southern California with the Ultra low-emissions technology and a device to continuously monitor emissions we verified longevity and reliability. The Ultra low-emissions system operated successfully for more than 25,000 hours, approximately 3.5 years, and consistently complied with California's stringent emission standards over the entire field testing period.
3. **Additional independent tests.** During the field test, two companies licensed in California to test emissions each verified our results at different times. The results from one of these tests, obtained in August 2011, enabled us to

qualify for New Jersey's fast-track permitting. Virtually every state nationwide requires some kind of permit related to local air quality, but New Jersey allows an exemption for systems such as ours that demonstrate superior emissions performance. This certification was granted in November 2011, and since then we have sold Ultera low-emissions systems to customers in this territory.

In 2012, a 75 kW CHP unit equipped with the Ultera system became our first unit to obtain a conditional air permit (i.e., pending a third party source test to verify compliance) in Southern California since the strict regulations went into effect in 2009. A state-certified source test, administered in January 2013, verified that our emissions levels were well below the new permitting requirements, and the final permit was approved in August 2013.

Standby Generators

After successfully developing the Ultera technology for our own equipment, our research and development team began exploring other possible emissions control applications in an effort to expand the market for the ultra-clean emissions system. Retrofit kits were developed in 2014 for other stationary engines and in 2015 the Ultera Retrofit Kit was applied successfully to natural gas stand-by generators from other manufacturers, including Generac and Caterpillar.

Historically, standby generators have not been subjected to the strict air quality emissions standards of traditional power generation. However, generators which run for more than 200 hours per year or run for non-emergency purposes (other than routine scheduled maintenance) in some territories are subject to compliance with the same stringent regulations applied to a typical electric utility. As demand response programs become more economically attractive and air quality regulations continue to become more stringent, there could be strong demand for retrofitting standby generators with our Ultera® emissions control technology, thus providing a cost-effective solution to keeping the installed base of standby generators operational and in compliance.

In 2017, a group of generators owned by a single customer in Southern California were supplied Ultera kits because of their particular requirement to exceed the 200-hour annual limit. These units are now operational and have been tested by the customer and shown to be compliant with the local pollution limits which we believe to be the strictest anywhere in the United States, and potentially the world. Our CHP products have been permitted to this same standard. However, CHP products are given a heat credit which effectively increases the allowable limit. In 2018, permitting was completed making these certification levels the lowest we have achieved. We believe no other engines have been certified to these levels since the latest regulations in the Los Angeles region became effective ten years ago.

It is noteworthy that these engine-generators were applied to powering dispersed loads in a fire-prone area where frequent de-energizing of the electric overhead power lines is required for safety. The company believes this application to be a new and significant application for the Ultera technology in California in light of the widely publicized widespread outages in California in 2019 and 2020 for precisely this same reason.

Biogas

The Ultera emissions control technology developed by our engineering team applies specifically to rich-burn, spark-ignited, internal combustion engines. While originally intended for natural gas-powered engines, we believe that our technology may be adapted for other fuel types as long as the engine meets the rich-burn criteria.

In 2015, the Ultera system was applied to a biogas powered engine operating at the Eastern Municipal Water District's (EMWD) Moreno Valley Region Water Reclamation Facility in Perris, California. The demonstration project was a result of an ongoing collaboration between Tecogen, the EMWD and various other partners, and successfully applied an Ultera Retrofit Kit to a 50-liter Caterpillar engine fueled by biogas extracted from an anaerobic digester.

Biogas is a significant byproduct of wastewater treatment plants. Considered to be a renewable source of fuel, it is becoming an increasingly important resource for power generation. According to the American Biogas Council, nationwide there are over 1,100 engines fueled by wastewater-derived biogas, over 600 fueled by landfill-generated biogas, and over 100 running on biogas from agricultural waste. This represents a significant potential market for the Ultera Retrofit Kit application as these biogas engines become subject to the same air quality standards as traditional power generation sources.

Automotive Emissions Control

In October 2015, following revelations of wide-scale problems with vehicle emissions compliance and testing, we formed an Emissions Advisory Committee to examine the potential application of Ultera to the automotive gasoline market. According to the U.S. EPA, 50 percent of nitrogen oxides (NOx) and 60 percent of all carbon monoxide (CO) emissions in the United States come from vehicle exhaust. The Ultera® emission control system is designed to target both NOx and CO. After a

through investigative process on the part of the Emissions Advisory Committee and various industry expert consultants, the group recommended that we pursue a funded initiative to develop the technology for gasoline vehicles.

In December 2015, we formed a joint venture company with a group of strategic investors, Ultra Emissions Technologies, Ltd. ("Ultratek"), to advance the Ultera near-zero emissions technology for adaptation to transportation applications powered by spark-ignited rich-burn engines in the automobile and truck categories. We granted Ultratek an exclusive license for the development of its patented emissions-related intellectual property for the vehicle market.

Initially, Ultratek's focus was on preliminary research, testing, and verification that the Ultera technology can in fact be applied to gasoline engines while maintaining similar near-zero emission results as have been demonstrated in other use cases. After we completed multiple phases of testing at AVL's California Technology Center, the Ultratek team verified the viability of the Ultera technology for gasoline automotive use.

On October 24, 2017, Ultratek was dissolved due to varying opinions regarding next steps toward potential commercialization. Upon dissolution, Ultratek's remaining cash was disbursed in accordance with the joint venture agreement, first to a return of our cash investment of \$2,000,000, with the remainder distributed on a pro rata basis to the strategic investors. Additionally, the license we originally granted to Ultratek reverted back to us, and we purchased all of the remaining Ultratek assets and intellectual property that Ultratek had created for a total purchase price of \$400,000.

On November 28, 2017, we formed Ultera Technologies, Inc. as a wholly owned subsidiary to continue the effort toward commercialization that was begun by Ultratek. Ultera Technologies Inc. was dissolved in 2018 and we continue the research and development relating to prototypes for commercialization within Tecogen. If successfully developed, the market for automotive emissions control could be a source of future growth for us; although it could take years to realize that goal, and there is no assurance that such efforts will be successful.

Fork-Truck Research

In October 2016, we were awarded a Propane Education & Research Council ("PERC") research grant funding our proposal to develop the Ultera ultra-clean emissions control technology for the propane powered fork truck market.

Electric fork trucks have been making significant in-roads in the fork truck industry, in part, because of their green image and indoor air quality benefit. The primary benefit of the Ultera-equipped ultra-clean propane fork truck will be fuel cell like emissions with a robust indoor air quality advantage without compromising vehicle performance. The project will assess the adaption of the Ultera near-zero emissions technology for the fork truck category and demonstrate the technical performance on popular propane fork truck models. In 2018, the PERC funded portion of the project concluded successfully and Mitsubishi Caterpillar Forklift America ("MCFA"), a major supplier in North and South America, which provided technical and marketing support and supplied a test truck, reviewed the results and decided to move forward with the program. In 2019, engineers from MCFA collaborated with our research staff to finalize the engine tuning for optimization of the Ultera process. This work was successful with the end-result demonstrating highly improved emissions levels for the fork truck, which we expect to be capable of reaching our goal of obtaining California's "Near-Zero" certification. Currently, we are preparing with MCFA for third party engine testing of a base engine to prove that the retuning performance works equally well in the test protocol required for certification (forklift engines are certified by dynamic testing of the base engine on a dynamometer rather than by operation in an actual fork truck). PERC has agreed to fund this step, a precursor to actual certification, which, if successful we hope will lead to achievement of our ultimate goal, commercialization of the Ultera system by MCFA.

Management believes that approximately 70,000 propane powered fork trucks are sold annually in the United States. Successful completion of this project could open a new emissions control market to us.

Other Ultera Applications

According to a 2013 Massachusetts Institute of Technology study, the U.S. experiences 200,000 early deaths each year due to emissions from heavy industry, transportation, and commercial and residential heating. As climate change and air quality continue to develop as areas of focus for government regulators, emissions restrictions are expected to become increasingly stringent around the world. These tightening regulations could open up new markets and applications for the Ultera near-zero emissions control technology. These opportunities may include:

- commercial and industrial natural gas fueled engines from other manufacturers;
- natural gas and biogas powered vehicle fleets - such as municipal bus fleets; and
- gensets for non-emergency applications such as forced utility outages for fire safety.

Product Service

We provide long-term maintenance contracts, parts sales, and turnkey installation for our products through a network of eleven well-established field service centers in California, the Midwest, the Northeast, the Southeast and in Ontario, Canada. These centers are staffed by our full-time technicians, working from local leased facilities. The facilities provide office and warehouse space for inventory. We encourage our customers to provide internet connections to our units so that we may maintain remote monitoring and communications with the installed equipment. For connected installations, the machines are contacted daily to download their status and provide regular operational reports (daily, monthly, and quarterly) to our service managers. This communications link is used to support the diagnostic efforts of our service staff, and to send messages to pre-programmed phones if a unit has experienced an unscheduled shutdown. In many cases, communications received by service technicians from connected devices allow for proactive maintenance, minimizing equipment downtime and improving operating efficiency for the customer.

The work of our service managers, supervisors, and technicians focuses on our products. Because we manufacture our own equipment, our service technicians bring hands-on experience and competence to their jobs. They are trained at our corporate headquarters and primary manufacturing facility in Waltham, Massachusetts.

Most of our service revenue is in the form of annual service contracts, which are typically of an all-inclusive "bumper-to-bumper" type, with billing amounts proportional to the equipment's achieved operating hours for the period. Customers are thus invoiced in level, predictable amounts without unforeseen add-ons for such items as unscheduled repairs or engine replacements. We strive to maintain these contracts for many years, and work to maintain the integrity and performance of our equipment.

Our products have a long history of reliable operation. Since 1995, we have had a remote monitoring system in place that connects to hundreds of units daily and reports their "availability," which is the amount of time a unit is running or is ready to run. More than 80% of the units operate above 90% availability, with the average being 93.8%. Our factory service agreements have directly impacted these positive results and represent an important long-term annuity-like stream of revenue for us.

New equipment sold beginning in 2016 and select upgrades to the existing installed equipment fleet include an industrial internet solution which enables Tecogen to collect, analyze, and manage valuable asset data continuously and in real-time. This provides the service team with improved insight into the functionality of our installed CHP fleet. Specifically, it enables the service department to perform remote monitoring and diagnostics and to view system results in real time via a computer, smart phone or tablet. Consequently, we can better utilize monitoring data ensuring customers are capturing maximum possible savings and efficiencies from their installation. Through constant monitoring and analysis of equipment data, Tecogen expects to enhance the performance of installed equipment by ensuring machinery consistently operates at peak performance and is available to deliver maximum potential value for customers. In 2018 we migrated our cloud based system from the General Electric's Company's Equipment Insight product to our in-house developed system that we have trade named CHP Insight®. CHP insight stores operating data on the cloud like the GE system but we have added improved user interface features specific to CHP operation as well as sophisticated data analysis tools. Management believes that similar monitoring solutions are available from other alternative sources.

Energy Production

Our Energy Production segment sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term sales agreements which represented 6.5% and 9.4% of our consolidated revenues for the years ended December 31, 2020 and 2019, respectively. See Note 17 "Segments" of the Notes to the Consolidated Financial Statements

On-Site Utility

We distribute, own and operate clean, on-site energy systems that produce electricity, hot water, heat, and cooling. Our business model is to own the equipment that we install at customers' facilities and to sell the energy produced by these systems to customers on a long-term contractual basis. We call this business the "On-Site Utility" and offer natural gas-powered cogeneration systems that are reliable and energy efficient. We utilize energy equipment we supply or that are supplied by other cogeneration manufacturers. Our cogeneration systems produce electricity from an internal combustion engine driving a generator, while the heat from the engine and exhaust is recovered and typically used to produce heat and hot water for use on-site. Also, we distribute and operate water chiller systems for building cooling applications that operate in a similar manner, except that the engines in the water chiller systems drive a large air-conditioning compressor while recovering heat for hot water.

Cogeneration systems reduce the amount of electricity that a customer must purchase from the local utility and produce valuable heat and hot water on-site to use as required. By simultaneously providing electricity, hot water and heat,

cogeneration systems also have a significant positive impact on the environment by reducing the carbon dioxide, or CO₂, produced by replacing a portion of the traditional energy supplied by the electric grid and conventional hot water boilers. Distributed generation of electricity, or DG, often referred to as cogeneration systems or combined heat and power systems, or CHP, is an attractive option for reducing energy costs and increasing the reliability of available energy. DG has been successfully implemented by others in large industrial installations over 10 Megawatts ("MW"), where the market has been growing for a number of years and is increasingly being accepted in smaller sized units because of technology improvements, increased energy costs, and better DG economics. We believe that our target market for DG, users of up to 1 MW, has been barely penetrated and that the reduced reliability of the utility grid, increasing cost pressures experienced by energy users, advances in new, low cost technologies, and DG-favorable legislation and regulation at the state and federal level will drive our near-term growth and penetration of this market.

We believe that the primary opportunity for DG energy and equipment sales is in regions of the U.S. where commercial electricity rates exceed \$0.12 per kW hour, or kWh, which is predominantly in the Northeast and California. Attractive DG economics are currently attainable in applications that include hospitals, nursing homes, multi-tenant residential housing, hotels, schools, colleges, recreational facilities, food processing plants, dairies, and other light industrial facilities. We also believe that the largest number of potential DG users in the U.S. require less than 1 MW of electric power and less than 1,200 tons of cooling capacity. We are able to design our systems to suit a particular customer's needs because of our ability to place multiple units at a site. This approach is part of what allows our products and services to meet changing power and cooling demands throughout the day (also from season-to-season) and greatly improves efficiency.

Sales & Distribution

Our products are sold directly to end-users by our sales team and by established sales agents and representatives. We have agreements with 23 distributors and outside sales representatives who are compensated by commissions for designated territories and product lines. For each of the fiscal years ended December 31, 2020 and 2019, we had a customer relationship accounting for more than 10% of our total revenue, though not the same customer.

Our product sales cycle exhibits typical seasonality for the HVAC industry with sales of chillers generally stronger in the warmer months while heat pump sales are stronger in the cooler months. Our products are sold directly to end-users by our sales team and by established sales agents and representatives. We have entered into various agreements with distributors and outside sales representatives who are compensated on a commission basis for certain territories and product lines. Our product sales cycle exhibits typical seasonality for the HVAC industry with sales of chillers generally stronger in the warmer months while heat pump sales are stronger in the cooler months.

Markets and Customers

Worldwide, stationary power generation applications vary from huge central stationary generating facilities (traditional electric utility providers) to back-up generators as small as 2 kW. Historically, power generation in most developed countries such as the United States has been part of a regulated central utility system utilizing high-temperature steam turbines powered by fossil-fuels. This turbine technology, though steadily refined over the years, reached a maximum efficiency (where efficiency means electrical energy output per unit of fuel energy input) of approximately 40%.

A number of developments related primarily to the deregulation of the utility industry as well as significant technological advances have now broadened the range of power supply choices available to all types of customers. CHP, which harnesses waste energy from power generation processes and puts it to work for other uses on-site, can boost the energy conversion efficiency to nearly 90%, a better than two-fold improvement over the average efficiency of a fossil fuel plant. This distributed generation, or power generated on-site at the point of consumption rather than power generated centrally, eliminates the cost, complexity, and inefficiency associated with electric transmission and distribution. The implications of the CHP distributed generation approach are significant. Management believes that if CHP were applied on a large scale, global fuel usage might be dramatically curtailed and the utility grid made far more resilient.

Our CHP products address the inherent efficiency limitation of central power plants by siting generation close to the loads being served. This allows customers with energy-intensive buildings or processes to reduce energy costs and operate with a lower carbon footprint. Furthermore, with technology we have introduced, like the Ultra low-emissions technology, our products can now contribute to better air quality at the local level while complying with the strictest air quality regulations in the United States.

Cogeneration and chiller products can often reduce the customer's operating costs (for the portion of the facility loads to which they are applied) by approximately 30% to 60% based on our estimates, which provides an excellent rate of return on the equipment's capital cost in many areas of the country with high electricity rates. Our chillers are especially suited to regions where utilities impose extra charges during times of peak usage, commonly called "demand" charges. In these cases, the gas-fueled chiller reduces the use of electricity during the summer, the costliest time of year.

On-site CHP not only eliminates the loss of electric power during transmission, but also offsets the capital expense of upgrading or expanding the utility infrastructure. The national electric grids of many developed countries are already challenged to keep up with existing power demand. In addition, the transmission and distribution network is operating at capacity in a majority of urban areas. Decentralizing power generation by installing equipment at customer sites not only relieves the capacity burden on existing power plants, but also lessens the burden on transmission and distribution lines. This ultimately improves the grid's reliability and reduces the need for costly upgrades.

Increasingly favorable economic conditions may improve our business prospects domestically and abroad. Specifically, we believe that natural gas prices are expected to increase from their historically depressed values, but only modestly, while electric rates are expected to continue to rise over the long-term as utilities pay for grid expansion, better emission controls, efficiency improvements, and the integration of renewable power sources.

Most potential new customers in the U.S. require less than 1 MW of electric power and less than 1,200 tons of cooling capacity. We are targeting customers in states with high electricity rates in the commercial sector, such as California, Connecticut, Massachusetts, New Hampshire, New Jersey, and New York. Most of these states also have high peak demand rates, which favor utilization of our modular units in groups so as to assure redundancy and peak demand savings. Governmental agencies in some of these regions may also provide generous rebates that can improve the economic viability of our systems.

We aggressively market to potential customers where utility pricing aligns with our advantages. These areas include regions that have strict emissions regulations, such as California, or those that reward CHP systems that are especially non-polluting, such as New Jersey. Currently, 23 states recognize CHP as part of their Renewable Portfolio Standards or Energy Efficiency Resource Standards and several of them, including New York, California, Massachusetts, New Jersey, and North Carolina, have initiated specific incentive programs for CHP.

The traditional markets for CHP systems are buildings with long hours of operation and with corresponding demand for electricity and heat. Traditional customers for our cogeneration systems include hospitals, nursing homes, colleges, universities, health clubs, spas, hotels, motels, office and retail buildings, food and beverage processors, multi-unit residential buildings, laundries, ice rinks, swimming pools, factories, municipal buildings, and military installations.

Traditional customers for our chillers, refrigeration compressors and heat pumps overlap with those for our cogeneration systems. Engine-driven chillers are often used as replacements for aging electric chillers because they both occupy similar amounts of floor space and require similar maintenance schedules. This is also the case with refrigeration compressors.

On-site utility services are provided in standardized packages of energy, equipment, and services suited to the needs of property owners and operators in healthcare, hospitality, large residential, athletic facilities, and certain industrial sites. This includes national accounts and other customer groups having a common set of energy requirements at multiple locations. Our products are sold directly to end-users by our sales team and by established sales agents and representatives. Various agreements are in place with distributors and outside sales representatives who are compensated by commissions for certain territories and product lines. For the fiscal years ended 2020 and 2019, one and one customer relationship accounted for more than 10% of total combined company revenue, respectively.

Competition

The markets for our products are highly competitive, though we believe that we offer customers a suite of premier best-in-class clean energy and thermal solutions. Our cogeneration products compete with the utility grid, existing technologies such as other reciprocating engine and microturbine CHP systems, and other emerging distributed generation technologies including solar power, wind-powered systems, and fuel cells. We believe that Capstone Turbine Corporation is the only microturbine manufacturer with a commercial presence in CHP.

Although operating solar and wind powered systems produce no emissions, the main drawbacks to these renewable powered systems are their dependence on weather conditions, their reliance on backup utility grid-provided power, and high capital costs that can often make these systems uneconomical without government subsidies. Similarly, while the market for fuel cells is still developing, a number of companies are focused on markets similar to ours. Fuel cells, like solar and wind powered systems, have received higher levels of incentives for the same type of applications as CHP systems in many territories. We believe that, notwithstanding these higher government incentives, our CHP solutions provide a better value and more robust solution to end users in most applications.

Additionally, our patents relating to the Ultera ultra-low emissions technology give our products a strong competitive advantage in markets where severe emissions limits are imposed or where very clean power is favored, such as New Jersey, California, and Massachusetts.

Our products fall into the broad market category of distributed generation systems that produce electric power on-site to mitigate the drawbacks of traditional central power and the low efficiency of conventional heating processes.

Overall, we compete with end users' other options for electrical power, heating, and cooling on the basis of our clean technology's ability to:

- Provide power when a utility grid is not available or goes out of service;
- Reduce the customer's total cost of purchasing electricity and other fuel;
- Reduce emissions of criteria pollutants (NOx and CO) to near-zero levels and cut the emission of greenhouse gases such as carbon dioxide;
- Provide reliable on-site power generation, heating and cooling services; and
- Control maintenance costs and ensure optimal peak equipment performance.

InVerde e+ CHP

We believe that no other company has developed a product that competes with our inverter-based InVerde e+, which offers UL-certified grid connection, black-start capability, and patented variable-speed operation. An inverter-based product with at least some of these features has been introduced by others, but we believe that they face serious challenges in duplicating all the unique features of the InVerde e+. Competitors' product development time and costs could be significant. We have exclusive license rights to Microgrid algorithms developed by the University of Wisconsin researchers. We have exclusive rights for engine-driven systems utilizing natural gas or diesel fuel in the application of power generation where the per-unit output is less than 500kW. The software allows our products to be integrated as a Microgrid, where multiple InVerde e+ units can be seamlessly isolated from the main utility grid in the event of an outage and re-connected to it afterward. We expect that our patents and license for Microgrid software will deter others from offering certain important functions. See "*Business-Intellectual Property.*"

Similarly, in the growing Microgrid segment, neither fuel cells nor microturbines can respond to changing energy loads when the system is disconnected from the utility grid. Engines such as those used in our equipment inherently have a fast-dynamic response to step load changes, which is why they are the primary choice for emergency generators. Fuel cells and microturbines require additional energy storage systems to be utilized in off-grid operation, giving our engine-driven solutions an advantage for Microgrid and resiliency applications.

TECOCHILL Chillers

Our TECOCHILL line of chillers are the only gas-engine-driven chillers available on the market. Natural gas can also fuel absorption chillers, which use fluids to transfer heat without an engine drive. However, engine chillers continue to have an efficiency advantage over absorption machines. TECOCHILL chillers reach efficiencies well above levels achieved by similarly sized absorption systems. Relatively low natural gas prices in the United States improve the economics of natural gas-fueled chillers while their minimal electric demand on backup power systems make them ideal for facilities requiring critical precision climate control.

Ilios Heat Pump

A few companies manufacture gas-engine heat pumps, including Yanmar and Tedom that we believe are competitive with our products. The Ilios® water heater and other heat pump products compete in both the high-efficiency water heating market and the CHP market.

Our On-Site Utility

Our on-site utility business competes with established utilities that provide electricity, wholesale electricity and gas utility distributors, companies that provide services similar to ours, and other forms of alternative energy. We believe DG is gaining acceptance in regions where energy customers are dissatisfied with the cost and reliability of traditional electricity services. These end-users, together with growing support from state legislatures and regulators, are creating a favorable climate for the growth of DG that is overcoming the objections of established utility providers. In our target markets, we compete with large utility companies such as Con Edison Inc. and Long Island Power Authority in New York, Public Service Electric and Gas Company in New Jersey, and Eversource and National Grid USA Service Company, Inc. in Massachusetts. These companies are much larger than us in terms of revenues, assets, marketing, and other resources, but we target the same markets and customers. We compete with large utility companies by marketing our electricity services to the same potential commercial building customers. We compete on the basis of the cost, service, price, and favorable environmental benefits of generating energy with our installed systems. We also compete with other on-site utility companies, such as Aegis Energy Services Inc. and All Systems Cogeneration Inc.

Research & Development

Our long and rich research and development tradition and sustained programs has allowed us to cultivate deep engineering expertise. We have strong core technical knowledge that is critical to product support and continuous product improvement efforts. Our TecoDrive engine, permanent magnet generator, cogeneration and chiller products, InVerde, Ilios heat pumps, and most recently the Ultera emissions control system were all created and optimized in-house with both public and private funding support.

We continue to seek alliances with utilities, government agencies, universities, research facilities, and manufacturers. We have succeeded in developing new technologies and products in collaboration with several entities, including:

- Sacramento Municipal Utility District has provided test sites to us since 2010.
- Southern California Gas Company and San Diego Gas & Electric Company, each a Sempra Energy subsidiary, have granted us research and development contracts since 2004.
- Department of Energy's Lawrence Berkeley National Laboratory, with whom we have had research and development contracts since 2005, including ongoing Microgrid development work related to the InVerde.
- Eastern Municipal Water District in Southern California has co-sponsored demonstration projects to retrofit both a natural-gas powered municipal water pump engine and a biofuel powered pumping station engine with the Ultera low emissions technology since 2012.
- Consortium for Electric Reliability Technology Solutions executed research and development contracts with us, and has provided a test site to us since 2005.
- California Energy Commission with whom we have had a research and development contract from 2004 until March 2013.
- The AVL California Technology Center performed a support role in research and development contracts as well as internal research and development on our Ultera emission control system from August 2009 to November 2011. In addition, the Center supported our research on emissions from gasoline vehicles from January of 2016 through October 2017. AVL researchers collaborated with our engineers on several peer reviewed papers published by technology association SAE International in 2017 and 2018.
- We had a research and development contract with Propane Education & Research Council (PERC) for work related to developing Ultera low emissions control systems for the propane powered fork truck market, also supported by Mitsubishi Caterpillar Forklift America.
- We have engaged the Southwest Research Institute, a non-profit independent research center located in San Antonio, Texas, to complete the next phase of research in the Ultera automotive application. This effort will focus on evaluation of advanced catalyst formulations tailored to the Ultera process and is ongoing.

Our efforts to forge partnerships continue to focus on utilities, particularly to promote the InVerde, our most utility-friendly product. The nature of these alliances varies by utility, but includes simplified interconnection, joint marketing, ownership options, peak demand mitigation agreements, and customer services. We have commissioned a Microgrid with the Sacramento Municipal Utility District at its headquarters in Sacramento, California, where the central plant incorporated three InVerde systems equipped with our Ultera low-emissions technology. Some expenses for this project were reimbursed to the utility through a grant from the California Energy Commission.

Certain components of our InVerde product were developed through a grant from the California Energy Commission. This grant includes a requirement that we pay royalties on all sales of all products related to the grant. As of December 31, 2020, such royalties accrued in accordance with this grant agreement were less than \$4,000 on an annual basis.

Our relationship with the Propane Education & Research Council (PERC) plays an instrumental role in the development of our Ultera emissions control system for the propane powered fork truck market.

We also continue to leverage our resources with government and industry funding, which has yielded a number of successful developments, including the Ultera low-emissions technology, sponsored by the California Energy Commission and Southern California Gas Company. Pursuant to the terms of the grants from the California Energy Commission, the California Energy Commission has a royalty-free, perpetual, non-exclusive license to these technologies for government purposes.

For the years ended December 31, 2020 and 2019, we spent \$767,323 and \$1,460,096, respectively, on research and development activities.

Intellectual Property*Patents*

Currently, we hold twelve United States patents for our technologies:

- 10,774,720: "NO_x Reduction Using a Dual-Stage Catalyst System with Intercooling in Vehicle Gasoline Engines under Real Driving Condition." This patent, granted in September 2020, improves the removal of Non-Methane Organic Gases (NMOG) and Carbon Monoxide (CO) from vehicle emissions. The improved performance, consisting of up to 90% reductions in NMOG and CO results from increased oxidation of NMOG and CO due to a lower temperature environment in the second stage catalyst.
- 10,774,724, titled, "Dual Stage Internal Combustion Engine Aftertreatment System Using Exhaust Gas Intercooling and Charger Driven Air Ejector." This patent, granted in September 2020, relates to the use of turbo compressors and exhaust gas intercoolers in turbocharged engines to reduce the complexity and cost of *Ultera* emissions reduction systems.
- 9,995,195: "Emissions control systems and methods for vehicles." This patent, granted in June 2018, is a method for vehicle cold start to enhance the removal of CO and hydrocarbons emissions, which are extremely problematic for cold engines. Air is injected in the exhaust between the engine's close-coupled catalyst and underbody catalyst. Once the engine is warmed (> 500 F exhaust) this air stream is shut off. This method synergizes well with the *Ultera* system by utilizing the injection air feed for an alternative purpose during engine start.
- 9,956,526: "Poison-Resistant Catalyst and Systems Containing Same." This patent, granted in May 2018, relates to a special catalyst formulation that is resistant to contaminant induced corrosion in conditions like those of the *Ultera* second stage. These poisons or contaminants are most commonly sulfur compounds.
- 9,702,306: "Internal Combustion Engine Controller." This patent granted in July of 2017 relates to the unique control methodology used in the InVerde e+ CHP unit that maximizes engine fuel economy under variable speed operation.
- 9,470,126: "Assembly and method for reducing ammonia in exhaust of internal combustion engines." This patent, granted in October 2016, is related to the *Ultera* emission control system applicable to all our products.
- 9,856,767: "Systems and methods for reducing emissions in exhaust of vehicles and producing electricity." This patent, filed in November 2015 and published in March 2016, relates to the development of the *Ultera* emission control system for vehicle applications.
- 9,121,326: "Assembly and method for reducing nitrogen oxides, carbon monoxide and hydrocarbons in exhausts of internal combustion engines." This patent, granted in September 2015, is related to the *Ultera* emission control system applicable to all our products.
- 9,651,534: "Assembly and Method for reducing nitrogen oxides, carbon monoxide, hydrocarbons and hydrocarbon gas in exhausts of internal combustion engines and producing and electrical output." This patent granted in April 25, 2017, is related to the *Ultera* emission control system applicable to all our products.
- 8,578,704: "Assembly and method for reducing nitrogen oxides, carbon monoxide, and hydrocarbons in exhausts of internal combustion engines." This patent, granted in November 2013, is for the *Ultera* emission control system applicable to all our products.
- 7,243,017: "Method for controlling internal combustion engine emissions." This patent, granted in July 2007, applies to the specific algorithms used in our engine controller for metering fuel usage to obtain the correct combustion mixture and is technology used by most of our engines.
- 7,239,034: "Engine driven power inverter system with cogeneration." This patent, granted in July 2007, pertains to the utilization of an engine-driven CHP module combined with an inverter and applies to our *InVerde* product specifically.

In addition, we have licensed specific rights to Microgrid software algorithms developed by University of Wisconsin researchers for which we pay royalties to the assignee, The Wisconsin Alumni Research Foundation (WARF). The specific patent named in our agreement is "Control of small distributed energy resources" (7,116,010), granted in 2006. Our exclusive rights are for engine-driven systems utilizing natural gas or diesel fuel in the application of power generation where the per-unit output is less than 500 kW. The software allows our products to be integrated as a Microgrid, where multiple InVerde units can be seamlessly isolated from the main utility grid in the event of an outage and re-connected to it afterward. The licensed software allows us to implement such a Microgrid with minimal control devices and associated complexity and cost. We pay WARF a royalty for each cogeneration module sold using the licensed technology. Such royalty payments have been in the range of \$5,000 to \$30,000 on an annual basis through the year ended December 31, 2020. In addition, WARF reserved the right to grant non-profit research institutions and governmental agencies non-exclusive licenses to practice and use, for non-commercial research purposes, the technology developed by us that is based on the licensed software.

We consider our patents and licensed intellectual property to be important in the operation of our business. The expiration, termination, or invalidity of one or more of these patents may have a material adverse effect on our business. Our earliest patent, licensed from WARF, was issued in 2006 and expires in 2022. Our current patents expire between 2022 and 2037.

We believe that one other company, Aegis Energy Service Inc., has developed a product that competes with our inverter-based InVerde. We anticipate that an inverter-based product with at least some of these features will be introduced by others, but we believe that our competitors will face serious challenges in duplicating the InVerde. Product development time and costs would likely be significant, and we expect that our patent for the inverter-based CHP system (7,239,034) would offer significant protections for key features. We consider the Microgrid software algorithm licensed from WARF to be a key feature of our InVerde product, and one that would be difficult to duplicate outside the patent.

In 2013, we purchased rights to designs and technologies, including patents granted or pending for our permanent magnet generators. A key component of our InVerde module uses this acquired technology.

Our patents for the Ultera low-emissions control technology applies to all our gas engine-driven products and may have applications to other rich-burn spark-ignited internal combustion engines. We have been granted patents for this technology in Europe, Australia, Brazil, Canada, Japan, Mexico, Korea and Singapore.

Copyrights

Our control software is protected by copyright laws or through an exclusive license agreement.

Trademarks

We have registered the brand names of our equipment and logos used on our equipment. These registered trademarks include Tecogen, Tecochill, Tecopower, Ultera, InVerde, Ilios, InVerde e+ and the associated logos. We will continue to trademark our product names and symbols.

We rely on treatment of our technology as trade secrets through confidentiality agreements, which our employees and vendors are required to sign. Also, we rely on non-disclosure agreements with others that have or may have access to confidential information to protect our trade secrets and proprietary knowledge.

Sourcing & Manufacturing

We are focused on continuously strengthening our manufacturing processes and increasing operational efficiencies. Many of the components used in the manufacture of our highly-efficient clean energy equipment are readily fabricated from commonly available raw materials or are standard available parts sourced from multiple suppliers. We believe that adequate supplies exist to meet our near to medium term manufacturing needs. We have an on-going focus on developing and implementing new systems to simplify our manufacturing processes, product sourcing methods, and our supply chain.

We have a combined total of approximately 27,000 square feet of manufacturing and warehouse space running on a single 5-day per week shift at our Waltham, Massachusetts facility. We believe we have sufficient spare capacity to meet near to medium term demand without incurring additional fixed costs.

Government & Regulation

Several kinds of federal, state and local government regulations affect our products and services, including but not exclusive to:

- product safety certifications and interconnection requirements;
- air pollution regulations which govern the emissions allowed in engine exhaust;
- state and federal incentives for CHP technology;
- various local building and permitting codes and third-party certifications;
- electric utility pricing and related regulations; and
- federal and state laws regarding the legalization of cannabis for medicinal and recreational use.

Our markets can be positively or negatively impacted by the effects of governmental and regulatory matters. We are impacted not only by energy policy, laws, regulations and incentives of governments in the markets in which we sell, but also by rules, regulations and costs imposed by utilities. Utility companies or governmental entities may place barriers on the installation or interconnection of our products with the electric grid. Further, utility companies may charge additional fees to customers who install on-site power generation; thereby reducing the electricity they take from the utility, or for having the capacity to use power from the grid for back-up or standby purposes. These types of restrictions, fees or charges could hamper the ability to install or effectively use our product or increase the cost to our potential customers for using our systems. This could make our systems less desirable, adversely impacting our revenue and profitability. In addition, utility rate reductions can make our products less competitive, causing a material adverse effect on our operations. These costs, incentives and rules are not always the same as those faced by technologies with which we compete.

Similarly, rules, regulations, laws and incentives could also provide an advantage to our distributed generation solutions as compared with competing technologies if we are able to achieve required compliance in a lower cost, more efficient manner. Additionally, reduced emissions and higher fuel efficiency could help our customers combat the effects of global warming. Accordingly, we may benefit from increased government regulations that impose tighter emission and fuel efficiency standards. We encourage investors and potential investors to carefully consider the risks described under "Item 1A. Risk Factors below regarding various aspects of the regulatory environment and other related risks.

Our products are well-suited to meet the needs of the rapidly emerging indoor agriculture market, including cannabis. To date our focus in the indoor agricultural market has primarily involved cannabis, a product with high revenue generating potential. However, we have sold to other indoor agricultural growers, and we believe that the indoor food production market will provide significant opportunities for us. The indoor agriculture market in particular has the potential to be a major driver of growth as states move to legalize the use of cannabis for medicinal purposes and recreational use. However, under the Controlled Substances Act (CSA) cannabis continues to be categorized as a Schedule I drug, so that cannabis growers continue to face significant uncertainty regarding their ability to conduct business.

First passed by Congress in 2014, the Rohrabacher-Farr Amendment is an amendment to the annual appropriations bill that, among other things, funds the Department of Justice. It prohibits the US Attorney General from using funds to prosecute the medical use of cannabis. It does not address recreational use. On January 4, 2018, US Attorney General Jeff Sessions rescinded the Cole memo. Written in 2013, the Cole memo had directed US Attorneys not to allocate resources to prosecute "individuals whose actions are in clear and unambiguous compliance with existing state laws" regarding the cannabis market. As of the date of the filing of this report, we are not aware of any US Attorney who has taken action against participants in the recreational cannabis market operating in accordance with state law. The uncertainty we face regarding the potential for growth from the sales to the cannabis industry is due in part to uncertainty regarding prosecutorial priorities of the current Presidential administration.

Our Energy Production segment is subject to extensive government regulation. We are required to file for local construction permits (electrical, mechanical and the like) and utility interconnects, and are required to make various local and state filings related to environmental emissions.

In the past, many electric utility companies have raised opposition to DG, a critical element of our On-Site Utility business. Such resistance has generally taken the form of stringent standards for interconnection and the use of target rate structures as disincentives to combined generation of on-site power and heating or cooling services. A DG company's ability to obtain reliable and affordable back-up power through interconnection with the grid is essential to the business model. Utility policies and regulations in most states often do not accommodate widespread on-site generation. These barriers erected by electric utility companies and unfavorable regulations, where applicable, makes our ability to connect to the electric grid at customer sites more difficult or uneconomic and is an impediment to the growth of this segment. The development of this segment could be adversely affected by any slowdown or reversal in the utility deregulation process or by difficulties in negotiating back-up power supply agreements with electric providers in the areas where we intend to do business.

Human Capital Resources

We believe our success in delivering energy efficient, ultra clean cogeneration systems, chillers and energy production services relies on our culture, values, and the creativity and commitment of our people. We strive to maintain healthy, safe, and secure working conditions - a workplace where our employees are treated with respect and dignity. Our vision is to create an inclusive, diverse and authentic community that inspires collaboration, integrity, engagement, and innovation. We are striving to create a world-class employee experience – one that offers opportunity for personal and professional growth, and enables work-life balance that aligns with our core values.

Employee Health and Safety

Employee health and safety continues to be a priority in every aspect of our business. We have taken a common sense approach to safety that helps us understand and reduce hazards in our business. Training, risk assessment, safety coaching, and employee engagement are all programs that help us consistently manage our facility and employee safety. As resources are available, we expect to continue to expand and evolve our safety programs to better meet our employee needs and workplace conditions as our business grows. 2020 was unique for the impact that the COVID-19 pandemic had on organizations, including ours. Our response has consistently evolved to meet the turbulent environment:

- The senior management team implemented regular communication regarding impacts of the COVID-19 pandemic, including health and safety protocols and procedures.
- Implementing a hierarchy of controls to address hand washing, social distancing, cleaning areas and frequency, personal protective equipment and resources to stay up to date on the changing conditions.
- Deployment of face covers across the company for use in areas where they are required and recommended.
- Prohibiting all domestic and international non-essential travel for all employees.
- Providing additional days of leave for full- and part-time employees to cope with the illness.
- Restricting access to our corporate offices.
- Providing public access by appointment or pickup only in high risk areas.
- Implementing protocols to address actual and suspected COVID-19 cases and potential exposure.
- Working closely with customers to meet their specific COVID-19 requirements and maintain service.

We understand the benefits of employee health and safety and continue to invest in programs, products, and resources. We also understand the environment of trust and fairness that exists when information is openly shared. We also continue to invest in products and services to meet the health and safety needs of our customers and communities.

Talent Acquisition and Development

Our values are integral to our employment process and serve as guideposts for leadership. The ultimate goal is straightforward: find great people, ask them to join, and give them a reason to stay. Reasons include fair compensation, a complete array of employee benefits to include: health, dental and life insurance; short-term and long-term disability insurance; HSA account funding; generous time off benefits; and the grant of options or awards to purchase shares of our common stock. Recently we instituted web-based training for all of our employees. From a practical standpoint, this means that we attract a broad group of candidates and then hire the candidate who is the best match for the position based on their skills and abilities.

Employees

As of December 31, 2020, we employed 79 full-time employees and 2 part-time employees, including 7 sales and marketing personnel, 46 service personnel, 19 manufacturing personnel and 7 finance and administrative personnel. Nine of our New Jersey service employees are represented by a collective bargaining agreement which expires on December 31, 2022 and thereafter renews annually unless terminated by either party by written notice within sixty days prior to the expiration date.

Available Information

Our internet website address is <http://www.tecogen.com>. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and other reports and filings with the SEC are available free of charge on our website as soon as reasonably practicable after the reports are filed with, or furnished to, the SEC. Information contained on our website is not incorporated into this Annual Report on Form 10-K or our other securities filings with the SEC. The SEC maintains an internet website at www.sec.gov which contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC.

Item 1A. Risk Factors

Our business, operations, and Tecogen face many risks. In addition to the other information in this Form 10-K, the following factors and the information contained under the heading "Cautionary Note Concerning Forward-Looking Statements" should be considered in evaluating Tecogen and its business. The risks described below may not be the only risks we face.

Additional risks that we do not yet know of, or that we currently think are immaterial, may also impair our business operations or financial results. If any of the events or circumstances described in the following risks occur, our business, financial condition or results of operations could suffer and the trading price of our common stock could decline.

Risks Relating to Our Business Strategy and Industry

Our financial condition and results of operations have been and may be materially adversely affected by the recent 2019 novel Coronavirus (COVID-19) outbreak.

The outbreak of the 2019 novel coronavirus has developed into a global pandemic that could have a material and adverse effect on our business, financial condition and results of operations. These effects have and could continue to include disruptions or restrictions on our employees' ability to travel, including our service technicians and in-house and outside sales personnel, as well as temporary closures of our manufacturing and other facilities or the facilities of our customers, suppliers, or other vendors in our supply chain. In addition, the coronavirus has resulted in a widespread health crisis that has adversely affected, and may continue to adversely affect, the economies and financial markets of many countries, resulting in an economic downturn and may result in a global recession that could affect demand for our products or our ability to obtain financing for our business or projects. These events, have and may continue to result in further disruptions to our supply chain, customer demand, our ability to secure new or additional orders and customers, our manufacturing and servicing capabilities, our ability to install new projects, and could materially and adversely affect our business and our results of operations. During the year ended December 31, 2020, our revenues were negatively impacted due to customer order delays or deferrals; service delays due to customer facility closures, in some cases for extended periods; and, a reduction in our energy production distribution, due to business closures and increased remote work and learning environments. The extent to which the coronavirus will continue to impact our business and our financial results will depend on future developments, which are highly uncertain and cannot be predicted. Such developments may include the continued geographic spread of the virus, the ultimate severity of the disease, the duration of the outbreak, the actions that may be taken by various governmental authorities in response to the outbreak, such as securing sufficient anti-virus medication, the ability of health authorities to distribute and inoculate the population, continued or new requirements to quarantine or "shelter-in-place" and continued or new business closures imposed by numerous states within the United States, and the possible impact on the U.S. or global economy. Significant portions of our business are deemed "essential services" under various state shelter-in-place orders, and we have been able to maintain critical manufacturing and service operations. There can be no assurances, however, that we will be able to maintain these operations at full or limited capacity as conditions change. We operate an essential service which means we must take every effort to keep our employees who operate our business safe and minimize unnecessary risk of exposure to the virus. As part of our pandemic response plan, our sales, engineering, and select administrative functions may be operated remotely when necessary or appropriate while our manufacturing and service teams continues to function normally, subject to customer-initiated disruptions in service.

Due to the impact of the coronavirus pandemic on our customers, including the closure of certain customers' facilities and difficulties that customers may have in maintaining their business and operations during the pandemic, collections from certain existing customers have been and may continue to be deferred or difficult or impossible to collect, that there may be delays in the implementation of current projects and the completion of sales of our products and services.

To the extent cash generated from operations in the future is insufficient to fund our operating requirements, we will be required to seek additional outside financing. Our inability to obtain necessary capital or financing to fund these working capital needs will adversely affect our ability to expand our operations.

If the cash generated by operations and the proceeds of the CARES Act, as amended ("CARES Act") loans we have obtained or may obtain in the future are insufficient to fund our future operating requirements, we will need to raise additional funds through public or private equity or debt financings. Such financing may not be available to us when needed, or if available, may not be available on terms that are favorable to us and could result in significant dilution to the holdings of our stockholders. Furthermore, any such debt financing is likely to include financial and other covenants that may impede our ability to react to changes in the economy or industry.

On April 17, 2020, we were granted a loan of \$1,874,200 under the Paycheck Protection Program established pursuant to the CARES Act to provide relief to certain businesses as a result of the pandemic. The loan was provided to us by Webster Bank, N.A. and was guaranteed by the United States Small Business Administration ("SBA"). We utilized the loan for payroll, rent, and utilities during the applicable covered period. Effective January 11, 2021, the loan together with all accrued interest thereon was forgiven by the SBA in full.

On May 11, 2020, we terminated our \$10 million line of credit with Webster Business Credit Corporation ("Webster"), together with related agreements including a Revolving Note, Security Agreement, Blocked Account Agreement, and Master Letter of Credit Agreement.

On February 5, 2021, we obtained a Second Draw Paycheck Protection Program unsecured loan in the amount of \$1,874,269 through Webster Bank, pursuant to the Paycheck Protection Program under the CARES Act and is guaranteed by the SBA. We intend to use the loan proceeds for payroll, rent, utilities and other operating expenses, and expect to apply for forgiveness of the loan balance as permitted under the CARES Act. There can be no assurance that the Second Draw Paycheck Protection Program loan will ultimately be forgiven. See Note 10, "Note Payable and Revolving Line of Credit, Bank" in our Consolidated Financial Statements for the year ended December 31, 2020.

Based upon our operating and cash flow plan and the proceeds of our PPP loans, we believe existing resources, including cash and cash flows from operations will be sufficient to meet our working capital needs for the next twelve months. If adequate financing is not available when needed, we may be required to implement cost-cutting strategies, delay production, curtail research and development efforts, or implement other measures, which may adversely affect our overall results of operations and financial condition and the price of our stock.

If we experience a period of significant growth or expansion, it could place a substantial strain on our resources.

If our cogeneration and chiller products penetrate the market rapidly, we may be unable to deliver large volumes of technically complex products or components to our customers on a timely basis and at a reasonable cost to us. We have never ramped up our manufacturing capabilities to meet significant large-scale production requirements. If we were to commit to deliver large volumes of products, we may not be able to satisfy these commitments on a timely and cost-effective basis.

Our operating history is characterized by net losses and there can be no assurance we will be able to increase our sales and sustain profitability in the future.

We have historically incurred annual operating losses, including a net loss of \$6.2 million for 2020 and \$4.7 million for 2019. Our Product and Services segment is capital intensive and, because our products generally are built to order with customized configurations, the lead time to build and deliver a unit can be significant. We may be required to purchase key components long before we can deliver a unit and receive payment. Changes in customer orders or lack of demand may also impact our profitability. There can be no assurance we will be able to increase our sales and achieve and sustain profitability in the future.

We are dependent on a limited number of third-party suppliers for the supply of key components for our products.

We use third-party suppliers for components in all of our products. Our engine supplier, generator supplier for cogeneration products (other than the InVerde), and the compressor and vessel sets in our chillers, are all purchased from large multinational equipment manufacturers. The loss of one or more of our suppliers could materially and adversely affect our business if we are unable to replace them. While alternate suppliers for the manufacture of our engine, generators and compressors have been identified, should the need arise, there can be no assurance that alternate suppliers will be available and able to provide such items on acceptable terms or on a timely basis.

From time to time, shipments of components for our products can be delayed because of industry-wide or other shortages of necessary materials and components from third-party suppliers, as well as shipping delays at points of importation. A supplier's failure to supply components in a timely manner, or to supply components that meet our quality, quantity, or cost requirements, or our inability to obtain substitute sources of these components on a timely basis or on terms acceptable to us, could impair our ability to deliver our products in accordance with contractual obligations.

The amount of our backlog is subject to fluctuation due to our customers' experiencing unexpected delays in financing, permitting or modifications in specifications of the equipment.

Our total product and installation backlog as of December 31, 2020 was \$8.3 million compared to \$22.4 million as of 2019. Although we expect our customers to issue definitive purchase orders with respect to such backlog, there can be no assurance that such amounts will not be subject to modification in the event customers experience unexpected delays in obtaining permits, interconnection agreements or financing. As a consequence of COVID-19, we have experienced order delays and deferrals for our products due to business closures or the inability to obtain government issued permits to conduct product installations. Any of such events may result in customers modifying the equipment or the terms or timing of the expected installation, which may result in changes to the amount of backlog attributed to those projects.

We experience significant fluctuations in revenues from quarter to quarter on our product sales which may make period to period comparisons difficult.

We have low volume, high dollar sales for projects that are generally non-recurring, and therefore our sales have fluctuated significantly from period to period. Fluctuations cannot be predicted because they are affected by the purchasing decisions and timing requirements of our customers, which are unpredictable. Such fluctuations may make quarter to quarter and year to year comparisons difficult.

We expect significant competition for our products and services.

Many of our competitors and potential competitors are well established and have substantially greater financial, research and development, technical, manufacturing and marketing resources than we do. If these larger competitors decide to focus on the development of distributed power or cogeneration, they have the manufacturing, marketing and sales capabilities to complete research, development, and commercialization of these products more quickly and effectively than we can. There can also be no assurance that current and future competitors will not develop new or enhanced technologies or more cost-effective systems, and therefore, there can be no assurance that we will be successful in this competitive environment.

We may not achieve production cost reductions necessary to competitively price our products, which would adversely affect our sales.

We believe that we will need to reduce the unit production cost of our products over time to maintain our ability to offer competitively priced products. Our ability to achieve cost reductions will depend on our ability to develop low-cost design enhancements, to obtain necessary tooling and favorable supplier contracts, and to increase sales volumes so we can achieve economies of scale. We can make no assurance that we will be able to achieve any such production cost reductions. Our failure to do so could have a material adverse effect on our business and results of operations.

Our products involve a lengthy sales cycle and we may not anticipate sales levels appropriately, which could impair our results of operations.

The sale of our products typically involves a significant commitment of capital by customers, with the attendant delays frequently associated with large capital expenditures. For these and other reasons, the sales cycle associated with our products is typically lengthy and subject to a number of significant risks over which we have little or no control. We expect to plan our production and inventory levels based on internal forecasts of customer demand, which is highly unpredictable and can fluctuate substantially. If sales in any period fall significantly below anticipated levels, our financial condition, results of operations and cash flow would suffer. If demand in any period increases well above anticipated levels, we may have difficulties in responding, incur greater costs to respond, or be unable to fulfill the demand in sufficient time to retain the order, which would negatively impact our operations. In addition, our operating expenses are based on anticipated sales levels, and a high percentage of our expenses are generally fixed in the short term. As a result of these factors, a small fluctuation in timing of sales can cause operating results to vary materially from period to period.

The economic viability of our projects depends on the price spread between fuel and electricity, and the variability of these prices creates a risk that our projects will not be economically viable and that potential customers will avoid such energy price risks.

The economic viability of our CHP products depends on the spread between natural gas fuel and electricity prices. Volatility in one component of the spread, such as the cost of natural gas and other fuels (e.g., propane or distillate oil), can be managed to some extent by means of futures contracts. However, the regional rates charged for both base load and peak electricity may decline periodically due to excess generating capacity or general economic recessions.

Our products and on-site utility service could become less competitive if electric rates were to fall substantially in the future, although, historically, electric rates have not had any sustained decline in price. Potential customers may perceive the risk of unpredictable swings in natural gas and electricity prices as a risk of investing in on-site CHP, and may decide not to purchase CHP products.

We may make acquisitions or take other corporate strategic actions that could harm our financial performance.

To expedite development of our business, including with regard to equipment installation and service functions, we anticipate investigating and potentially pursuing future acquisitions of complementary businesses. Risks associated with such acquisitions include the diversion of management attention and cash from operations to cover the costs associated with acquisitions, disruption of our existing operations, loss of key personnel in the acquired companies, dilution through the issuance of additional securities, assumptions of existing liabilities, and commitment to further increase operating expenses. If any or all of these problems actually occur, acquisitions could negatively impact our financial performance and future stock value.

We completed our merger with ADGE in May 2017. As we complete the integration of ADGE's assets and business model into its operations, our financial condition, cash flows, and results of operations could be negatively impacted.

Expiring customer contracts may lead to decreases in revenue and increases in expenses.

Each year, a portion of our customer contracts expire and need to be renewed or replaced. We may not be able to renew or extend contracts with existing customers or obtain replacement contracts at attractive rates or for the same term as the expiring contracts. To the extent we are unable to extend customer contracts prior to their expiration date, energy production revenue will decline due to less energy billing. Expiring customer contracts can also lead to an increase in expenses because we

are obligated to remove the equipment from the customer location at our own expense at the end of the customer contract. The investment required to obtain replacement contracts, to include the manufacture and installation of the cogeneration or chiller equipment and the costs to incorporate this equipment into a facility are significant. To the extent that we do not have sufficient liquidity, may have an adverse impact on our ability to add new energy contracted sites.

Our revenue from energy billing may be adversely impacted by reductions in utility rates for electrical power, by the weather, or by an increase in remote work environment, all of which could reduce our revenue.

Over the past several years, there has been a sharp decrease in electric rates, subsequent to the vast majority of customer contract dates, causing the billable value of the electrical power generated by our systems to decrease which has an adverse effect on our results of operations. In warmer months the customers do not use as much thermal energy because they do not have as much demand for heat at their locations. Due to lower demand in warmer months we may not be able to bill for thermal energy and in turn may have a decrease in revenue. Also, the increase in the number of student and employees conducting their studies or work remotely, which has accelerated during the COVID-19 pandemic, has resulted in a significant decrease in commercial electricity generated by our systems, which has resulted in decreased revenues and has adversely effected our results of operations.

Our financial condition and results of operations could suffer if there is an impairment of goodwill or intangible assets.

As of December 31, 2020, our goodwill was \$2,406,156, and our intangible assets were \$1,360,319. We recognized goodwill impairment relating to our energy production segment of \$2,875,711 and \$3,693,198 in the years ended December 31, 2020 and 2019, respectively. We are required to test intangible assets with indefinite lives, including goodwill, annually or, in certain instances, more frequently, and may be required to record impairment charges, which would reduce any earnings or increase any loss for the period in which the impairment was determined to have occurred. Our goodwill impairment analysis is sensitive to changes in key assumptions used in our analysis. If the assumptions used in our analysis are not realized, it is possible that an impairment charge may need to be recorded in the future. We cannot accurately predict the amount and timing of any impairment of goodwill or other intangible assets. However, any such impairment would have an adverse effect on our results of operations.

Risks Related to our Technology and Business Operations

If we are unable to maintain our technological expertise in design and manufacturing processes, we will not be able to successfully compete.

We believe that our future success will depend upon our ability to continue to develop and provide innovative products and product enhancements that meet the increasingly sophisticated needs of our customers.

However, this requires that we successfully anticipate and respond to technological changes in design and manufacturing processes in a cost-effective and timely manner. The development of new, technologically advanced products and enhancements is a complex and uncertain process requiring high levels of innovation, as well as the accurate anticipation of technological and market trends. There can be no assurance that we will successfully identify new product opportunities, develop and bring new or enhanced products to market in a timely manner, successfully lower costs, and achieve market acceptance of our products, or that products and technologies developed by others will not render our products or technologies obsolete or noncompetitive.

The introduction of products embodying new technologies and the shifting of customer demands or changing industry standards could render our existing products obsolete and unmarketable. We may experience delays in releasing new products and product enhancements in the future. Material delays in introducing new products or product enhancements may cause customers to forego purchases of our products and purchase those of our competitors.

Legal, Regulatory and Compliance Risks

Our business is subject to product liability and warranty claims.

Our business exposes us to potential product liability claims, which are inherent in the manufacturing, marketing and sale of our products, and we may face substantial liability for damages resulting from the faulty design of products, manufacture of products or improper use of products by end users. We currently maintain a moderate level of product liability insurance, but there can be no assurance that this insurance will provide sufficient coverage in the event of a claim. Also, we cannot predict whether we will be able to maintain such coverage on acceptable terms, if at all, or that a product liability claim would not harm our business or financial condition. In addition, negative publicity in connection with the faulty design or manufacture of our products would adversely affect our ability to market and sell our products.

We sell our products with limited warranties. There can be no assurance that the provision in our financial statements for estimated product warranty expense will be sufficient. We cannot ensure that our efforts to reduce our risk through warranty disclaimers will effectively limit our liability. Any significant occurrence of warranty expense in excess of estimates could have a material adverse effect on our operating results, financial condition and cash flow. Further, we have at times undertaken programs to enhance the performance of units previously sold. These enhancements have at times been provided at no cost or below our cost. If we choose to offer such programs again in the future, such actions could result in significant costs.

Agreements with our customers may include potential liquidated damages relating to construction delays or performance guaranties.

Turnkey construction contracts to which we are a party may contain liquidated damages provisions resulting from failure to achieve agreed milestones relating to construction activity. Agreements relating to the sale of equipment or energy may include performance and other obligations that may result in payment obligations to customers.

Utilities or governmental entities could hinder our entry into and growth in the marketplace, and we may not be able to effectively sell our products.

Utilities or governmental entities on occasion have placed barriers to the installation of our products or their interconnection with the electric grid, and they may continue to do so. Utilities may charge additional fees to customers who install on-site CHP and rely on the grid for back-up power. These types of restrictions, fees, or charges could make it harder for customers to install our products or use them effectively, as well as increasing the cost to our potential customers. This could make our systems less desirable, thereby adversely affecting our revenue and other operating results.

The reduction, elimination or expiration of government and economic incentives for applications of our equipment could reduce demand for our equipment and harm our business.

The market for cogeneration equipment depends in part on the availability and size of government and economic incentives that vary by geographic market. Because our sales to customers are typically into geographic areas with such incentives, elimination, or expiration of government subsidies and economic incentives for cogeneration equipment may negatively affect the competitiveness of equipment relative to other sources of electricity, heating, and cooling equipment, and could harm or halt the growth of the cogeneration industry and our business. In particular, the Company depends on the New York State Energy Development Authority CHP Program (PON 2568) and the New Jersey Smart Start Combined Heat and Power Incentive.

We may incorporate price reduction on equipment sold to customers based on the anticipated receipt of governmental economic incentive payments and apply and collect the incentives payments. If such incentives become unavailable to us our financial condition may be adversely affected.

Competing sources of electricity, heating, and cooling equipment may successfully lobby for changes in the relevant legislation in their markets that are harmful to the cogeneration industry. Reductions in, or eliminations or expirations of, governmental incentives in regions where we focus our sales efforts could result in decreased demand for and lower revenue from cogeneration equipment there, which would adversely affect us. In addition, our ability to successfully penetrate new geographic markets may depend on new geographic areas adopting and maintaining incentives to promote cogeneration, to the extent such incentives are not currently in place. Additionally, electric utility companies may establish pricing structures or interconnection requirements that could adversely affect our sales and be harmful to cogeneration.

We may be exposed to substantial liability claims if we fail to fulfill our obligations to our customers or our on-site equipment malfunctions.

We enter into contracts with large commercial and not-for-profit customers under which we assume responsibility for meeting a portion of the customers' building energy demand and equipment installation. We may be exposed to substantial liability claims if we fail to fulfill our obligations to customers. If the equipment malfunctions, it may be costly to repair or replace. There can be no assurance that we will not be vulnerable to claims by customers and by third parties that are beyond any contractual protections that we are able to negotiate. As a result, liability claims could cause us significant financial harm.

We may be subject to litigation, which is expensive and could divert management attention.

Our share price may be volatile and in the past companies that have experienced volatility in the market price of their stock have been subject to an increased incidence of securities class action litigation. Securities litigation against us could result in substantial costs and divert our management's attention from other business concerns, which could seriously harm our business.

Although we maintain directors' and officers' insurance coverage, there can be no assurances that this insurance coverage will be sufficient to cover the substantial fees and expenses of lawyers and other professional advisors relating to any future litigation, our obligations to indemnify our officers and directors who are or may become parties to such pending and

future actions, or the amount of any judgments or settlements that we may be obligated to pay in connection with such actions. We may be required to make material payments in connection with the defense of or to settle such litigation or to satisfy any adverse judgment. In addition, actions that arise in the future could be excluded from coverage or, if covered, could exceed our deductibles and/or the coverage provided. In addition, an adverse outcome of litigation could cause our insurance premiums and retention amounts to increase in the future. Any of these consequences could have a material adverse effect on our business, financial condition and results of operations. For more information regarding litigation, see "Item 3. Legal Proceedings" and Note 11 "Commitments and Contingencies" in the Notes to our Consolidated Financial Statements included elsewhere herein.

Credit and Liquidity Risks

We are exposed to credit risks with respect to some of our customers

To the extent our customers do not advance us sufficient funds to finance our costs during the execution phase of our contracts, we are exposed to the risk that they may be unable to accept delivery or that they will be unable to make payment at the time of delivery or within agreed upon payment terms. Our provision for doubtful accounts receivable increased \$608,397 in the year ended December 31, 2020, compared to the year ended December 31, 2019. We have experienced customer payment delays due to COVID-19, which are attributable to temporary business shutdowns, resulting in declines in revenues and cash flows from our customers and delays in project completion due to delays in government project inspections and a general slowdown in business activity and in some cases, customers ceasing business activities altogether.

Risks Relating to Ownership of our Common Stock

Investment in our Common Stock is subject to price fluctuations and market volatility.

Historically, valuations of many small companies have been highly volatile. The securities of many small companies have experienced significant price and trading volume fluctuations unrelated to the operating performance or the prospects of such companies. The market price of shares of our common stock could be subject to wide fluctuations in response to many risk factors listed in this section, and others beyond our control, including:

- results and timing of our product development;
- results of the development of our competitors' products;
- regulatory actions with respect to our products or our competitors' products;
- actual or anticipated fluctuations in our financial condition and operating results;
- actual or anticipated changes in our growth rate relative to our competitors;
- actual or anticipated fluctuations in our competitors' operating results or changes in their growth rate;
- competition from existing products or new products that may emerge;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures, collaborations, or capital commitments;
- issuance of new or updated research or reports by securities analysts;
- fluctuations in the valuation of companies perceived by investors to be comparable to us;
- share price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- additions or departures of key management or personnel;
- disputes or other developments related to proprietary rights, including patents, litigation matters, and our ability to obtain, maintain, defend or enforce proprietary rights relating to our products and technologies;
- announcement or expectation of additional financing efforts;
- sales of our Common Stock by us, our insiders, or our other stockholders; and
- general economic and market conditions.

Furthermore, during the COVID-19 pandemic and at other times, the U.S. stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political, and market conditions such as recessions, interest rate changes, or international currency fluctuations, may negatively impact the market price of shares of our common stock. In addition, such fluctuations could subject us to securities class action litigation, which could result in substantial costs and divert our management's attention from other business concerns, which could potentially harm our business.

If securities or industry analysts do not publish research or publish inaccurate or unfavorable research about our business, our share price and trading volume could decline.

The trading market for our shares will depend on the research and reports that securities or industry analysts publish about us or our business. There can be no assurance that analysts will cover us or provide favorable coverage. If one or more analysts downgrade our shares or change their opinion of our share price would likely decline. In addition, if one or more analysts cease coverage of us or fails to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our share price or trading volume to decline.

Because our directors and executive officers are among our largest stockholders, they can exert influence over our business and affairs and have actual or potential interests that may differ from other stockholders or investors.

As of the date of this report, our directors and executive officers collectively beneficially own approximately 13% of our issued and outstanding shares. John Hatsopoulos, a director, beneficially owns approximately 9% of our issued and outstanding shares. Additionally, the holdings of our directors and executive officers may increase in the future upon vesting or exercise of the options or other stock awards they may hold or in the future may be granted or if they otherwise acquire additional shares in the open market or otherwise. The interests of such persons may differ from the interests of our other stockholders. As a result, in addition to their board seats and offices, such persons will have influence over corporate actions requiring shareholder approval.

Such persons' stock ownership may discourage a potential acquirer from making a tender offer or otherwise attempting to acquire us, which in turn could reduce our stock price or prevent our stockholders from realizing a premium over our stock price.

Current stockholdings may be diluted if we make future equity issuances or if outstanding options are exercised for shares of our common stock.

"Dilution" refers to the reduction in the voting effect and proportionate ownership interest of a given number of shares of common stock as the total number of shares increases. Our issuance of additional stock, convertible preferred stock, or convertible debt may result in dilution to the interests of shareholders and may also result in the reduction of your stock price. The sale of a substantial number of shares into the market, or even the perception that sales could occur, could depress the price of our Common Stock. Also, the exercise of options may result in additional dilution.

The holders of outstanding options, warrants and convertible securities or derivatives, if any are subsequently issued have the opportunity to profit from a rise in the market price of our shares, if any, without assuming the risk of ownership, with a resulting dilution in the interests of other stockholders. We may find it more difficult to raise additional equity capital if it should be needed for our business while the options, warrants and convertible securities are outstanding.

Future sales of our shares by our existing stockholders may cause our stock price to fall.

The market price of our shares could decline as a result of sales by our existing stockholders of shares of our shares in the market or the perception that these sales could occur. These sales might also make it more difficult for us to conduct an equity or equity-based financing at a time and price that we deem appropriate and thus inhibit our ability to raise additional capital when it is needed.

Because we have not and do not intend to pay cash dividends, our stockholders receive no current income from holding our stock.

We have paid no cash dividends on our capital stock to date and we currently intend to retain our future earnings, if any, to fund the development and growth of our business. We currently expect to retain earnings for use in the operation and expansion of our business, and therefore do not anticipate paying any cash dividends in the foreseeable future. In addition, the terms of our credit facility may restrict our ability to pay any cash dividends. As a result, capital appreciation, if any, of our Common Stock could be the sole source of gain for our stockholders for the foreseeable future.

We incur substantial costs to operate as a public reporting company.

We incur substantial legal, financial, accounting and other costs and expenses to operate as a public reporting company. We believe that these costs are a disproportionately larger percentage of our revenues than they are for many larger companies. In addition, the rules and regulations of the SEC impose significant requirements on public companies, including ongoing disclosure obligations and mandatory corporate governance practices. Our senior management and other personnel need to devote a substantial amount of time to ensure ongoing compliance with these requirements. Our common stock is currently quoted on the OTC Markets Group's OTCQX tier. Under the OTC Markets Group Inc.'s OTCQX continued qualification requirements, we are required to have a minimum bid price of \$0.10 per share as of the close of business for at least one of every 30 consecutive calendar days, a market capitalization of at least \$5 million for at least one of every 30 consecutive calendar days, and at least two market makers. Also, we must be current in our SEC reporting obligations. If we determine to list our stock for trading on a national securities exchange or quoted on the Nasdaq Stock Market, we will be

subject to additional disclosure and governance obligations. There can be no assurance that we will continue to meet all of the public company requirements to which we are subject on a timely basis, or at all, or that our compliance costs will not continue to be material.

Because our common stock is not traded on a national securities exchange, our stock has limited liquidity and our ability to raise capital is impaired.

On June 19, 2020, we voluntarily delisted our common stock from Nasdaq and transitioned the quotation of our shares to OTC Markets Group Inc.'s OTCQX Best Market. Our common stock has been quoted on the OTC Markets Group Inc.'s OTCQX Best Market since June 19, 2020, under the symbol "TGEN". We believe that trading "over the counter" has limited our stock's liquidity and may impair our ability to raise additional capital.

Certain provisions of our charter and bylaws may discourage mergers and other transactions.

Certain provisions of our certificate of incorporation and bylaws may make it more difficult for someone to acquire control of us. These provisions may make it more difficult for stockholders to take certain corporate actions and could delay or prevent someone from acquiring our business. These provisions could limit the price that certain investors might be willing to pay for shares of our common stock. The ability to issue "blank check" preferred stock is a traditional anti-takeover measure. This provision may be beneficial to our management and the board of directors in a hostile tender offer and may have an adverse impact on stockholders who may want to participate in such tender offer, or who may want to replace some or all of the members of the board of directors.

Our board of directors may issue additional shares of preferred stock without stockholder approval.

Our certificate of incorporation authorizes the issuance of up to 10,000,000 shares of preferred stock. Accordingly, our board of directors may, without shareholder approval, issue one or more new series of preferred stock with rights which could adversely affect the voting power or other rights of the holders of outstanding shares of our common stock. In addition, the issuance of shares of preferred stock may have the effect of rendering more difficult or discouraging, an acquisition or change of control of us. Although we do not have any current plans to issue any shares of preferred stock, we may do so in the future.

In order to comply with public reporting requirements, we must continue to strengthen our financial systems and internal controls, and failure to do so could adversely affect our ability to provide timely and accurate financial statements.

Refinement of our internal controls and procedures will be required as we manage future growth and operate effectively as a public company. Such refinement of our internal controls, as well as compliance with the Sarbanes-Oxley Act of 2002 and related requirements, will be costly and will place a significant burden on management. We cannot assure you that measures already taken, or any future measures, will enable us to provide accurate and timely financial reports, particularly if we are unable to hire additional personnel in our accounting and financial department, or if we lose personnel in this area. Any failure to improve our disclosure controls or other problems with our financial systems or internal controls could result in delays or inaccuracies in reporting financial information, or non-compliance with SEC reporting and other regulatory requirements, any of which could adversely affect our business and stock price.

Investor confidence in the price of our stock may be adversely affected if we are unable to comply with Section 404 of the Sarbanes-Oxley Act of 2002. As of the end of the period covered by this report, our principal executive officers and principal accounting officer have concluded there is a material weakness in our disclosure controls and procedures and our internal control over financial reporting, which could harm our operating results or cause us to fail to meet our reporting obligations.

As a public company, we are subject to the rules adopted by the SEC pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, which require us to include in our annual report on Form 10-K our management's report on, and assessment of the effectiveness of, our internal control over financial reporting ("management's report"). If we fail to achieve and maintain the adequacy of our disclosure control or internal control over financial reporting, there is a risk that we will not comply with all of the requirements imposed by Section 404. Moreover, effective internal control over financial reporting, particularly that relating to revenue recognition, is necessary for us to produce reliable financial reports and is important in helping to prevent financial fraud. Any of these possible outcomes could result in an adverse reaction in the financial marketplace due to a loss in investor confidence in the reliability of our financial statements, which ultimately could harm our business and could negatively impact the market price of our common stock. Investor confidence and the price of our common stock may be adversely affected if we are unable to comply with Section 404 of the Sarbanes-Oxley Act of 2002.

As of the end of the period covered by this Annual Report, December 31, 2020, our principal executive officer and principal financial officer performed an evaluation of disclosure controls and procedures and concluded that our controls were not effective to provide reasonable assurance that information required to be disclosed by us in reports that we file under the

Securities Exchange Act, is recorded, processed, summarized and reported when required. Management conducted an evaluation of our internal control over financial reporting and based on this evaluation, management concluded that the company's internal control over financial reporting was not effective as of December 31, 2020. We have a small number of employees dealing with general controls over information technology security and user access. This constitutes a material weakness in financial reporting. Any failure to implement effective internal controls could harm our operating results or cause us to fail to meet our reporting obligations. Inadequate internal controls could also cause investors to lose confidence in our reported financial information, which could have a negative effect on the trading price of our common stock and may require us to incur additional costs to improve our internal control system.

General Business Risks

We are implementing a new enterprise resource planning system and, if this new system proves ineffective or if we experience issues with the transition, we may be unable to timely or accurately prepare financial reports, make payments to our suppliers and employees, or invoice and collect from our users.

We are implementing a new enterprise resource planning, or ERP system. Our ERP system is critical to our ability to accurately maintain books and records and to prepare our financial statements. The transition to our new ERP system may be disruptive to our business if the ERP system does not work as planned or if we experience issues relating to the implementation. Such disruptions could impact our ability to timely or accurately make payments to our suppliers and employees, and could also inhibit our ability to invoice, and collect from our customers. Data integrity problems or other issues may be discovered which, if not corrected, could impact our business or financial results. In addition, we may experience periodic or prolonged disruption of our financial functions arising out of this conversion, general use of such system, other periodic upgrades or updates, or other external factors that are outside of our control. If we encounter unforeseen problems with our ERP system or other related systems and infrastructure, it could adversely affect our financial reporting systems and our ability to produce financial reports, the effectiveness of internal controls over financial reporting, and our business, operating results and financial condition could be adversely affected.

Our intellectual property may not be adequately protected.

We seek to protect our intellectual property rights through patents, trademarks, copyrights, trade secret laws, confidentiality agreements, and licensing arrangements, but we cannot ensure that we will be able to adequately protect our technology from misappropriation or infringement. We cannot ensure that our existing intellectual property rights will not be invalidated, circumvented, challenged, or rendered unenforceable.

Our competitors may successfully challenge the validity of our patents, design non-infringing products, or deliberately infringe our patents. There can be no assurance that other companies are not investigating or developing other similar technologies. In addition, our intellectual property rights may not provide a competitive advantage to us or ensure that our products and technology will be adequately covered by our patents and other intellectual property. Any of these factors or the expiration, termination, or invalidity of one or more of our patents may have a material adverse effect on our business.

Others may assert that our technology infringes their intellectual property rights.

We may be subject to infringement claims from time to time. The defense of any claims of infringement made against us by third parties could involve significant legal costs and require our management to divert time from our business operations. If we are unsuccessful in defending any claims of infringement, we may be forced to obtain licenses or to pay additional royalties to continue to use our technology. We may not be able to obtain any necessary licenses on commercially reasonable terms or at all. If we fail to obtain necessary licenses or other rights, or if these licenses are costly, our operating results would suffer either from reductions in revenues through our inability to serve customers or from increases in costs to license third-party technologies.

Our business and financial performance may be adversely affected by information systems interruptions, cybersecurity attacks or other disruptions which could have a material adverse effect on our business and results from operations.

We depend upon information technology, infrastructure, including network, hardware and software systems to conduct our business. Despite our implementation of network and other cybersecurity measures, our information technology system and networks could be disrupted or experience a security breach from computer viruses, break-ins and similar disruptions from unauthorized tampering with our computer systems. Our security measures may not be adequate to protect against highly targeted sophisticated cyber-attacks, or other improper disclosures of confidential and/or sensitive information. Additionally, we may have access to confidential or other sensitive information of our customers, which despite our efforts to protect, may be vulnerable to security breaches, theft, or improper disclosure any of which could have a material adverse effect on our competitive position, results of operations, cash flows or financial condition.

Our success is dependent upon attracting and retaining highly qualified personnel and the loss of key personnel could significantly hurt our business.

To achieve success, we must attract and retain highly qualified technical, operational and executive employees. The loss of the services of key employees or an inability to attract, train and retain qualified and skilled employees, specifically engineering, operations, and business development personnel, could result in the loss of business or could otherwise negatively impact our ability to operate and grow our business successfully.

Our business may be impacted by political events, war, terrorism, public health issues, natural disasters and other circumstances that are not within our control.

War, terrorism, geopolitical uncertainties, public health issues, and other business interruptions have caused and could cause damage or disruption to international commerce and the global economy, and thus could have a material adverse effect on us, our suppliers, and manufacturing vendors. Our business operations are subject to interruption by natural disasters, fire, power shortages, nuclear power plant accidents, terrorist attacks, and other hostile acts, labor disputes, public health issues, and other events beyond our control. Such events could decrease demand for our products, make it difficult or impossible for us to make and deliver products to our customers, or to receive products from our manufacturers and suppliers, and create delays and inefficiencies in our supply chain. If major public health issues, including pandemics, arise, we could be adversely affected by more stringent employee travel restrictions, additional limitations in freight services, governmental actions limiting the movement of products between regions, delays in production ramps of new products, and disruptions in the operations of our manufacturing vendors and suppliers. In the event of a natural disaster, we could incur significant losses, require substantial recovery time and experience significant expenditures in order to resume operations.

We depend on a small number of customers for a substantial portion of our product revenues. The loss of one or more of these customers, or our inability to collect outstanding receivables from such customers could have a material adverse effect on our financial results.

During the year ended December 31, 2020, one customer accounted more than 10% of our revenues and during the year ended December 31, 2019, one customer accounted for more than 10% of our revenues. There was no customer who represented more than 10% of the accounts receivable balance as of December 31, 2020, and one as of December 31, 2019. The loss of any one or more of our major customers or our inability to collect on outstanding accounts receivable from one or more of these customers could have a material adverse effect on our business and financial condition. Our provision for doubtful accounts receivable increased \$608,397 in the year ended December 31, 2020, compared to the year ended December 31, 2019. We continue to seek to increase our customer base and reduce our reliance on a limited number of customers. Although we are seeking to diversify our customer base and reduce our reliance upon sales to a small number of customers, we expect sales to such customers to continue to constitute a significant portion of our revenues in the near term given we actively pursue large contracts and projects. The loss of any one or more of such customers or an inability to collect such accounts receivable could have a material adverse effect on our business, financial condition and results of operations.

Item 1B. Unresolved Staff Comments.

Disclosure in response to this item is not required of a smaller reporting company.

Item 2. Properties.

Our headquarters is located in Waltham, Massachusetts, and consists of approximately 43,000 square feet of manufacturing, storage and office space. Our lease is for a term that will expire on March 31, 2024. Currently, our monthly base rent is \$42,964. We believe that our facilities are appropriate and adequate for our current needs.

Our eleven leased service centers can be broken into two different sizes. The larger leased spaces have office space to accommodate administrative, sales and engineering personnel, and warehouse space to stock parts in support of our service contracts.

As of December 31, 2020, the service centers that fit this larger category are based in Piscataway, New Jersey and Valley Stream and Buchanan, New York to service the Metro New York City and the Mid-Atlantic region. The San Francisco Bay area and Northern California is served by such a center in Hayward, California. A portion of the corporate headquarters in Waltham, Massachusetts is used in this manner to service Boston and New England.

The smaller service centers are parts depots or warehouses for the stocking of parts in support of our service contracts. These centers are located in Los Angeles, California; Sterling Heights, Michigan; Newark, New York, East Windsor, Connecticut; Toronto, Ontario and Wellesley Chapel, Florida.

Item 3. Legal Proceedings.

The Company is not a party to any material pending legal proceeding.

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.**Market for Our Shares**

Our common stock is quoted on the OTC Markets Group's OTCQX Best Market tier and trades under the symbol TGEN. As of March 9, 2021, there were 57 holders of record of our common stock. Any over-the-market quotations reflect inter-dealer prices, without mark-up, markdown or commission and may not necessarily represent actual transactions.

Dividends

We have never declared or paid a cash dividend on our common stock and do not anticipate paying cash dividends on our common stock in the foreseeable future. Payment of future cash dividends, if any, will be at the discretion of our board of directors and will depend on our financial condition, results of operations, contractual restrictions and covenants included under our bank or other indebtedness, capital requirements, business prospects and other factors that our board of directors considers relevant.

Equity Compensation Plan Information

We adopted the 2006 Stock Option and Incentive Plan (the "Plan"), under which the board of directors may grant incentive or non-qualified stock options and stock grants to key employees, directors, advisors and consultants of the Company. The Plan was amended at various dates by the Board of Directors to increase the reserved shares of common stock issuable under the Plan to 3,838,750 as of December 31, 2020, and in June 2017 stockholders approved an amendment to extend the termination date of the Plan to January 1, 2026 and to ratify all of our option grants made after January 1, 2016 (the "Amended Plan").

Stock options vest based upon the terms within the individual option grants, with an acceleration of the unvested portion of such options upon a change in control event, as defined in the Amended Plan. The options are not transferable except by will or domestic relations order. The option price per share under the Amended Plan cannot be less than the fair market value of the underlying shares on the date of the grant. The number of shares remaining available for future issuance under the Amended Plan as of December 31, 2020 and 2019 was 761,812 and 1,906,180, respectively.

The following table provides information as of December 31, 2020, regarding Common Stock that may be issued under the, as Amended Plan.

	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in first column)
Equity compensation plans approved by security holders	2,496,242	\$ 1.94	761,812
Equity compensation plans not approved by security holders	—	—	—
Total	2,496,242	\$ 1.94	761,812

Item 6. Selected Financial Data.

Disclosure in response to this item is not required of a smaller reporting company.

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

You should read the following discussion and analysis of our financial condition and results of operations together with our consolidated financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. Some of the information contained in this discussion and analysis or set forth elsewhere in this Annual Report on Form 10-K, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. You should review "Item 1A. Risk Factors" of this Annual Report on Form 10-K for a discussion of important factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis.

Overview

Tecogen designs, manufactures and sells industrial and commercial cogeneration systems that produce combinations of electricity, hot water, and air conditioning using automotive engines that have been specially adapted to run on natural gas. Cogeneration systems are efficient because in addition to supplying mechanical energy to power electric generators or compressors – displacing utility supplied electricity – they provide an opportunity for the facility to incorporate the engine's waste heat into onsite processes such as space and potable water heating. We produce standardized, modular, small-scale products, with a limited number of product configurations that are adaptable to multiple applications. We refer to these combined heat and power products as CHP (electricity plus heat) and MCHP (mechanical power plus heat).

Our products are sold directly to end-users by our in-house marketing team and by established sales agents and representatives. We have agreements in place with distributors and sales representatives. Our existing customers include hospitals and nursing homes, colleges and universities, health clubs and spas, hotels and motels, office and retail buildings, food and beverage processors, multi-unit residential buildings, laundries, ice rinks, swimming pools, factories, municipal buildings, military installations and indoor growing facilities. To date we have shipped over 3,000 units, some of which have been operating for almost 35 years.

As a result of our acquisition of American DG Energy ("ADGE") in May 2017, we added an additional source of revenue. Through ADGE, we install, own, operate and maintain complete distributed generation electricity systems, or DG systems or energy systems, and other complementary systems at customer sites, and sell electricity, hot water, heat and cooling energy under long-term contracts at prices guaranteed to the customer to be below conventional utility rates. Each month we obtain readings from our energy meters to determine the amount of energy produced for each customer. We use a contractually defined formula to multiply these readings by the appropriate published price of energy (electricity, natural gas or oil) from each customer's local energy utility, to derive the value of our monthly energy sale, which includes a negotiated discount. Our revenues per customer on a monthly basis vary based on the amount of energy produced by our energy systems and the published price of energy (electricity, natural gas or oil) from our customers' local energy utility that month.

Although we may, from time to time, have one or a few customers who may represent more than 10% of our product revenue for a given year, we are not dependent on the recurrence of revenue from those customers. Our product revenue is such that customers may make a large purchase once and may not ever make a purchase again. Our equipment is built to last 30 or more years. Therefore, our product revenue model is not dependent on recurring sales transactions from the same customer. Our service revenue does lend itself to recurring revenue from particular customers, although we currently do not have any service revenue customers who make up more than 10% of our total revenues on an annual basis.

For the last two fiscal years, more than half of our revenue was generated from long-term maintenance and energy production contracts, which provides us with a predictable revenue stream, especially during the summer months. We have a slight surge of activity from May through September as our "chiller season" is in full swing. Our service revenue which had grown from year to year since 2005, with our New York City/New Jersey and New England systems experiencing the majority of the growth, was impacted by the COVID-19 pandemic, especially with the decreased installation service related revenue we achieved in the year ended December 31, 2020. Our service margins are generally predictable as we service hundreds of long-term contracts with relatively low dollar, high volume sales.

During the year ended December 31, 2020, our revenues were negatively impacted due to customer order delays or deferrals; service delays due to customer facility closures, in some cases for extended periods; and a reduction in our energy production distribution due to business closures and increased remote work and learning environments. The extent to which the coronavirus will continue to impact our business and our financial results will depend on future developments, which are highly uncertain and cannot be predicted.

Our product revenue is derived from the sale of the various cogeneration modules, such as the InVerde, InVerde e+, the CM-75, the CM-60, Ilios heat pumps, and the three TECOCHILL chiller models, such as the smaller ST, the larger DT and the RT (roof-top) units. In 2019, we also reintroduced our TecoFrost line to the mix. The sales cycle for each module varies widely and can range from as short as a month to as long as a year or more. Furthermore, since our products and their installation are costly, they are considered a major capital improvement and customers may be slow in making their buying decisions. Our product sales are high dollar value, low volume transactions. Therefore, our product revenue can be difficult to predict and the expected margin can vary.

Our cogeneration, heat pump, and chiller modules are built to order and revenue is recognized upon shipment. The lead time to build and deliver a unit depends on its customized configuration and is approximately 12 to 14 weeks for a chiller and 6 to 8 weeks for a cogeneration or heat pump from time of purchase order. As revenue is recognized upon shipment, our work-in-process is an important factor in understanding our financial condition in any given quarter.

Our operations are comprised of two business segments, as follows:

- *Products and Services segment* - designs, manufactures and sells industrial and commercial cogeneration systems
- *Energy Production segment* - sells energy in the form of electricity, heat, hot water, and cooling to our customers under long-term sales agreements

Recent Developments

On April 17, 2020, we obtained an unsecured loan in the amount of \$1,874,200 under the first Paycheck Protection Program ("First Draw PPP Loan") pursuant to the Coronavirus Aid, Relief, and Economic Security Act, as amended ("CARES Act"), through Webster Bank, N.A. ("Webster Bank"). The loan was guaranteed by the United States Small Business Administration ("SBA") and, subject to certain limitations, to the extent that the loan is used for payroll, rent, or utilities during the applicable covered period following the disbursement of the loan, the loan may be forgiven by the SBA. In January 2021, we were notified by Webster Bank that all of the original principal amount of \$1,874,200 together with all accrued interest thereon was forgiven in full as of January 11, 2021.

On February 5, 2021, we obtained a Second Draw Paycheck Protection Program unsecured loan through Webster Bank in the amount of \$1,874,269 under the CARES Act that is also guaranteed by the SBA. We intend to use the loan proceeds for payroll, rent, utilities and other operating expenses, and expect to apply for forgiveness of the loan balance as permitted under the CARES Act. See Note 10. "*Note Payable and Revolving Line of Credit, Bank.*"

On May 4, 2018, we entered into a Credit Agreement with Webster Business Credit Corporation ("Webster") that provided us with a line of credit of up to \$10 million on a revolving and secured basis, with availability based on our accounts receivable, raw materials, and finished goods, during the period until May 4, 2021. The line of credit was used to repay the amounts due to Mr. John Hatsopoulos under a promissory note assumed by us in connection with our merger with American DG Energy Inc. and for working capital purposes. On May 11, 2020, we agreed with Webster to terminate our Credit Agreement, together with related agreements, including a Revolving Note, Security Agreement, Blocked Account Agreement, and Master Letter of Credit Agreement. We paid an early termination fee in the amount of \$25,000 in connection with the termination of the Credit Agreement and continue to use depository and cash management services provided by Webster Bank. The \$145,011 of costs incurred in connection with the issuance of the revolving credit facility were capitalized and were being amortized to interest expense on a straight-line basis over three years based on the contractual term of the agreement. Upon termination of the Credit Agreement, the unamortized balance of debt issuance cost of \$37,861 was expensed during the year ended December 31, 2020.

On March 5, 2019, we transferred ownership of certain of our energy systems assets and related energy production contracts in a sale transaction in consideration for approximately \$5 million. In connection with the sale, we entered into two separate agreements to provide operational and maintenance services for the purchaser. Concurrently, we amended the terms of an agreement related to certain energy systems related assets and related energy production contracts, the ownership of which were transferred to the same purchaser in December 2018 in consideration of approximately \$2 million, in order to conform and finalize the terms of the agreement to the March 2019 agreement. See Note 5. "*Sale of Energy Producing Assets and Goodwill Impairment*" in the Notes to our Consolidated Financial Statements for further discussion.

Critical Accounting Policies

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires us to make judgments, assumptions and estimates that affect the reported amounts of assets, liabilities, sales and expenses, and related disclosure of contingent assets and liabilities. These judgments, assumptions and estimates are made or applied within the context of accounting policies related to the nature of the transaction. Note 2. "Summary of Significant Accounting Policies" of the Notes to our Consolidated Financial Statements describes the significant accounting policies used in the preparation of the consolidated financial statements.

Certain aspects of certain accounting policies require management to make difficult, subjective or complex judgments that could have a material effect on our financial condition and results of operations. These aspects of these accounting policies are considered critical accounting policies. These policies may require management to make assumptions about matters that are highly uncertain at the time of the estimate or employ an estimate where alternative estimates could have also been employed, and may involve estimates that are reasonably likely to change with the passage of time. Estimates and assumptions about future events and their effects cannot be determined with certainty. We base our estimates on historical experience and on various other assumptions believed to be applicable and reasonable under the circumstances. These estimates may change as new events occur, as additional information is obtained and as our operating environment changes. These changes have historically been minor and have been included in the consolidated financial statements as soon as they became known. In

addition, management is periodically faced with uncertainties, the outcomes of which are not within its control and will not be known for prolonged periods of time. These uncertainties are discussed in *Item 1A, "Risk Factors"* above.

Management believes that the following are critical accounting policies:

Revenue Recognition

Revenue is recognized when performance obligations under the terms of a contract with our customer are satisfied. This generally occurs with the transfer of control of our products, services and energy production. Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services or energy to customers.

Determination of contract consideration allocable to multiple performance obligations within a single contract requires employing stand-alone selling prices which may be based on observable selling prices, estimated selling prices or as a residual. We use an observable selling price to determine standalone selling prices where available and either a combination of an adjusted market assessment approach, an expected cost plus a margin approach, and/or a residual approach to determine the standalone selling prices for separate performance obligations as a basis for allocating contract consideration when an observable selling price is not available.

Under complete turnkey installation service contracts our performance obligation under such contracts is satisfied progressively over time as enhancements are made to customer owned and controlled properties. We measure progress towards satisfaction of the performance obligation based on an input method based on cost and revenue is recognized over time using the percentage-of-completion method determined on a cost to cost basis. This method requires management to estimate future cost to complete based on conditions and information available at the time the estimate is made. Events or changes in circumstances can cause these estimates to be revised which may result in significant adjustments to revenue amounts previously recognized.

Accounts Receivable

Accounts receivable are stated at the amount management expects to collect from outstanding balances. An allowance for doubtful accounts is provided for those accounts receivable considered to be uncollectible based upon historical experience and management's evaluation of outstanding accounts receivable at the end of the year.

Inventory

Raw materials, work in process, and finished goods inventories are stated at the lower of cost, as determined by the average cost method, or net realizable value. We periodically review inventory quantities on hand for excess and/or obsolete inventory based primarily on historical usage, as well as based on estimated forecast of product demand. Any reserves that result from this review are charged to cost of sales.

ADGE's Property and Equipment and Depreciation

Upon acquisition, property and equipment employed in energy production are recorded at fair value using a cost approach whereby replacement cost new ("RCN") is utilized as the starting point, with factors for inflation, physical obsolescence, functional obsolescence and economic obsolescence being considered and applied as required to arrive at an estimated fair value.

Depreciation is computed using the straight-line method at rates sufficient to write off the cost of the applicable assets over their estimated useful lives. Repairs and maintenance are expensed as incurred.

We review our energy systems for potential impairment whenever events or changes in business circumstances indicate that the carrying value of the assets may not be fully recoverable or that the useful lives of the assets are no longer appropriate. We evaluate the recoverability of its long-lived assets when impairment is indicated by comparing the net book value of the asset group to the estimated future undiscounted cash flows attributable to such assets. The useful life of the Company's energy systems is the lesser of the economic life of the asset or the term of the underlying contract with the customer, typically 12 to 15 years. If impairment is indicated, the asset is written down to its estimated fair value.

Contract Assets and Liabilities

The favorable contract asset and unfavorable contract liability included in the intangible assets and liabilities of the consolidated balance sheets represent the fair value of customer energy production contracts (both positive for favorable contracts and negative for unfavorable contracts) which were acquired by us.

The determination of fair value required development of an estimate of the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants at the measurement date under current market conditions. Contracts are considered to be assets or liabilities by virtue of the rights and obligations inherent in the contract terms. Typically, contracts with terms considered to be at market are considered to have no fair value as, in order to be entitled to the rights under the contract, performance must occur for which a market rate of return is earned due to the at market terms.

The fair value of a contract is primarily a measurement of its off-market terms. The obligation to perform under a contract with terms that are unfavorable to market results in a liability to the extent its terms are off market. The resulting liability is an estimate of the price that would need to be paid to a willing market participant to assume the obligations under the contract in order for them to receive a market rate of return for their remaining performance obligation under the contract. The exact opposite holds true in instances where the terms of a contract are considered to be favorable to market. In that case an asset would exist as an estimate of the price that would be received from a willing market participant in order to be entitled to the rights under the contract.

In determining the estimate of fair value of customer energy production contracts, the measure of market, and thus the baseline to measure the amount related to any of the off market terms or conditions with respect to the contracts, was considered best determined, given the nature of the services provided under the contracts, by utilizing a benchmark level of margin, in this case 35% of revenue which is consistent with the average return on revenue of US investor owned public utilities.

Goodwill

Goodwill is not amortized, however, it is reviewed for impairment annually in the fourth quarter and/or when circumstances or other events indicate that impairment may have occurred. ASC 350 "Intangibles—Goodwill and Other" (ASC 350) permits entities to make a qualitative assessment of whether it is more likely than not that a reporting unit's fair value is less than its carrying amount before applying the two-step goodwill impairment test. Circumstances that are considered as part of the qualitative assessment and could trigger the two-step impairment test include, but are not limited to: a significant adverse change in the business climate; a significant adverse legal judgment; adverse cash flow trends; an adverse action or assessment by a government agency; unanticipated competition; decline in our stock price; and a significant restructuring charge within a reporting unit. We define reporting units at the business segment level. For purposes of testing goodwill for impairment, goodwill has been allocated to our reporting units to the extent it relates to each reporting unit.

During 2018, we early-adopted the provisions of ASU 2017-04 which simplified goodwill impairment testing by eliminating the requirement to determine the implied value of goodwill where a quantitative analysis indicates that the carrying value of the reporting unit exceeds its fair value.

It is our practice, at a minimum, to perform a quantitative goodwill impairment test in the fourth quarter of the year following an acquisition involving a significant amount of goodwill. In the fourth quarter of 2020, we performed a quantitative goodwill impairment test for our energy production reporting unit acquired in 2017. We used a discounted cash flow approach to develop the estimated fair value of that reporting unit. Management judgment is required in developing the assumptions for the discounted cash flow model. An impairment would be recorded if the carrying amount of a reporting unit including goodwill exceeded the estimated fair value. Based on the aforementioned analysis, the carrying amount of that reporting unit, including goodwill, exceeded the estimated fair value and an impairment charge of \$2,875,711 was recorded in the fourth quarter of 2020. See Note 5. "*Sale of Energy Producing Assets and Goodwill Impairment*".

The impairment recognizes the shortening of remaining contract terms with customers without replacement and without further growth, as well as less than expected cost savings and, offset by profitability from our initiatives to optimize the long-term profitability of its various site operations, and a price peak of the Company's stock on the date of the business combination to which the goodwill relates (see also Note 5. "*Sale of Energy Producing Assets and Goodwill Impairment*").

The discount rate, profitability assumptions, and terminal growth rate of this reporting unit were the material assumptions utilized in the discounted cash flow model used to estimate its fair value. The discount rate reflects an estimate of our weighted-average cost of capital.

The discounted cash flow analysis requires estimates, assumptions and judgments about future events. Our analysis uses our internally generated long-range plan. The long-range plan reflects management's judgment and assumptions about future events.

We believe the assumptions used in our goodwill impairment analysis are appropriate and result in a reasonable estimate of the fair value of the reporting unit. However, given the economic environment and the uncertainties regarding the impact on our business, there can be no assurance that our estimates and assumptions, made for purposes of our goodwill impairment testing, will prove to be an accurate prediction of the future. If our assumptions regarding future performance are not achieved, we may be required to record additional goodwill impairment charges in future periods.

Results of Operations

The following table sets forth for the periods indicated, the percentages of the net sales represented by certain items reflected in our statements of operations.

	Years ended December 31,			
	2020		2019	
Revenues	100.0	%	100.0	%
Cost of Sales	61.7		62.7	
Gross Profit	38.3		37.3	
General and administrative	36.5		31.1	
Selling	9.2		8.0	
Research and development	2.7		4.4	
Loss from operations	(21.1)		(13.9)	
Total other expense, net	(0.8)		(0.4)	
Consolidated net loss	(22.0)		(14.3)	
Income attributable to the noncontrolling interest	0.2		0.3	
Net loss attributable to Tecogen Inc.	(21.8)	%	(14.1)	%

Year Ended December 31, 2020 Compared to Year Ended December 31, 2019*Revenues*

The following table presents revenue by segment and the change from the prior year for the years ended December 31:

Revenue	Year End						
	December 31, 2020		December 31, 2019		Increase (Decrease) \$	Increase (Decrease) %	
Product:							
Cogeneration	\$	9,233,613	\$	7,073,342	\$	2,160,271	30.5 %
Chillers		1,300,483		5,904,554		(4,604,071)	(78.0) %
Total product revenue		10,534,096		12,977,896		(2,443,800)	(18.8) %
Service:							
Service contracts		10,077,805		9,801,754		276,051	2.8 %
Installations		5,805,497		7,505,964		(1,700,467)	(22.7) %
Total service revenue		15,883,302		17,307,718		(1,424,416)	(8.2) %
Energy production		1,837,181		3,140,834		(1,303,653)	(41.5) %
Total Revenue	\$	28,254,579	\$	33,426,448	\$	(5,171,869)	(15.5) %

Revenues in 2020 were \$28,254,579 compared to \$33,426,448 in 2019, a decrease of \$5,171,869 or 15.5%. This decrease is the result of the decrease in energy production revenue due to the sale of several sites in Q4 2018 and Q1 2019 and decreases in Product and Service revenues. Product revenues in 2020 were \$10,534,096 compared to \$12,977,896 in 2019, a decrease of \$2,443,800 or 18.8%. This decrease from the year ended December 31, 2019 to 2020 is due primarily to a decrease in chiller sales of \$4,604,071, due to decreased unit volume, which is partially offset by an increase in cogeneration sales of \$2,160,271, due to increased unit volume. Our product mix, as well as product revenue, can vary significantly from period to period as our products are high dollar, low volume sales in which revenue is recognized upon shipment and to some degree were impacted by COVID-19 as energy and other constructions projects were delayed.

Revenues derived from our service centers, including installation activities, in 2020 were \$15,883,302 compared to \$17,307,718 for the same period in 2019, a decrease of \$1,424,416 or 8.2%. Our service operation grows with the sales of installed systems, since the majority of our product sales are accompanied by a service contract or time and materials

agreements. As a result our "fleet" of units being serviced by our service department grows with product sales. Certain installation projects, particularly those in New York City, were stopped due to COVID-19 in the third and fourth quarters of 2020 accounting for the decrease in installation revenues.

Energy Production revenues for the year ended December 31, 2020 were \$1,837,181 compared to \$3,140,834 for 2019, a decrease of \$1,303,653, or 41.5%. This reduction in Energy Production revenue is primarily due to the sale of several sites at the end of 2018 and the beginning of 2019 as discussed in "Note 5. Sale of Energy Producing Assets and Goodwill Impairment" and the impact of COVID-19 on several hotel, athletic and education customers, resulting in the temporary closure of these properties and a change to remote work and learning environments, resulting in decreased energy production revenues.

Cost of Sales

Cost of sales in 2020 was \$17,427,065 compared to \$20,947,696 in 2019, a decrease of \$3,520,631 or 16.8%. Our overall gross margin was 38.3% in 2020 compared to 37.3% in 2019, an increase of 1.0%. The decrease in cost of sales is due to the reduction of Products and Energy Production revenues and their related cost of sales, while the increase in gross margin percentage is due to an overall change in our revenue mix to increased higher margin service contract revenue.

Cost of sales for Energy Production for the year ended December 31, 2020 was \$1,169,645 compared to \$1,753,980 in 2019, decreased due to the reduction in sites we serviced in 2020 compared to 2019. Included in Energy Production cost of sales is depreciation expense associated with the energy producing sites, net of amortization of favorable and unfavorable contract liability of \$414,126.

Operating Expenses

Operating expenses decreased in 2020 to \$16,787,827 compared to \$17,137,333 in 2019, a decrease of \$349,506 or 2.0%. This decrease was mainly due to the reduction of general and administrative costs of \$69,057 and the reduction of the goodwill impairment charge of \$817,487 when comparing the year ended December 31, 2020 to 2019. See Note 9. "Goodwill" in the accompanying consolidated financial statements for further discussion of the impairment charges. General and administrative expenses decreased due to management's effort to control overhead costs, resulting in decreased payroll and related costs, decreased travel and travel related expenses due to COVID-19 travel restrictions, decreased professional fees and lower bank fees, partially offset by an increase in bad debt expense of \$608,397. In addition, selling expenses decreased in 2020 to \$2,593,168 compared to \$2,685,200 in 2019, a decrease of \$92,032 or 3.4%, due to reduced travel related expenses. Research and development expenses decreased in 2020 to \$767,323 compared to \$1,460,096 in 2019, a decrease of \$692,773 or 47.4%, as certain R&D projects were curtailed or stopped entirely as a consequence of COVID-19. There has not been a change in our focus with regards to research and development activities.

Gains on the sale of assets of \$11,367 were recognized in 2020 in connection with the sale of certain assets, which compares to a gain on the sale of assets of \$1,081,304 recognized in 2019 due to the sales of certain energy producing assets. See discussion in Note 5. "Sale of Energy Producing Assets and Goodwill Impairment".

Goodwill impairment relating to American DG Energy of \$2,875,711 and \$3,693,198 were recognized in the years ended December 31, 2020 and 2019, respectively. Further, asset impairment of \$251,906 was recognized in the year ended December 31, 2020, consisting of the impairment of American DG Energy long-lived assets of \$524,972, partially offset by the reversal of \$478,411 of unfavorable contract liability, and the derecognition of \$205,345 of patent application legal costs, which were abandoned.

Loss from Operations

Loss from operations for the year ended December 31, 2020 was \$5,960,313 compared to loss of \$4,658,581 in 2019, an increase in the loss from operations of \$1,301,732. The increase in the net loss from operations is primarily due to the decrease in revenues and gross margin experienced in the year ended December 31, 2020 and the \$1,069,937 decrease in the gain on sales of assets recognized in the year ended December 31, 2020, compared to the year ended December 31, 2019, partially offset by the decrease in operating expenses, due to the cost control instituted by management and a decrease in the goodwill impairment of \$2,875,711 recognized in 2020 as compared to the impairment charge of \$3,693,198 for the year ended December 31, 2019, as discussed in Note 9. "Goodwill" in the accompanying consolidated financial statements.

Other Expense, net

Other expense, net, for the year ended December 31, 2020 was \$226,707 compared to \$120,598 for the same period in 2019. Other income (expense) includes interest and other income of \$2,479, net of interest expense on debt of \$125,824 in 2020. For the same period in 2019, interest and other income was \$933 and interest expense was \$101,851. For the year ended December 31, 2020, other expense, net also includes the unrealized loss on securities of \$98,404 compared to \$19,680 for the same period in 2019, which represents the market value fluctuation of marketable equity securities as discussed in Note 15. "Fair value measurements".

Noncontrolling Interest

With the addition of American DG Energy, we have income and losses attributable to the noncontrolling interest we have in American DG Energy's 51% owned subsidiary, ADGNY, LLC. The noncontrolling interest share of ADGNY profits and losses was a \$66,684 loss for the year ended December 31, 2020 and \$85,354 in 2019. The noncontrolling interest recognized losses in the year ended December 31, 2020 and 2019, due to the goodwill impairment recognized in both years.

Net Loss Attributable to Tecogen Inc

Net loss for the year ended December 31, 2020 was \$6,150,507 compared to a net loss of \$4,709,019 for the comparable period in 2019. The increase in the net loss attributable to Tecogen, Inc. is primarily due to the decrease in revenues and gross margin experienced in the year ended December 31, 2020 and a \$1,069,937 decrease in gain on sales of assets recognized in the year ended December 31, 2020, compared to the year ended December 31, 2019, partially offset by the decrease in operating expenses, due to the cost control instituted by management and a decrease in the goodwill impairment of \$2,875,711 recognized in 2020 as compared to the impairment charge of \$3,693,198 for the year ended December 31, 2019, as we discussed in Note 9. "Goodwill" of the Notes to our Consolidated Financial Statements

Net Loss Per Share

Net loss per share for the year ended December 31, 2020 was \$0.25 compared to a \$0.19 loss per share for the same period in 2019. The increase in loss per share of \$0.06 for the year ended December 31, 2020 was due to the decrease in revenues and gross margin experienced in 2020 and the decrease in the gain on sales of assets recognized in the year ended December 31, 2019, partially offset by a decrease in operating expenses and the decrease in the goodwill impairment, as discussed above. The basic and diluted weighted average shares outstanding for the year ended December 31, 2020 was 24,850,258 compared to 24,839,957 for the same period in 2019.

Liquidity and Capital Resources

The following table presents a summary of our net cash flows from operating, investing and financing activities:

Cash Provided by (Used in)	Year End	
	December 31, 2020	December 31, 2019
Operating activities	\$ 1,407,237	\$ (4,484,242)
Investing activities	(217,765)	4,706,469
Financing activities	(576,929)	382,897
Change in cash and cash equivalents	\$ 612,543	\$ 605,124

Consolidated working capital at December 31, 2020 was \$13,379,263, compared to \$14,463,579 at December 31, 2019, a decrease of \$1,084,316 or 7.5%. Included in working capital were cash and cash equivalents of \$1,490,219 at December 31, 2020, compared to \$877,676 at December 31, 2019, an increase of \$612,543 or 69.8%. The decrease in consolidated working capital is due to decreased revenue which resulted in decreased accounts receivable and unbilled receivables of \$6,852,797, as well as increased inventories, offset by decreases in our accounts payable, accrued expenses and deferred revenue.

Net cash provided by (used in) operating activities for the years ended December 31, 2020 and 2019 were \$1,407,237 and (\$4,484,242), respectively, an increase of \$5,891,479 in net cash provided by operating activities. Our accounts receivable balance decreased by \$5,555,235 at December 31, 2020 compared to December 31, 2019, due to decreased revenue and the timing of billing, shipments, and collections. Unbilled revenues also decreased by \$1,154,562 in connection with turnkey projects as some revenues are recognized prior to contractual milestones for invoicing. Our inventory increased by \$849,367 as of December 31, 2020 compared to December 31, 2019 and other non-current assets decreased by \$825,817 as of December 31, 2020 as compared to December 31, 2019.

Accounts payable decreased by \$1,088,651 from December 31, 2019 to December 31, 2020. The decrease in accounts payable is related to timing and reduced volume of manufacturing and inventory purchase activities. Accrued expenses from operations decreased by \$524,358 as of December 31, 2020 compared to December 31, 2019 due to lower operating expenses. Deferred revenues from decreased by \$2,100,011 as of December 31, 2020 as compared to December 31, 2019.

During 2020, our cash flows used by investing activities were \$217,765, and included purchases of property and equipment of \$59,952, capital outlays related to intangible assets such as patents and product certifications of \$123,252, distributions to non-controlling interest holders of ADGNY of \$60,896 and, was partially offset by proceeds from the sale of certain long-lived assets of \$26,335.

During 2020, our net cash flows used in financing activities were \$576,929, which included the termination and repayment of the Webster Bank revolving line of credit of \$2,452,329, the receipt of proceeds from the First Draw Paycheck Protection Program loan of \$1,874,200 and proceeds from the exercise of stock options of \$1,200.

Our total product and installation backlog as of December 31, 2020 was \$8.3 million compared to \$22.4 million as of December 31, 2019. Backlog does not include maintenance contract service revenues or energy contract revenues.

As discussed above, on February 5, 2021, we obtained a Second Draw Paycheck Protection Program loan of \$1,874,269 pursuant to the CARES Act that is guaranteed by the SBA. We intend to use the loan proceeds for payroll, rent, utilities and other operating expenses, and expect to apply for forgiveness of the loan balance as permitted under the CARES Act. See Note 10. "Note Payable and Revolving Line of Credit, Bank."

At December 31, 2020 and 2019, we had cash and cash equivalents of \$1,490,219 and \$877,676, an increase of \$612,543 or 69.8%. During the year ended December 31, 2020, our revenues were negatively impacted due to customer order delays or deferrals; service delays due to customer facility closures, in some cases for extended periods and a reduction in our energy production revenues, due to business closures and increased remote work and learning environments. The extent to which the coronavirus will continue to impact our business, our financial results and our cash flows will depend on future developments, which are highly uncertain and cannot be predicted.

Based on our current operating plan, we believe existing resources, including cash and cash flows from operations, together with the \$1,874,269 of proceeds from our Second Draw Paycheck Protection Program loan, will be sufficient to meet our working capital requirements for the next twelve months. However, if we seek to grow our business, we expect that our cash requirements will increase. As a result, we may need to raise additional capital through a debt financing or an equity offering to meet our operating and capital needs for future growth.

Contractual Obligations and Commitments

We are obligated under operating leases for our Waltham, Massachusetts headquarters and our eleven leased service centers through August 2016. Future minimum lease commitments under non-cancellable operating leases as of December 31, 2020 were \$1,946,456. See Note 13. "Leases."

Seasonality

We expect that the majority of our heating systems sales will be operational for the winter and the majority of our chilling systems sales will be operational for the summer. Our cogeneration sales are not generally affected by the seasons. Our service team does experience higher demand in the warmer months when cooling is required. These chiller units are generally shut down in the winter and started up again in the spring. This chiller "busy season" for the service team generally runs from May through the end of September.

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

Disclosure in response to this item is not required of a smaller reporting company.

Item 8. Financial Statements and Supplementary Data.

The information required by this item is incorporated from Item 15 and pages F-1 through F-26 of this Annual Report on Form 10-K.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Management's Evaluation of Disclosure Controls and Procedures:

Our disclosure controls and procedures are designed to provide reasonable assurance that the control system's objectives will be met. Our management, including our Chief Executive Officer and Principal Financial Officer, after evaluating the effectiveness of our disclosure controls and procedures as of December 31, 2020 ("Evaluation Date"), have concluded that as of the Evaluation Date, our disclosure controls and procedures were not effective due to the material weakness in financial reporting relating to a small number of employees dealing with general controls over information technology. At the present time, our management has decided that the expense associated with a new system is justified and is in the process of implementing a system which will put the proper control procedures in place to remediate this weakness.

For these purposes, the term disclosure controls and procedures of an issuer means controls and other procedures of an issuer that are designed to ensure that information required to be disclosed by the issuer in the reports that it files or submits under Section 13(a) or 15(d) of the Securities Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and

procedures designed to ensure that information required to be disclosed by an issuer in the reports that it files or submits under Section 13(a) or 15(d) of the Securities Exchange Act is accumulated and communicated to the issuer's management, including its principal executive and principal accounting officers, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

Management's Annual Report on Internal Control over Financial Reporting:

Our management is responsible for establishing and maintaining adequate internal controls over financial reporting as defined in Rules 13a-15(f) under the Securities Exchange Act of 1934, as amended.

Our 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 in the United States of America. Our internal controls over financial reporting include those policies and procedures that:

- pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles;
- provide reasonable assurance that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and
- 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 consolidated financial statements.

Because of its inherent limitations, internal control over financial reporting, no matter how well designed, may not prevent or detect misstatements. Accordingly, even effective internal control over financial reporting can provide only reasonable assurance with respect to financial statement preparation. Also, the assessment of the effectiveness of internal control over financial reporting was made as of a specific date. 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.

Management, including our Chief Executive Officer and Principal Financial Officer, conducted an evaluation of our internal control over financial reporting based on the framework and criteria established in Internal Control—Integrated Framework, issued by the Committee of Sponsoring Organizations of the Treadway Commission. This evaluation included review of the documentation of controls, evaluation of the design effectiveness of controls, testing of the operating effectiveness of controls and a conclusion regarding this evaluation. Based on this evaluation, management concluded that our internal control over financial reporting was not effective as of December 31, 2020.

At December 31, 2020, we employed 79 active full-time employees and 2 part-time employees. Considerable progress has been made during 2020 with the addition of competent staff, competent consultants and changes in processes, however, due to the small number of employees dealing with general controls over information technology security and user access, management believes this constitutes a material weakness in financial reporting. At this time, management has decided that the expense associated with a new system is justified and is in the process of implementing a system which will put the proper control procedures in place to remediate these weaknesses.

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

This annual report does not include an attestation report of our registered independent public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by our registered

independent public accounting firm pursuant to rules of the Securities and Exchange Commission that permit us to provide only management's report in this Annual Report on Form 10-K.

Changes in Internal Control Over Financial Reporting

We are in the process of implementing a company-wide ERP system which will enable us to put increased control procedures in place to remediate internal control weaknesses. As of December 31, 2019, this implementation was in process and continued in the year ended December 31, 2020. There has been no change to our internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act) during the fourth quarter of the fiscal year ended December 31, 2020 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The following tables set forth our current directors and executive officers:

Directors

Name	Age	Position(s)	(1)	(2)	(3)
Angelina M. Galiteva	54	Chairperson of the Board and Director	x	x	
John N. Hatsopoulos	86	Lead Director			
Benjamin M. Locke	53	Director			
Ahmed F. Ghoniem	69	Director		x	x
Deanna Peterson	59	Director	x		x
Earl L. Lewis, III	77	Director		x	
Fred Holubow	82	Director	x		

(1) Member of Audit Committee

(2) Member of Compensation Committee

(3) Member of Nominating and Governance Committee

Executive Officers

Name	Age	Positions
Benjamin M. Locke	53	Chief Executive Officer and Principal Financial Officer
Robert A. Panora	66	President and Chief Operating Officer
John K. Whiting, IV	60	General Counsel and Secretary

Biographical information regarding each of our current directors and executive officers is set forth below. There are no family relationships between any present executive officers or directors.

Biographical Information Regarding Our Directors

Angelina M. Galiteva has been Chairperson of the board of directors since 2005. Ms. Galiteva is founder and Chair of the Board for the Renewables 100 Policy Institute, a non-profit entity dedicated to the global advancements of renewable energy solutions since 2008. She is also Chairperson at the World Council for Renewable Energy (WCRE), which focuses on the development of legislative and policy initiatives to facilitate the introduction and growth of renewable energy technologies since 2003. Since 2011, she has served on the Board of Governors of the California Independent System Operator (CA ISO), providing direction and oversight for the CA ISO which operates the California electricity grid. Also, she is a principal at New Energy Options, Inc., a company focusing on advancing the integration of sustainable energy solutions since 2006. She has also been a strategic consultant with Renewable Energy Policy and Strategy Consulting since 2004. Ms. Galiteva holds a M.S in Environmental and Energy Law, a J.D. from Pace University School of Law, and a B.S. from Sofia University in Bulgaria. Ms. Galiteva is currently serving a one-year term as Chairperson and as a director and serves as a member of our Audit and Compensation Committees.

Our board has determined that, based upon Ms. Galiteva's prior experience in the energy field, she is qualified to be a member of the board.

John N. Hatsopoulos has been a member of our board of directors since its founding in 2000 (other than the period between June 6, 2018 and February 1, 2019) and was our Co-Chief Executive Officer until March 29, 2018. He also was the Co-Chief Executive Officer of American DG Energy Inc., or ADGE, until ADGE merged with us in May of 2017, or the ADGE Merger, and was on the board of directors of ADGE until March 29, 2018. Mr. Hatsopoulos was the Chairman of

EuroSite Power Inc., a former affiliate of ours, from 2009 until 2016. Mr. Hatsopoulos was a co-founder of Thermo Electron Corporation, which is now Thermo Fisher Scientific. He was formerly the President and Vice Chairman of the Board of Directors of that company. He is a former Member of the Corporation of Northeastern University. He graduated from Athens College in Greece and holds a B.S. in history and mathematics from Northeastern University, as well as honorary doctorates in business administration from Boston College and Northeastern University. On February 1, 2019, Mr. Hatsopoulos was reappointed by the board as a director and he is currently serving a one-year term as Lead Director to identify and evaluate financing alternatives for us.

Our board has determined that, based upon Mr. Hatsopoulos extensive experience at leadership experience in senior positions at Thermo Electron Corporation and education, he is qualified to be a member of our board.

Benjamin M. Locke has been a member of our board of directors since June 2018. Mr. Locke was our Co-Chief Executive Officer from 2014 until March 29, 2018, and from that date until the present, our Chief Executive Officer. Mr. Locke was our Director of Corporate Strategy and was promoted to General Manager prior to his appointment as our Co-Chief Executive Officer. Effective as of June 5, 2020, Mr. Locke was appointed as Principal Financial Officer and Treasurer. In October 2014, Mr. Locke began serving as Co-Chief Executive Officer of ADGE and continued to serve as Co-Chief Executive Officer until the completion of the Merger. Previously, Mr. Locke was the Director of Business Development and Government Affairs at Metabolix, a bioplastics technology development and commercialization company. In that role, he was responsible for developing and executing plans for partnerships, joint ventures, acquisitions, and other strategic arrangements for commercializing profitable clean energy technologies. Prior to joining Metabolix in 2001, Mr. Locke was Vice President of Research at Innovative Imaging Systems, or IISI, a high-technology R&D company. At IISI, he drove the development and implementation of growth strategies for the funding of specialty electronic systems for the United States Government. Mr. Locke has a B.S. in Physics from the University of Massachusetts, a M.S. in Electrical Engineering from Tufts University, and an M.B.A. in Corporate Finance from Boston University. Mr. Locke is currently serving a one year term as a Tecogen director.

Our board has determined that, based upon Mr. Locke's prior experience and education, he is qualified to be a member of our board.

Ahmed F. Ghoniem has been a member of our board of directors since 2008. Dr. Ghoniem is the Ronald C. Crane Professor of Mechanical Engineering at MIT. He is also the Director of the Center for 21st Century Energy, and the head of Energy Science and Engineering at MIT, where he plays a leadership role in many energy-related activities, initiatives and programs. He joined MIT as an Assistant Professor in 1983. He is an associate fellow of the American Institute of Aeronautics and Astronautics, and Fellow of American Society of Mechanical Engineers. He was recently granted the KAUST Investigator Award. Dr. Ghoniem holds a Ph.D. in Mechanical Engineering from the University of California, Berkeley, and a M.S. and B.S. in Mechanical Engineering from Cairo University. Dr. Ghoniem is currently serving a one-year term as a Tecogen director, and is a member of our Nominating and Governance Committee and Compensation Committee.

Our board has determined that, based upon Mr. Ghoniem's prior experience as a Professor of Mechanical Engineering at MIT and his prior experience in the energy sector, he is qualified to be a member of the board.

Deanna Petersen has been a member of our board of directors since 2017. Ms. Petersen has been Chief Business Officer at AvroBio since January of 2016. She was Vice President of Business Development for Shire Human Genetic Therapies from 2009 until 2015, where she initiated and managed partnering, licensing and merger and acquisition activities worldwide. From 2002 to 2009, Ms. Petersen was Vice President of Business Development for Agenus Inc., and from 1998 to 2002 she was Vice President and Executive Director of Business Development at Coley Pharmaceutical Group, Inc. Ms. Petersen was on the board of ADGE until completion of the ADGE Merger. Ms. Petersen is on the board of directors for the Massachusetts Biotechnology Association and was previously the Treasurer of the board of directors for the Healthcare Business Women's Association, Boston Chapter. Ms. Petersen holds a B.S. in Biology from Iowa State University and a M.B.A. from the University of Iowa. Ms. Petersen is currently serving a one-year term as a Tecogen director and is the Chair of our Audit and Nominating and Corporate Governance Committees.

Our board has determined that, based upon Ms. Petersen's prior experience in senior operating positions at various companies where she demonstrated leadership capability and garnered extensive expertise involving complex financial matters, she is qualified to be a member of the board.

Earl R. Lewis III has served as Chairman of the board and as Chief Executive Officer and President of FLIR Systems from 2000 through May 2013, and since May 2013 as Chairman of the Board and as a senior consultant to FLIR Systems. Mr. Lewis also served as Chairman of the Board of Harvard Bio Science from 2013 through June 2018, as CEO and President of Thermo Instrument Systems from 1998 to 2000, as President in 1997, and as COO in 1996. Mr. Lewis also served as CEO and President of Thermo Optek Corporation from 1994 to 1996, as President of Thermo Jarrell Ash Corporation from 1988 to 1994,

and in senior operations and manufacturing roles at Thermo Jarrell Ash since 1984 and at other companies in previous years. Mr. Lewis holds a B.S. from Clarkson College of Technology. Mr. Lewis is currently serving a one-year term as a Tecogen director and serves as the Chair of our Compensation Committee.

Our board has determined that, based upon Mr. Lewis' extensive leadership experience in senior positions at FLIR Systems, Harvard Bio Science, Thermo Instrument Systems, Thermo Optek Corporation, Thermo Jarrell Ash, and elsewhere, he is qualified to be a member of the board.

Fred Holubow has been our director since June 6, 2020. He served as a director of ANI Pharmaceuticals, Inc. from 1999 through May 2018 where he served on the Board's Audit and Finance Committee. Mr. Holubow is, and since 1984 has been a General Partner of Starbow Partners, an investor in early stage healthcare ventures. In addition, Mr. Holubow serves as a Principal of Petard Risk Analysis, a position he has held since January 2012. From 2001 to December 2011 Mr. Holubow served as a Managing Director of William Harris Investors, Inc., a registered investment advisory firm. From 1982 to 2001 Mr. Holubow served as Vice President of Pegasus Associates, a registered investment advisory firm he co-founded. He specializes in analyzing and investing in pharmaceutical and biotechnology companies. Mr. Holubow also previously served on the board of directors of the following public companies: Micrus Endovascular Corporation, ThermoRetec Corporation, Savient Pharmaceuticals, Inc. (formerly Bio-Technology General Corp.), Gynex Pharmaceuticals, Inc., and Unimed Pharmaceuticals, Inc.

Our board has determined that, based on Mr. Holubow's significant experience on boards of directors (including audit committees) of public companies, his experience with investment advisors and his relationships in the investment community, and his experience with investment analysis and expertise relating to financial and accounting matters, he is qualified to be a member of the board.

There are no arrangements or understandings between any of our directors or executive officers and any other individuals regarding his or her selection as a director. There are no family relationships between any current executive officer, director, or director nominee in light of our business and structure.

There are no material proceedings to which any of our directors, officers or affiliates, any owner of record or beneficially of more than five percent of any class of our voting securities, or any associate of any such director, officer, affiliate or security holder is a party adverse to us or any of our subsidiaries or has a material interest adverse to us or any of our subsidiaries.

Biographical Information Regarding Our Executive Officers

Benjamin M. Locke has been our co-Chief Executive Officer from 2014 until March 29, 2018, and from that date until the present, our Chief Executive Officer. For more information regarding Mr. Locke, please see his biographical information under "Directors," above.

Robert A. Panora has been our Chief Operating Officer and President since the organization of Tecogen in 2000. In August of 2015, Mr. Panora began serving as Director of Operations of American DG Energy and continued to serve as Director of Operations until the completion of the ADGE Merger. On March 29, 2018, Mr. Panora was appointed as the sole director of ADGE. Before this role, since 1990, he had been General Manager of the Company's Product Group while a division of Thermo Electron Corporation and Manager of Product Development, Engineering Manager, and Operations Manager since 1984. Over his 31-year tenure with Tecogen and its predecessors, Mr. Panora has been responsible for sales and marketing, engineering, service, and manufacturing. Mr. Panora contributed to the development of Tecogen's first product, the CM-60 cogeneration system, and was Program Manager for the cogeneration and chiller projects that followed. Mr. Panora has had considerable influence on many aspects of the business, from building the employee team, to conceptualizing product designs and authoring many of the original business documents, sales tools, and product literature pieces. Mr. Panora has a B.S. and M.S. in Chemical Engineering from Tufts University.

John K. Whiting, IV has been the Company's General Counsel since January 2018, and Secretary of the Company since November 2019. Mr. Whiting has also served as General Counsel & CFO of Inspired Therapeutics LLC since April 2017. Previously, Mr. Whiting served as Vice President, General Counsel & Secretary of Vero Biotech LLC (previously known as GeNO LLC) from January 2012 to 2017, as Vice President, General Counsel & Secretary of Pharos LLC and Levitronix LLC from 2009 through 2011, as Vice President & General Counsel of American Renal Associates Inc. from 2002 to 2008, and as Associate General Counsel of Thermo Electron Corporation (now Thermo Fisher Scientific Inc.) from 1996 through 2002. Mr. Whiting holds a B.A. in Political Science and History from the University of Vermont, a J.D. from Boston University School of Law, and an MBA from F.W. Olin Graduate School of Business at Babson College.

Each executive officer is appointed by, and serves at the discretion of, our board. Our executive officers hold office until their successors are duly appointed, or until their earlier resignation or removal.

The board maintains an audit committee, compensation committee, and nominating and corporate governance committee. We may also establish special or other committees from time to time to consider matters at the request of the board. The current members of such committees are set forth in the table set forth above.

Corporate Governance

Our Board of Directors

The number of our directors is established by resolution of the board in accordance with our by-laws. The directors are elected to serve until the next succeeding annual meeting of stockholders or until the election and qualification of a successor or such director's earlier death, resignation, or removal.

Our certificate of incorporation and by-laws provide that directors may be removed only for cause and only by the affirmative vote of the holders of at least two-thirds of the votes that all stockholders would be entitled to cast in an election of directors, and that any vacancy on the Board, including a vacancy resulting from an increase in the number of directors, may be filled only by vote of a majority of our directors then in office.

Members of the board discussed various business matters informally on numerous occasions throughout the year. There were five formal board meetings during 2020 and they handled certain matters by unanimous written consent. All current directors attended all board meetings, except for Ms. Galiteva and Ms. Roosevelt each of whom missed one formal meeting. Independent directors endeavor to meet on a regular basis as often as necessary to fulfill their responsibilities, including at least twice annually in executive sessions without the presence of non-independent directors and management.

We have a policy of requiring our directors to attend our annual meeting of stockholders. However, due to the COVID-19 pandemic, only Mr. Locke attended our 2020 annual meeting of stockholders.

Board Leadership Structure and Role in Risk Oversight

We separate the roles of Chief Executive Officer and Chairperson in recognition of the differences between the two roles. Our Chief Executive Officer is responsible for setting our strategic direction and our overall leadership and performance. Our Chairperson provides guidance to the Chief Executive Officer, sets the agenda for board meetings, presides over meetings of the full board and leads all executive meetings of our independent directors. We are a small company with a small management team and have determined that the separation of these roles enhances high-level attention to our business. Our board has no lead independent director.

Our board oversees our risk management processes directly and through its committees. Our management is responsible for risk management on a day-to-day basis. The Audit Committee assists the board in fulfilling its oversight responsibilities with respect to risk management in the areas of financial reporting, internal controls and compliance with legal and regulatory requirements, and discusses policies with respect to risk assessment and risk management, including guidelines and policies to govern the process by which our exposure to risk is handled. The Compensation Committee assists the board in fulfilling its oversight responsibilities with respect to the management of risks arising from our compensation policies and programs. The Nominating and Governance Committee assists the board in fulfilling its oversight responsibilities with respect to the management of risks associated with board organization, membership and structure, succession planning for our directors, and corporate governance.

Committees of the Board of Directors

Our Board directs the management of our business and affairs and conducts its business through meetings of the Board and the following standing committees: Audit Committee, Compensation Committee, and Nominating and Corporate Governance Committee.

Audit Committee

The Audit Committee is presently composed of three of our independent directors:

- Ms. Deanna Petersen (Chair),
- Angelina M. Galiteva, and
- Mr. Fred Holubow

The Audit Committee assists the board in the oversight of the audit of our financial statements and the quality and integrity of our accounting, auditing and financial reporting processes. Also, the Audit Committee has the responsibility for reviewing the qualifications, independence and performance of our independent registered public accounting firm and is responsible for the appointment, retention, oversight and, where appropriate, termination of the independent registered public accounting firm. During fiscal year 2020, the Audit Committee held four meetings. The board has determined that each of the members of the Audit Committee meets the criteria for independence under Nasdaq listing standards, Section 10A-3 of the Securities Exchange Act of 1934, as amended, and that Ms. Petersen also qualifies as an "audit committee financial expert," as defined under rules adopted by the SEC. The board has adopted a written charter for the Audit Committee, which is reviewed

annually by the Audit Committee. The current Audit Committee Charter is available on the Company's web site, <http://investors.tecogen.com/audit-committee-charter>.

Compensation Committee

The Compensation Committee is presently composed of three of our independent directors:

- Mr. Earl Lewis (Chair),
- Ms. Angelina Galiteva, and
- Mr. Ahmed Ghoniem.

The principal functions of the Compensation Committee are reviewing with management cash and other compensation policies for employees, making recommendations to the board regarding compensation matters and determining compensation for the executive officers. Our Chief Executive Officer has been instrumental in the design and recommendation to the Compensation Committee of compensation plans and awards for our directors and executive officers including our President and Chief Operating Officer, Principal Financial Officer, and General Counsel. All compensation decisions for the Chief Executive Officer and all other executive officers are reviewed and approved by the Compensation Committee subject to ratification by the board. The Compensation Committee has the authority under its charter to engage the services of outside advisors, experts, and others to assist the Compensation Committee. In 2020, no compensation consultant was engaged for employee or executive compensation. During fiscal year 2020, the Compensation Committee held four formal meetings. The Board has determined that each of the members of the Compensation Committee meets the criteria for independence under the applicable NASDAQ listing standards. The current Compensation Committee Charter is available on the Company's web site at <http://investors.tecogen.com/compensation-committee-charter>.

Nominating and Corporate Governance Committee

The Nominating and Corporate Governance Committee is presently composed of two of our independent directors (Ms. Roosevelt was also a member of the Nominating and Governance Committee until June 2020):

- Ms. Deanna Petersen (Chair), and
- Mr. Ahmed Ghoniem

The Nominating and Governance Committee functions are to identify persons qualified to serve as members of the board, to recommend to the board persons to be nominated by the board for election as directors at the annual meeting of stockholders and persons to be elected by the board to fill any vacancies and recommend to the board persons to be appointed to each of its committees. Qualifications for consideration as a director nominee may vary according to the particular areas of expertise being sought as a complement to the existing composition of our board. However, minimum qualifications include high level leadership experience in business activities, breadth of knowledge about issues affecting us, experience on other boards of directors, preferably public company boards, and time available for meetings and consultation on company matters. In addition, the Nominating and Governance Committee is responsible for developing and recommending to the board a set of corporate governance guidelines applicable to us (as well as reviewing and reassessing the adequacy of such guidelines as it deems appropriate from time to time) and overseeing the annual self-evaluation of the board. The committee held one meeting in 2020. The charter of the Nominating and Governance Committee is available on our website at <http://investors.tecogen.com/nominating-and-governance-committee-charter>.

Nominations and Proposals of Stockholders

Our Nominating and Governance Committee identifies new director candidates through recommendations from members of the committee, other board members and our executive officers and will consider candidates who are recommended by security holders, as described below. Although the board does not have a formal diversity policy, the committee and the board will consider such factors as it deems appropriate to assist in developing a board and committees that are diverse in nature and comprised of experienced and seasoned advisors. These factors focus on skills, expertise or background and may include decision-making ability, judgment, personal integrity and reputation, experience with businesses and other organizations of comparable size, experience as an executive with a publicly traded company, and the extent to which the candidate would be a desirable addition to the board and any committees of the board.

Stockholders who wish to present a business proposal or nominate persons for election as directors at our annual meetings of stockholders must provide a notice of the business proposal or nomination in accordance with Section 1.11 of our by-laws, in the case of business proposals, or Section 1.10 of our by-laws, in the case of director nominations. In order to be properly brought before our annual meeting of stockholders, Sections 1.10 and 1.11 of our by-laws require that a notice of the business proposal the stockholder wishes to present, or the person or persons the stockholder wishes to nominate as a director, must be received at our principal executive office not less than 90 days, and not more than 120 days, prior to the first anniversary of our prior year's annual meeting. However, if the date of our annual meeting of stockholders occurs more than 20

days before or 60 days after the anniversary of the immediately preceding annual meeting of stockholders, a stockholder notice will be timely if it is received at our principal executive office by the later of (1) the 120th day prior to such annual meeting or (2) the close of business on the tenth day following the day on which public disclosure of the date of the meeting was made. To be in proper form, a stockholder's notice must include the specified information concerning the stockholder and the business proposal or nominee, as described in Sections 1.10 and 1.11 of our by-laws.

All proposals must be mailed to our principal executive offices and should be directed to the attention of our Corporate Secretary, Tecogen Inc., 45 First Avenue, Waltham, MA 02451.

The Nominating and Corporate Governance Committee will evaluate new director candidates in view of the criteria described above, as well as other factors the Committee deems to be relevant, through reviews of biographical and other information, input from others, including members of the Board and our executive officers, and personal discussions with the candidate when warranted by the results of these other assessments. The Committee will evaluate any director candidates recommended by security holders under the same process. In determining whether to recommend to the Board the nomination of a director who is a member of the Board, the Committee will review the Board performance of such director and solicit feedback about the director from other Board members.

Code of Conduct and Ethics

We have adopted a code of business conduct and ethics that applies to our directors, officers and employees. Our code of business conduct and ethics is intended to promote honest and ethical conduct, including the ethical handling of actual or apparent conflicts of interest between personal and professional relationships; full, fair, accurate, timely and understandable disclosure in reports and documents that we file with, or submit to, the SEC and in other public communications we make; compliance with applicable governmental laws, rules and regulations; prompt internal reporting of violations of the code of business conduct and ethics to an appropriate person or persons identified in the code of business conduct and ethics; and accountability for adherence to the code of business conduct and ethics. Our code of business conduct and ethics is available on our website at <http://ir.tecogen.com/governance-docs>. A printed copy of the code of business conduct and ethics is also available free of charge to any person who requests a copy by writing to our Corporate Secretary, at the address for our principal executive offices set forth above.

Director Communication Policy

A stockholder that desires to communicate directly with the board or one or more of its members concerning our affairs may direct the communication in writing to Tecogen Inc., attention Corporate Secretary, 45 First Avenue, Waltham, MA 02451. If such communication is intended for some or all of the members of the board, the mailing envelope must contain a clear notation indicating that the enclosed letter is a "Stockholder-Board Communication." The Corporate Secretary has been authorized to screen commercial solicitations and materials which pose security risks, are unrelated to the business or governance of the Company or are otherwise inappropriate. All such letters must identify the author as a stockholder and clearly state whether the intended recipients are all or individual members of the board. The Corporate Secretary will make copies of all such letters and circulate them to the appropriate director or directors.

Section 16(a) Compliance and Reporting

Until August 7, 2020, our directors, executive officers, and beneficial owners of 10% or more of our common stock ("10% holders") were required to report their initial ownership of our common stock and any subsequent changes in that ownership to the SEC ("Section 16 reports"). Such persons ceased to be subject to Section 16 reporting on August 7, 2020 ("effective date"), 90 days following the filing of a Form 25 by us with the SEC de-registering our shares under Section 12(b) of the Securities Exchange Act of 1934, as amended ("Securities Exchange Act"), following which we are subject to applicable reporting requirements pursuant to Section 15(d) of the Securities Exchange Act. Prior to the effective date, specific due dates for the filing of Section 16 reports were established and we are required to disclose any failure to file by these dates.

Based on our review of Forms 3, 4 and 5 filed electronically with the SEC by our executive officers, directors, and 10% holders during, or with respect to, our most recent fiscal year ended December 31, 2020, or prior fiscal years, there were no known late reports, transactions that were not reported, or known failures to file a required report by such persons, except that one Form 4 for Ms. Galiteva was filed late.

Item 11. Executive Compensation.

Summary Compensation Table

The following Summary Compensation Table sets forth compensation earned or awarded by our Chief Executive Officer, President and COO, Principal Financial Officer and other named executive officers during each of the two fiscal years ended December 31, 2020.

Name and principal position	Year	Salary (\$)	Bonus (\$)	Stock awards (\$)	Option awards (\$)(1)	All other compensation (\$)(6)	Total (\$)
Benjamin M. Locke	2020	\$ 210,000	\$ —	\$ —	\$ 87,000	\$ 966	\$ 297,966
Chief Executive Officer	2019	210,000	—	—	—	1,021	211,021
(PEO and Principal Financial Officer) (2)							
Robert A. Panora	2020	160,000	—	—	55,400	5,334	220,734
Chief Operating Officer and President (3)	2019	200,000	—	—	—	1,032	201,032
Bonnie J. Brown	2020	130,336	—	—	—	1,135	131,471
Former Chief Accounting Officer and Treasurer (Former Principal Financial Officer) (4)	2019	168,832	—	—	—	1,600	170,432
John K. Whiting, IV	2020	156,000	—	—	55,400	1,352	212,752
General Counsel and Secretary (5)	2019	165,600	—	—	51,150	1,352	218,102

- (1) The amounts in the "Option Awards" column reflect the aggregate grant date fair value of the awards computed in accordance with FASB ASC Topic 718. The assumptions used by us with respect to the valuation of stock and option awards are set forth in "Note 14 - Stockholders' Equity" to our Notes to the Consolidated Financial Statements.
- (2) Mr. Locke was appointed Principal Financial Officer and Treasurer on July 9, 2020, effective as of June 5, 2020.
- (3) Mr. Panora transitioned to a part-time role on January 11, 2020.
- (4) Ms. Brown transitioned to a part-time role on June 1, 2019, and provided approximately 36 hours of service per week during the period from June 1, 2019 through December 31, 2019. On May 15, 2020, Ms. Brown resigned as our Chief Accounting Officer.
- (5) Mr. Whiting has provided services on a part-time basis since he joined us in 2018 and provide approximately 30 hours of service per week in both 2020 and 2019.
- (6) Premiums paid by us for disability and group term life insurance.

Executive Officer Target Bonus Plan and Stock Option Grant

On July 9, 2020, the compensation committee recommended and our board of directors approved a target bonus of up to \$50,000 for Mr. Locke if both corporate and individual performance goals are achieved, and approved target bonuses of up to \$35,000 for each of Messrs. Panora and Whiting if both corporate and individual goals are achieved. The recommended bonus for Mr. Locke was approved by the board of directors as of July 15, 2020. For the year ended December 31, 2020, the board of directors determined that the performance objectives were not achieved, therefore no target bonuses were payable to Messrs. Locke, Panora or Whiting.

On July 9, 2020, the compensation committee and our board of directors approved the grant of non-qualified performance stock options to acquire 200,000 and 200,000 shares of our common stock to Messrs. Panora and Whiting, respectively. Each option exercisable at a price of \$0.71 per share and is for a term of 10 years from the date of grant. On July 15, 2020, the compensation committee and our board of directors approved the grant of a non-qualified stock option to acquire 300,000 shares of our common stock to Mr. Locke. Mr. Locke's option is exercisable at a price of \$0.74 and is for a term of 10 years from the date of grant.

In each case, the corporate performance goal for vesting of the first 50% of options consists of achieving one quarter of a positive Adjusted EBITDA goal, and the corporate performance goal for vesting of the second 50% of the options consists of achieving a positive Adjusted EBITDA goal in the following quarter.

Adoption of Change in Control Severance Benefit Plan

On July 9, 2020, our compensation committee of the board of directors adopted the Tecogen Inc. Change in Control Severance Benefit Plan ("Plan"). The Plan provides for up to 12 months of severance benefits for certain of our key management employees who are selected as plan participants by the plan administrator and who have executed a Change in Control Severance Benefit Plan Participation Notice. On July 9, 2020, Robert A. Panora, our President and Chief Operating Officer, and John K. Whiting, IV, our General Counsel and Secretary, were each designated as participants in the Plan, and on July 20, effective as of July 15, 2020, Mr. Locke was identified as a participant in the plan.

Under the Plan, upon the occurrence of certain termination events following a change in control of the Company, the executive participants would receive cash severance payments equal to 12 months' salary and bonus payments, continuation of certain health benefits, the acceleration of bonus awards, and immediate vesting of outstanding unvested options (including performance options) to acquire our common stock. The severance payments are required to be paid in a single lump sum. The Plan has a term of three years and will automatically extend for successive additional one-year terms unless we provide written notice at least six months in advance of a then current term.

An executive will be entitled to severance under the Plan only if there has been a "Change in Control" of the Company and the termination of employment or service occurs during the period that is three months prior to and 18 months following a change in control of the Company. Also, a participant's employment with the Company must be terminated by a participant for "Good Reason" or be an "Involuntary Termination Without Cause" by the Company, as those terms are defined in the Plan. In order to be eligible to receive severance benefits under the Plan, an executive must comply with the terms of the Plan, including the release and non-revocation of claims in favor of the Company and certain confidentiality, non-compete, non-solicitation, and non-disparagement covenants during and following termination of employment. The Plan will be administered by the compensation committee of the board of directors (or by the full board of directors or such other committee as the board may designate).

Potential Payments Upon Termination or Change in Control

The following table describes the estimated compensation that Messrs. Locke, Panora, and Whiting would be entitled to upon (i) termination of the Named Executive Officer by us without "cause," or (ii) termination by the Named Executive Officer for "good reason," excluding certain changes in control involving Tecogen. The estimated incremental compensation assumes the triggering event had occurred on December 31, 2020. Benefits generally available to all employees are not included in the table. The actual amount of compensation can only be determined at the time of termination.

Name	Change of Control Severance Payable (1)	Target Bonus Payable (2)	COBRA Benefits Payable (3)
Benjamin M. Locke	\$210,000	\$50,000	\$25,912
Robert A. Panora	160,000	35,000	25,912
John K. Whiting, IV	156,000	35,000	15,838

(1) We are required to issue a lump-sum payment to Messrs. Locke, Panora and Whiting equal to their annual base salary then in effect upon termination.

(2) We are required issue a lump-sum payment to Messrs. Locke, Panora and Whiting equal to their target bonus for the fiscal year in which the termination occurs prorated for the portion of the fiscal year preceding the date of termination.

(3) Represents estimated out-of-pocket COBRA health premium expenses to be paid by us in a lump-sum on behalf of Messrs. Locke, Panora and Whiting over the twelve-month period after termination.

See "*Employment Contracts and Termination of Employment and Change in Control Arrangements*" below for the terms of certain agreements and change-in-control provisions.

Executive Officer Outstanding Equity Awards at Fiscal-Year End

The following table sets forth information with respect to outstanding equity awards held by our executive officers as of December 31, 2020.

Name		Option awards				Stock awards	
		Number of securities underlying unexercised options (#) exercisable	Number of securities underlying unexercised options (#) unexercisable	Option exercise price (\$)	Option expiration date	Number of shares of stock that have not vested (#)	Market value of shares of stock that have not vested (\$)
Benjamin M. Locke	(1)	37,500	—	\$ 3.20	6/3/2023	—	—
	(2)	62,500	—	\$ 4.96	12/17/2024	—	—
	(3)	100,000	—	\$ 4.96	12/17/2024	—	—
	(4)	9,200	—	\$ 10.33	11/19/2024	—	—
	(5)	18,400	—	\$ 5.65	12/11/2024	—	—
	(6)	9,200	—	\$ 5.65	6/10/2025	—	—
	(7)	100,000	100,000	\$ 3.68	5/31/2028	—	—
	(8)	—	300,000	\$ 0.74	7/15/2030	—	—
Robert A. Panora	(9)	125,000	—	\$ 2.60	2/24/2021	—	—
	(10)	12,723	—	\$ 0.79	2/12/2026	—	—
	(11)	—	200,000	\$ 0.71	7/9/2030	—	—
John K. Whiting, IV	(12)	7,500	2,500	\$ 2.50	1/16/2028	—	—
	(13)	25,000	25,000	\$ 3.80	12/11/2028	—	—
	(14)	12,500	37,500	\$ 3.76	6/11/2029	—	—
	(15)	—	200,000	\$ 0.71	7/9/2030	—	—

(1) Includes stock option award granted on June 3, 2013, with 25% of the options vesting on June 3, 2014 and then an additional 25% of the options vesting on each of the subsequent three anniversaries, subject to Mr. Locke's continued employment and subject to acceleration of vesting upon a change in control.

(2) Includes stock option award granted on December 18, 2014, with 25% of the options vesting on December 18, 2015 and then an additional 25% of the options vesting on each of the subsequent three anniversaries, subject to Mr. Locke's continued employment and subject to acceleration of vesting upon a change in control.

(3) Includes stock option award granted on December 18, 2014, with the options vesting if we achieve a positive adjusted EBITDA for the year ended 2015, modified in December 2015 to provide that 25% of the options vest on December 18, 2015 and an additional 25% of the options vest on each of the subsequent three anniversaries subject to Mr. Locke's continued employment and subject to acceleration of vesting upon a change in control.

(4) Includes stock option award granted November 19, 2014 in connection with Mr. Locke's service with ADGE. Upon completion of the ADGE Merger, all ADGE options were exchanged for fully vested options of the Company according to an exchange ratio. The exchange ratio affected the number of Tecogen options received.

(5) Includes stock option award granted December 11, 2014 in connection with Mr. Locke's service with ADGE. Upon completion of the ADGE Merger, all ADGE options were exchanged for fully vested options of the Company according to an exchange ratio. The exchange ratio affected the number of Tecogen options received.

(6) Includes stock option award granted June 6, 2015 in connection with Mr. Locke's service with ADGE. Upon completion of the ADGE Merger, all ADGE options were exchanged for fully vested options of Tecogen according to an exchange ratio. The exchange ratio affected the number of Tecogen options received.

(7) Includes stock option award granted May 31, 2018 in connection with Mr. Locke's service with us, with 25% of the options vesting on May 31, 2019 and then an additional 25% of the options vesting on each of the subsequent three anniversaries, subject to Mr. Locke's continued employment and subject to acceleration of vesting upon a change in control.

(8) Includes stock option award granted on July 15, 2020, that provides that 50% of the options vest once we achieve Adjusted EBITDA of not less than 2% of revenue for two consecutive quarters and the remaining 50% of the options vest once we have achieved Adjusted EBITDA of 3% for four consecutive quarters, subject to Mr. Locke's continued employment and subject to acceleration of vesting upon a change in control.

- (9) Includes stock option award granted on February 15, 2011, with 25% of options vesting on February 15, 2012 and an additional 25% of the options vesting on each of the subsequent three anniversaries, subject to Mr. Panora's continued employment and subject to acceleration of vesting upon a change in control.
- (10) Includes stock option award granted on May 12, 2016 in connection with the Ilios Merger. Upon completion of the Ilios Merger all option holders of Ilios Inc. received fully vested options of Tecogen according to an exchange ratio, where every 7.86 options of Ilios Inc., were exchanged for 1 fully vested option of Tecogen.
- (11) Includes stock option award granted on July 9, 2020, that provides that 50% of the options vest once we achieve Adjusted EBITDA of not less than 2% of revenue for two consecutive quarters and the remaining 50% of the options vest once we have achieved Adjusted EBITDA of 3% for four consecutive quarters, subject to Mr. Panora's continued employment and subject to acceleration of vesting upon a change in control.
- (12) Includes stock option award granted January 16, 2018 in connection with Mr. Whiting's service with us, with 25% of the options vesting on January 16, 2019 and then an additional 25% of the options vesting on each of the subsequent three anniversaries, subject to Mr. Whiting's continued employment and subject to acceleration of vesting upon a change in control.
- (13) Includes stock option award granted December 11, 2018 in connection with Mr. Whiting's service with us, with 25% of the options vesting on December 11, 2019 and then an additional 25% of the options vesting on each of the subsequent three anniversaries, subject to Mr. Whiting's continued employment and subject to acceleration of vesting upon a change in control.
- (14) Includes stock option award granted June 11, 2019 in connection with Mr. Whiting's service with us, with 25% of the options vesting on June 11, 2020 and then an additional 25% of the options vesting on each of the subsequent three anniversaries, subject to Mr. Whiting's continued employment and subject to acceleration of vesting upon a change in control.
- (15) Includes stock option award granted on July 9, 2020, that provides that 50% of the options vest once we achieve Adjusted EBITDA of not less than 2% of revenue for two consecutive quarters and the remaining 50% of the options vest once we have achieved Adjusted EBITDA of 3% for four consecutive quarters, subject to Mr. Whiting's continued employment and subject to acceleration of vesting upon a change in control.

Director Compensation

We did not pay any compensation to our non-employee directors for serving as directors in 2020. Non-employee directors are eligible to receive stock or option awards under our equity incentive plan. We reimburse all of our non-employee directors for reasonable travel and other expenses incurred in attending Board and committee meetings. Any director who is also one of our employees receives no additional compensation for serving as a director.

The following table shows information regarding the compensation earned or paid during 2020 to non-employee directors who served on the board during the year:

Name	Fees earned or paid in cash (\$)	Stock Awards (\$)	Options Awards (\$)	Non-equity incentive compensation earnings (\$)	Nonqualified deferred compensation earnings (\$)	All other compensation (\$)	Total (\$)
Angelina M. Galiteva	\$ —	\$ —	27,700	\$ —	\$ —	\$ —	27,700
John N. Hatsopoulos (1)	1	—	—	—	—	—	1
Deanna Peterson	—	—	27,700	—	—	—	27,700
Ahmed F. Ghoniem	—	—	27,700	—	—	—	27,700
Earl R. Lewis	—	—	27,700	—	—	—	27,700
Laurence Garcia Roosevelt (2)	—	—	—	—	—	—	—
Fred Holubow (3)	—	—	27,700	—	—	—	27,700

- (1) Mr. Hatsopoulos is entitled to the benefits set forth in an Advisory Agreement, dated January 3, 2018, as amended on July 22, 2019, including \$1 in cash compensation, the continuation of certain employee benefits, use of an office at our headquarters, the services of an administrative assistant, and reimbursement of certain travel expenses. The July 22, 2019 amendment extended the Advisory Agreement until May 2024 provided Mr. Hatsopoulos continues to provide services to us.
- (2) Ms. Roosevelt resigned as a director effective June 5, 2020 upon the appointment of Mr. Holubow.
- (3) Mr. Holubow was elected to the Board of Directors at our 2020 Annual Meeting of Stockholders (the "Annual Meeting") held on June 5, 2020

Compensation Committee Interlocks and Insider Participation

During fiscal year 2020, none of our executive officers served as a member of the board of directors or compensation committee, or other committee serving an equivalent function, of any other entity that has one or more of its executive officers serving as a member of our Board or Compensation Committee. None of the current members of the Compensation Committee of our Board has ever been our employee.

Employment Contracts and Termination of Employment and Change-in-Control Arrangements

None of our executive officers, other than Mr. John Hatsopoulos, has an employment contract, other than stock and option awards that contain certain change-in-control provisions such as accelerated vesting due to acquisition. In the event that an acquisition that is not a private transaction occurs while the optionee maintains a business relationship with the us and the option has not fully vested, the option will become exercisable for 100% of the shares as to which it has not vested with such vesting to occur immediately prior to the closing of the acquisition.

On July 9, 2020, Robert A. Panora, President and Chief Operating Officer of the Company, and John K. Whiting, IV, General Counsel and Secretary of the Company, were each designated as participants in the Plan, and on July 20, effective as of July 15, 2020, Mr. Locke was identified as a participant in the plan. Messrs. Locke, Panora, and Whiting would be entitled to 12 months of severance benefits under the conditions set forth in the Plan.

The stock and option awards that would vest for each named executive officer if a change-in-control were to occur are disclosed under our *Outstanding Equity Awards at Fiscal Year-End Table*. Our stock and option awards contain certain change-in-control provisions. Descriptions of those provisions are set forth below:

Stock Awards: Change-in-Control Definition

For the purposes of our stock awards, change-in-control shall mean (a) the acquisition in a transaction or series of transactions by a person (such term to include anyone deemed a person under Section 13(d)(3) of the Securities Exchange Act), other than us or any of our subsidiaries, or any employee benefit plan or related trust we or a subsidiary maintain, of beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Securities Exchange Act) of 50% or more of the combined voting power of our then outstanding voting securities entitled to vote generally in the election of directors or (b) the sale or other disposition of all or substantially all of our assets in one transaction or series of related transactions.

Option Awards Change-in-Control Definition

For the purposes of our option awards, change-in-control shall mean merger (or reverse merger), consolidation, or other similar event or the sale or lease of all or substantially all of our assets. Upon a change-in-control, while the optionee maintains a business relationship with us and the option has not fully vested, the option shall become exercisable for 100% of the then number of shares as to which it has not vested, such vesting to occur immediately prior to the closing of the acquisition.

Advisory Agreement

On January 3, 2018, we entered into an Advisory Agreement with John N. Hatsopoulos, a member of the board and a principal stockholder. The Advisory Agreement provides that Mr. Hatsopoulos would resign as a member of the board at our 2018 Annual Meeting of Stockholders or June 30, 2018, whichever comes first, and that Mr. Hatsopoulos would remain an advisor to our board and an employee in our Investors Relations Department. We agreed to pay him a nominal salary of \$1.00 annually and that he would receive the same benefits as other similarly situated employees as well as administrative support for the duration of the agreement. Mr. Hatsopoulos was not nominated for election as a director at the June 6, 2018 Annual Meeting of Stockholders, but on February 1, 2019, he was reappointed by our board of Directors. On July 22, 2019 the Advisory Agreement with Mr. Hatsopoulos was modified to provide that we would continue to provide the employee benefits contemplated by the Advisory Agreement until March 29, 2024, provided that Mr. Hatsopoulos continues to provide the advisory services contemplated by the agreement.

Our 2006 Stock Incentive Plan

Our 2006 Stock Incentive Plan was originally adopted by us on December 22, 2005, and subsequently amended by us to extend the expiration date or increase or decrease the number of shares reserved under the plan for grant and issuance (as amended, "Plan"). The Compensation Committee of our board of directors is authorized to administer the Plan and to make grants and issuances of incentive stock options ("ISOs") to our officers and employees to purchase our shares of common stock and to make grants or awards of non-qualified stock options ("NQSOs") and stock awards ("Stock Awards") in the form of bonus shares, deferred stock awards, performance share awards, or restricted stock grants to our officers, employees, directors, advisors, and consultants. An aggregate of 3,838,750 shares of our common stock are reserved for issuance under the Plan.

Stock options granted under the Plan allow a grantee to purchase a fixed number of shares of our common stock at a fixed exercise price. Such exercise price may not be less than the fair market value (or 110% thereof for ISOs issued to a holder of 10% or greater beneficial ownership) of the shares on the date the option is granted. Stock options granted pursuant to the Plan vest pursuant to the terms of each individual option grant. The options may vest on a single date or over a period of time but normally they do not vest unless the grantee is still employed by us or our director on the vesting date. Generally, for all employees, the options vest 25% each year during the 4 years following the date of grant. Stock options granted to independent members of the board vest 25% each year during the 4 years following the date of grant. Any unvested portion of such options immediately vest and become exercisable upon a change in control of Tecogen as defined in the Plan. The options are not transferable except by will or domestic relations order. The options are exercisable at a price per share of not less than the fair market value of the underlying shares on the date of the grant. The number of shares remaining available for future issuance under the Plan as of December 31, 2020 and 2019, were 761,812 and 1,906,180, respectively.

The purpose of the Plan is to foster our success and the success of our subsidiaries and affiliates by providing incentives to employees, directors, officers, advisors, and consultants to promote our long-term financial success. The Plan permits us to compensate and award employees, directors, officers, advisors and consultants through the issuance of certain options, RSAs, RSRs, and stock awards in addition, or as an alternative, to the incentive and non-qualified stock options that may be awarded under the 2006 Plan. As amended and restated on November 1, 2016, the 2006 Plan terminates on January 1, 2026, and no award may be made after that date, however, awards made before that date may extend beyond that date. If an award under the 2006 Plan is cancelled, expires, forfeited, settled in cash or otherwise terminates without being exercised in full, the shares of common stock not acquired pursuant to the award will again become available for issuance under the 2006 Plan.

Our board of directors has delegated its authority to administer the Plan to the Compensation Committee. Subject to the provisions of the 2006 Plan, the committee has the power to:

- determine:
 - the employees to whom ISOs may be granted
 - to whom NQSO, awards of restricted stock may be granted
 - the time or times at which options or awards of stock may be granted or restricted stock are made
 - determine the exercise price of shares subject to each option and the purchase price of shares subject to each restricted stock purchase award
 - whether an option granted shall be an ISO or a NQSO
 - the time or times when or what conditions must be satisfied before each option shall become exercisable and the duration of the exercise period
 - whether restrictions such as transfer restrictions, repurchase options, and "drag along" rights and rights of first refusal are to be imposed on shares subject to options, Awards and restricted stock purchase awards and the nature of such restrictions, if any
- impose such other terms and conditions with respect to capital stock issued pursuant to an award not inconsistent with the terms of the Plan as it deems necessary or desirable
- interpret the Plan and prescribe and rescind rules and regulations relating to it

Our board may delegate to one of our officers who is also a member of the board the board's or Committee's authority and duties with respect to the granting of awards to individuals who are not subject to the reporting and other provisions of Section 16 of the Securities Exchange Act of 1934, as amended, or "covered employees" within the meaning of Section 162(m) of the Internal Revenue Code of 1986, as amended ("Code"), subject to such limitations as the board or the Committee deems appropriate, including as to the amount of awards granted, the exercise price of any option, the purchase price of other stock rights, and the setting of vesting schedules or criteria.

The Compensation Committee determines all awards to non-employee directors and such awards are not subject to management's discretion. From time to time, the committee may set the amount and the type of award that will be granted to non-employee directors on a periodic, nondiscriminatory basis, including pursuant to any plan adopted by the Compensation Committee or Board for the compensation of non-employee directors. The committee may set additional awards to be granted to non-employee directors also on a periodic, nondiscriminatory basis based on one or more of the following criteria: (i) service as the chairperson of a board committee; (ii) service as chairman of the board; (iii) the number or type of board committees on which a director serves; or (iv) the first selection or appointment of an individual to the board.

ISOs granted under the Plan are evidenced by a stock option agreement in a form consistent with the provisions of the Plan. Each option expires on the earliest of ten (10) years from the date it is granted, up to one year after the optionee dies or becomes disabled, or 90 days after termination of employment but in any event no later than the date set forth in the option agreement. However, no ISO granted to an optionee who, at the time such option is granted, owns stock possessing more than ten (10) percent of the total combined voting power of all classes of stock of our stock, shall be exercisable after the expiration of five (5) years from the date such option is granted.

To exercise an option, the participant, in accordance with the relevant option agreement, must provide us with a written notice setting forth the number of options being exercised and their underlying shares, and tender an amount equal to the total exercise value of the options being exercised. The right to purchase shares is cumulative so that once the right to purchase any shares has vested, those shares or any portion of those shares may be purchased at any time thereafter until the expiration or termination of the option. ISOs and NQSOs that are not exercised in accordance with the terms and provisions of the stock option agreement will expire as to any then unexercised portion. Stock options that expire, are cancelled, or forfeited will again become available for issuance under the Plan. The aggregate number of shares and the number of shares in an award (as well as the option price) may be adjusted in the event our shares are divided or subdivided into a greater or lesser number of shares, in the event of a stock dividend, upon our acquisition or change in control, upon our recapitalization or reorganization, or our outstanding shares are increased, decreased or exchanged through merger or other stock transaction. Except as specifically provided in an option agreement, options granted under the Plan may not be sold, pledged, transferred or assigned in any way, except by will or by the laws of descent and distribution, and during the lifetime of a participant to whom the ISOs is granted, and the ISOs may only be exercised by the participant.

NQSOs may be granted pursuant to non-qualified stock option award agreements and certificates adopted by the board, as amended by the Compensation Committee. The Compensation Committee determines the terms of each stock option granted under the Plan, including the number of shares covered by an option, exercise price and means of payment, the vesting and exercisability of the option, and restrictions on transfer and the term. The exercise price of an option granted under the Plan may not be less than the fair market value on the date of grant. The options expire on the earliest of ten years after the date of grant, 90 days after the death or disability of the recipient, immediately upon termination of employment or service other than by death or disability, or such date as the Compensation Committee determines. The Compensation Committee, in its sole discretion, may change by agreement the post-termination rights of a recipient, including accelerating the date or dates on which the option becomes vested and is exercisable following termination of employment or service, or extend the period. Options granted under the plan may be exercised by delivering cash, a cashless exercise, or by delivering to us the proceeds of shares of our common stock issuable under an option.

The terms of any award of restricted stock shall be set forth in an award agreement and the terms of a restricted stock purchase award will be set forth in a restricted stock purchase agreement. The Compensation Committee determines the terms of each such award under the Plan, including the number of shares covered by the award, purchase price and means of payment, the vesting of the award, and restrictions on transfer and the term. Generally, prior to the termination of the restrictions, award recipients may not sell or otherwise transfer the shares. In the case of a restricted stock purchase award, upon termination of any restrictions and vesting of the award shares, the participant will be required to pay for the shares covered by the award at the purchase price set forth in the award agreement.

The board may amend, terminate, or modify the Plan at any time, without shareholder approval, unless required by the Code, pursuant to Section 16 under the Securities Exchange Act of 1934, as amended, or by any national securities exchange or system on which our common stock is then listed or reported, or by any regulatory body.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The following table shows, as of March 9, 2021, the beneficial ownership of our common stock by (i) any person we know who is the beneficial owner of more than 5% of our common stock, (ii) each of our directors and executive officers, and (iii) all of our directors and executive officers as a group. As of March 9, 2021, 24,850,261 shares of our common stock were issued and outstanding.

Name of Beneficial Owner	Number of Shares Beneficially Owned ⁽¹⁾		Percent of Common Stock Beneficially Owned
Named executive officers and directors:			
Benjamin M. Locke, CEO, PFO and Director	342,018	(2)	1.38 %
Robert A. Panora, President	137,723	(3)	0.55 %
John K. Whiting, IV, General Counsel and Secretary	45,636	(4)	*
John N. Hatsopoulos, Lead Director	2,347,596	(5)	9.45 %
Angelina M. Galiteva, Director and Chairperson	75,000	(6)	*
Ahmed F. Ghoniem, Director	62,723	(7)	*
Deanna Petersen, Director	9,200	(8)	*
Earl R. Lewis, III, Director	250,000	(9)	1.01 %
Fred Holubow, Director	—		*
All named executive officers and directors as a group (9 persons)	3,269,896		13.16 %
Stockholders owning more than 5% of our common stock:			
Estate of George N. Hatsopoulos	2,744,385	(10)	11.04 %
The Hatsopoulos 2012 Family Trust	2,250,000	(11)	9.05 %
The John N. Hatsopoulos Family Trust	1,620,664	(12)	6.52 %
Tryfon Natsis and Despina Pantopoulou Natsis	1,616,673	(13)	6.51 %

* Less than 1%.

- (1) Beneficial ownership is determined in accordance with Rule 13d-3 under the Securities Exchange Act and is generally determined by voting power and/or investment power with respect to securities. Unless otherwise noted, all shares of common stock listed above are owned of record by each individual named as beneficial owner and such individual has sole voting and dispositive power with respect to the shares of common stock owned by each of them. Such person or entity's percentage of ownership is determined by assuming that any options or convertible securities held by such person which are exercisable within 60 days from the date hereof have been exercised or converted as the case may be. Except as otherwise indicated, the address of each shareholder is c/o Tecogen Inc., 45 First Avenue, Waltham, Massachusetts 02451.
- (2) Includes: (a) 5,218 shares held directly by Mr. Locke; (b) 36,800 shares underlying currently exercisable options granted pursuant to the 2005 Plan; and (c) 300,000 shares underlying currently exercisable options granted pursuant to the 2006 Plan. Does not include the following shares underlying options granted pursuant to the 2006 Plan: (A) 100,000 shares underlying options that are not currently exercisable, 50,000 of which will vest and become exercisable on May 31, 2021, and 50,000 of which will vest and become exercisable on May 31, 2022; and (B) 300,000 shares underlying options that are not currently exercisable which will vest and become exercisable as follows: (i) 50% of such options will vest and become exercisable upon Tecogen reporting two consecutive fiscal quarters of positive adjusted Earnings Before Income Taxes, Depreciation and Amortization (EBITDA) in excess of 2% of revenue; and (ii) 50% of such options will vest and become exercisable upon Tecogen reporting four consecutive fiscal quarters of positive adjusted Earnings Before Income Taxes, Depreciation and Amortization (EBITDA) in excess of 3% of revenue ("*Executive Option Vesting Schedule and Criteria*").
- (3) Includes: 137,723 shares underlying currently exercisable options granted pursuant to the 2006 Plan. Does not include 200,000 shares underlying options granted pursuant to the 2006 Plan that are not currently exercisable which will vest and become exercisable as follows: (i) 50% of such options will vest and become exercisable upon Tecogen reporting two consecutive fiscal quarters of positive adjusted Earnings Before Income Taxes, Depreciation and Amortization (EBITDA) in excess of 2% of revenue; and (ii) 50% of such options will vest and become exercisable upon Tecogen reporting four consecutive fiscal quarters of positive adjusted Earnings Before Income Taxes, Depreciation and Amortization (EBITDA) in excess of 3% of revenue ("*Executive Option Vesting Schedule and Criteria*").
- (4) Includes: (a) 636 shares held directly by Mr. Whiting; and (b) 45,000 shares underlying currently exercisable options granted pursuant to the 2006 Plan. Does not include the following shares underlying options granted pursuant to the 2006 Plan: (A) 7,500 shares underlying options that are not currently exercisable, 2,500 of which will vest and become exercisable on January 16, 2022; (B) 25,000 shares underlying options that are not currently exercisable, 12,500 of which will vest and become exercisable on December 11, 2021, and 12,500 of which will vest and become exercisable on December 11, 2022; (C) 37,500 shares underlying options that are not currently exercisable, 12,500 of which will vest and become exercisable on June 11, 2021, 12,500 of which will vest and become exercisable on June 11, 2022, and 12,500 of which will vest and become exercisable on June 11, 2023, and (D) 200,000 shares underlying options which will vest and become exercisable in accordance with the Executive Option Vesting Schedule and Criteria.
- (5) Based solely upon: (a) the Schedule 13G/A filed by Mr. John N. Hatsopoulos on March 26, 2019 and the Form 4 filed by Mr. Hatsopoulos on April 24, 2020. Based on the Schedule 13G/A and Form 4/A the beneficial ownership of Mr. Hatsopoulos is the following: (1) 180,351 shares of common stock held directly by Mr. Hatsopoulos; (2) 1,039,480 shares of common stock held by the Nia M. Hatsopoulos Jephson 2011 Irrevocable Trust, for which Mr. Hatsopoulos is the trustee; (3) 1,039,480 shares of common stock held by the Alexander J. Hatsopoulos 2011 Irrevocable Trust, for which Patricia Hatsopoulos, Mr. Hatsopoulos' wife, is the trustee; (4) 3,325 shares of common stock held in an individual retirement account for Mrs. Hatsopoulos; (5) 44,012 shares held in Pat Ltd., a joint account maintained by Mr. Hatsopoulos and Mrs. Hatsopoulos; (6) 28,225 shares of common stock held by Mrs. Hatsopoulos; and (7) 12,723 shares of common stock underlying currently exercisable options granted pursuant to the 2006 Plan. Does not include the following shares with respect to which Mr. Hatsopoulos disclaims beneficial ownership: (1) 808,339 shares of Common stock held in The John N. Hatsopoulos 1989 Family Trust for the benefit of Nia Maria Hatsopoulos, of which Ann Marie Pacheco is the sole trustee; (2) 812,325 shares of common stock held in The John N. Hatsopoulos 1989 Family Trust for the benefit of Alexander J. Hatsopoulos, or which Ms. Ann Marie Pacheco is the sole trustee; and (3) 571,538 shares of common stock held in The John N. Hatsopoulos Family Trust 2007, of which Mr. Yiannis Monovoukas is the sole trustee. The address of the holder is 45 First Avenue, Waltham, MA 02451.
- (6) Includes: (a) 50,000 shares held directly by Ms. Galiteva; and (b) 25,000 shares underlying currently exercisable options granted pursuant to the 2006 Plan. Does not include 100,000 shares underlying options granted pursuant to the 2006 Plan that are not currently exercisable which will vest and become exercisable as to 25% of such options commencing on each of the first, second, third and fourth anniversaries of the date of grant, July 9, 2020.
- (7) Includes: (a) 25,000 shares held directly by Mr. Ghoniem; and (b) 37,723 shares underlying currently exercisable options granted pursuant to the 2006 Plan. Does not include 100,000 shares underlying options granted pursuant to the 2006 Plan that are not currently exercisable which will vest and become exercisable as to 25% of such options commencing on each of the first, second, third and fourth anniversaries of the date of grant, July 9, 2020.
- (8) Represents shares underlying currently exercisable options granted pursuant to the 2005 Plan. Does not include 100,000 shares underlying options granted pursuant to the 2006 Plan that are not currently exercisable which will vest and become exercisable as to 25% of such options commencing on each of the first, second, third and fourth anniversaries of the date of grant, July 9, 2020.
- (9) Includes 250,000 shares held directly by Mr. Lewis. Does not include 100,000 shares underlying options granted pursuant to the 2006 Plan that are not currently exercisable which will vest and become exercisable as to 25% of such options commencing on each of the first, second, third and fourth anniversaries of the date of grant, July 9, 2020.

- (10) Mr. George Hatsopoulos was the brother of Mr. John Hatsopoulos and a former director. Based solely upon the Schedule 13G/A filed by Dr. George Hatsopoulos and Mrs. Daphne Hatsopoulos on May 16, 2018. Dr. Hatsopoulos died on or about September 20, 2018. The Schedule 13G/A states the beneficial ownership of Dr. Hatsopoulos as the following: (1) 1,812,468 shares of common stock held directly by Dr. Hatsopoulos; (2) 154,760 shares of common stock held by Dr. Hatsopoulos and his wife Daphne Hatsopoulos as joint tenants; (3) 320,179 shares of Common Stock held in The Hatsopoulos 1994 Family Trust for the Benefit of Nicholas Hatsopoulos, of which Mrs. Hatsopoulos and Mr. Joseph Comeau are trustees, and (4) 456,978 shares of Common Stock held in The Hatsopoulos 1994 Family Trust for the Benefit of Marina Hatsopoulos, of which Mrs. Hatsopoulos and Mr. Michael Bass are trustees. The address of the holder is 233 Tower Road, Lincoln, MA 01773.
- (11) Based solely upon the Schedule 13G filed by Mr. Joseph Comeau on behalf of The Hatsopoulos 2012 Family Trust on May 22, 2018. The Schedule 13G states the beneficial ownership consists of 2,250,000 shares of common stock held by The Hatsopoulos 2012 Family Trust, of which Mr. Comeau is the sole trustee. The address of the holder is Oliver St. Tower, 125 High St., Boston, MA 02110.
- (12) Based solely upon Schedule 13G filed by Mr. John N. Hatsopoulos on March 26, 2019. The Schedule 13G states the beneficial ownership of The John N. Hatsopoulos 1989 Family Trust consists of 1,620,646 shares of common stock, including 808,339 shares held for the benefit of Nia Marie Hatsopoulos, and 812,325 shares held for the benefit of Alexander J. Hatsopoulos. Ms. Ann Marie Pacheco is the sole trustee of the John N. Hatsopoulos 1989 Family Trust. The address of the holder is 45 First Ave., Waltham, MA 02451. Mr. John Hatsopoulos disclaims beneficial ownership of all shares held by the trust.
- (13) Based solely upon the Schedule 13G filed by Tryfon Natsis and Despina Pantopoulou Natsis on February 1, 2017. The Schedule 13G states the beneficial ownership as the following: 1,616,673 shares of common stock owned jointly by Tryfon Natsis and Despina Pantopoulou Natsis as spouses and joint tenants with the right of survivorship. The address for each holder is 36 Chemin Du Milieu, Collonge-Bellerive, Geneva, Switzerland 1245.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

Since the beginning of the last completed fiscal year we have not been a party to any transaction in which the amount involved exceeded or will exceed the lesser of \$120,000 or one percent of the average of our total assets as at the year-end for the last two completed fiscal years and in which any of our directors, executive officers or beneficial holders of more than 5% of our capital stock, or any immediate family member of, or person sharing the household with, any of these individuals, had or will have a direct or indirect material interest.

Independent Directors

Our board of directors has adopted the definition of “*Independent Director*” in Section 5605(a)(2) of The Nasdaq Stock Market Rulebook. Under these requirements, the board undertakes a review at least annually of director independence. During this review, the board considers transactions and relationships between each director or any member of his immediate family and Tecogen and its affiliates, if any. The purpose of this review is to determine whether any such relationship or transactions exist that are inconsistent with a determination that the director is independent. Based upon such definition, the board of directors has determined that each of Ms. Galiteva, Ms. Petersen, Mr. Ghoniem, Mr. Lewis and Mr. Holubow are independent; and that a majority of our directors are independent. The board bases these determinations primarily on a review of the responses of the directors and executive officers to questions regarding employment and transaction history, affiliations and family and other relationships and on discussions with the directors.

Item 14. Principal Accountant Fees and Services.

To ensure the independence of our independent registered public accounting firm and to comply with applicable securities laws, the Audit Committee is responsible for reviewing, deliberating and, if appropriate, pre-approving all audit, audit-related, and non-audit services to be performed by our independent registered public accountants. For that purpose, the Audit Committee has established a policy and related procedures regarding the pre-approval of all audits, audit-related, and non-audit services to be performed by our independent accountants (“Policy”).

The Policy provides that our independent accountant may not perform any audit, audit-related, or non-audit service for us, subject to those exceptions that may be permitted by applicable law, unless (1) the service has been pre-approved by the Audit Committee, or (2) we engaged the independent registered public accountant to perform the service pursuant to the pre-approval provisions of the Policy. In addition, the Policy prohibits the Audit Committee from pre-approving certain non-audit services that are prohibited from being performed by our independent accountant by applicable securities laws. The Policy also provides that our Principal Financial Officer will periodically update the Audit Committee as to services provided by the independent auditor. With respect to each such service, the independent registered public accountant provides detailed back-up documentation to the board and the Principal Financial Officer.

Pursuant to its Policy, the Audit Committee has pre-approved certain categories of services to be performed by the independent registered public accountant and a maximum amount of fees for each category. The board annually re-assesses these service categories and the associated fees. Individual projects within the approved service categories have been pre-approved only to the extent that the fees for each individual project do not exceed a specified dollar limit, which amount is re-

assessed annually. Projects within a pre-approved service category with fees in excess of the specified fee limit for individual projects may not proceed without the specific prior approval of the Audit Committee. In addition, no project within a pre-approved service category will be considered to have been pre-approved by the board if the project causes the maximum amount of fees for the service category to be exceeded, and the project may only proceed with the prior approval of the Audit Committee to increase the aggregate amount of fees for the service category.

The Audit Committee has appointed the firm of Wolf & Company P.C. ("Wolf") to serve as our independent auditors for the fiscal year ending December 31, 2020. Wolf was first appointed on August 15, 2014, for the fiscal year ending December 31, 2014 audit.

For the fiscal year ended December 31, 2020, and 2019, we paid (or will pay) fees for services rendered in connection with the fiscal years ended 2020 and 2019 set forth below.

	December 31, 2020	December 31, 2019
Audit fees	\$ 224,633	\$ 234,400
Audit-related fees	10,000	—
Tax fees	—	—
All other fees	—	—
Total	<u>\$ 234,633</u>	<u>\$ 234,400</u>

Audit Fees

Audit fees billed by Wolf for 2020 and 2019 consist of fees for the audit of our financial statements included in our fiscal year end reports for the year ended December 31, 2020 and 2019 and review of financial statements included in our Quarterly Reports on Form 10-Q or services that are normally provided by an accountant in connection with statutory and regulatory filings or engagements for those fiscal years.

Audit-related Fees

Represents fees associated with consents for registration statements and other miscellaneous filings.

Tax Fees

Represents fees for tax compliance services. No tax fees were billed by Wolf in 2020 and 2019.

All Other Fees

Represents fees for professional services other than those described above. No other such services for fiscal years 2020 and 2019 were approved or rendered pursuant to the de minimis exception provided by Rule 2-01(7)(i)(C) of Regulation S-X. There were no other fees billed by Wolf in 2020 and 2019.

Audit Committee's pre-approval policy and procedures

The Audit Committee's current policy is to require all audit and permissible non-audit services provided by our independent auditors to be pre-approved by the committee. These services may include audit services, audit-related services, tax services and other services. The Audit Committee may also pre-approve particular services on a case-by-case basis.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

The following are filed as part of this Annual Report on Form 10-K.

(a) Index to Financial Statements and Financial Statement Schedules

Report of Independent Registered Public Accounting Firm

Consolidated Balance Sheets as of December 31, 2020 and 2019

Consolidated Statements of Operations for the years ended December 31, 2020 and 2019

Consolidated Statements of Stockholders' Equity for the years ended December 31, 2020 and 2019

Consolidated Statements of Cash Flows for the years ended December 31, 2020 and 2019

Notes to Audited Consolidated Financial Statements

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

(b) Exhibits

The exhibits are listed in the Exhibit Index attached hereto and incorporated by reference herein.

Item 16. Form 10-K Summary.

The Company has determined not to include a summary of the information permitted by Item 16 of the Form 10-K.

EXHIBIT INDEX

Exhibit Number	Description
2.1	Agreement and Plan of Merger, dated as of November 1, 2016, by and among Tecogen Inc., American DG Energy Inc. and ADGE.Tecogen Merger Sub Inc. incorporated herein by reference to Exhibit 2.1 to the registrant's Current Report on Form 8-K filed with the SEC on November 2, 2016.
2.2	Amendment I to the Agreement and Plan of Merger, dated as of March 23, 2017, by and among Tecogen Inc., American DG Energy Inc., and ADGE.Tecogen Merger Sub Inc. incorporated herein by reference to Exhibit 2.2 to the registrant's Current Report on Form 8-K filed with the SEC on March 24, 2017.
3.1	Amended and Restated Certificate of Incorporation incorporated herein by reference to Exhibit 3.1 to Amendment No. 3 to the registrant's Registration Statement on Form S-1 (Registration No. 333-193791) filed with the SEC on June 27, 2014.
3.2	Amended and Restated Bylaws incorporated herein by reference to Exhibit 3.2 Amendment No. 3 to the registrant's Registration Statement on Form S-1 (Registration No. 333-193791) filed with the SEC on June 27, 2014.
4.1	Specimen Common Stock Certificate of Tecogen Inc. incorporated herein by reference to Exhibit 4. to the registrant's Amendment No. 3 to the registrant's Registration Statement on Form S-1 (Registration No. 333-193791) filed with the SEC on June 27, 2014.
4.3+	Form of Stock Option Agreement incorporated by reference to exhibit 4.3 to Amendment No. 3 to the registrant's Registration Statement on Form S-1 (Registration No. 333-193791) filed with the SEC on June 27, 2014.
4.4	Description of Registrant's Securities incorporated herein by reference to Exhibit 4.4 to the registrant's Annual Report on Form 10-K for the year ended December 31, 2019, filed with the SEC on March 12, 2020.
10.1+	Tecogen Inc. 2006 Stock Incentive Plan, as amended and restated on November 1, 2016 incorporated herein by reference to Exhibit 10.1 to the registrant's Annual Report on Form 10-K, for the year ended December 31, 2017, filed with the SEC on March 21, 2018.
10.2	Lease Agreement between Atlantic-Waltham Investment II, LLC, and Tecogen Inc., dated May 14, 2008 incorporated herein by reference to Exhibit 10.7 to the registrant's Amendment No. 3 to its Registration Statement on Form S-1 (Registration No. 333-193791), filed with the SEC on June 27, 2014.
10.3	Second Amendment to Lease Agreement between Atlantic-Waltham Investment II, LLC, and Tecogen Inc., dated January 16, 2013 incorporated herein by reference to Exhibit 10.2 to the registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2014, filed with the SEC on May 15, 2014.
10.4#	Exclusive License Agreement between Tecogen Inc. and the Wisconsin Alumni Research Foundation, dated February 5, 2007 incorporated herein by reference to Exhibit 10.1 to Amendment No. 3 to the registrant's Registration Statement on Form S-1 (Registration No. 333-193791), filed with the SEC on June 27, 2014.
10.5	Facilities and Support Services Agreement between American DG Energy Inc. and Tecogen Inc., dated August 8, 2014, incorporated herein by reference to Exhibit 10.1 to American DG Energy Inc.'s Quarterly Report on Form 10-Q (No. 001-34493) filed with the SEC on August 14, 2014.
10.6	Shelf Registration Rights Agreement dated August 3, 2015 incorporated herein by reference to Exhibit 10.29 to the registrant's Current Report on Form 8-K filed with the SEC on August 8, 2015.
10.7	First Amendment to the Facilities and Support Services Agreement between American DG Energy Inc. and Tecogen Inc., dated August 7, 2015, incorporated herein by reference to Exhibit 10.1 to American DG Energy Inc.'s Current Report on Form 8-K (No. 001-34493) filed with the SEC on August 13, 2015.
10.8	TTcogen LLC Operating Agreement dated as of May 19, 2016 incorporated herein by reference to Exhibit 10.38 to the registrant's Current Report on Form 8-K filed with the SEC on May 24, 2016.
10.9+	Advisory Agreement, dated January 3, 2018, between Tecogen Inc. and John N. Hatsopoulos incorporated herein by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K filed with the SEC on January 8, 2018.
10.10	Research and Development Contract between Southwest Research Institute and Tecogen Inc. incorporated herein by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K filed with the SEC on January 9, 2018.
10.11	Membership Interest and Wind-Down Agreement between Tedom USA Inc., Tedom a.s., TTcogen LLC and Tecogen Inc. dated as of March 27, 2018 incorporated herein by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K filed with the SEC on March 30, 2018.
10.12	Credit Agreement between the registrant and Webster Business Credit Corporation, dated as of May 4, 2018, incorporated herein by reference to Exhibit 10.45 to the registrant's Quarterly Report on Form 10-Q, for the quarter ended June 30, 2018, filed with the SEC on August 14, 2018.

10.13	Amendment No. 1 to, and Waiver No. 1 to, Credit Agreement between registrant and Webster Business Credit Corporation, dated December 17, 2018, effective as of May 4 2018 incorporated herein by reference to Exhibit 99.01 to the registrant's Current Report on Form 8-K filed with the SEC on December 17, 2018
10.14	Waiver No. 2 under Credit Agreement, dated December 27, 2018, among the registrant, Ttcogen LLC, and Webster Business Credit Corporation, incorporated herein by reference to Exhibit 10.47 to the registrant's Annual Report on Form 10-K for the year ended December 31, 2018, filed with the SEC on March 29, 2019.
10.15	Amendment No. 2 to, and Waiver No. 3 under Credit Agreement, dated as of March 5, 2019, incorporated herein by reference to Exhibit 10.47 to the registrant's Current Report on Form 8-K filed with the SEC on March 8, 2019.
10.16	Membership Interest Purchase Agreement by and among SDCL TG Cogen LLC, American DG Energy Inc., and registrant, dated as of December 14, 2018 incorporated herein by reference to Exhibit 10.48 to the registrant's Current Report on Form 8-K filed with the SEC on March 8, 2019.
10.17	Guaranty Agreement by registrant in favor of CogenOne LLC and SDCL TG Cogen LLC, dated December 14, 2018 incorporated herein by reference to Exhibit 10.49 to the registrant's Current Report on Form 8-K filed with the SEC on March 8, 2019.
10.18	Membership Interest Purchase Agreement by and among SDCL TG Cogen LLC, American DG Energy Inc., and registrant, dated as of March 5, 2019, incorporated herein by reference to Exhibit 10.50 to the registrant's Current Report on Form 8-K filed with the SEC on March 8, 2019.
10.19	Guaranty Agreement by registrant in favor of CogenTwo LLC and SDCL TG Cogen LLC, dated March 5, 2019, incorporated herein by reference to Exhibit 10.51 to the registrant's Current Report on Form 8-K filed with the SEC on March 8, 2019.
10.20	Billing and Asset Management Agreement by and among CogenOne LLC and the registrant, as amended and restated as of March 5, 2019, incorporated herein by reference to Exhibit 10.52 to the registrant's Current Report on Form 8-K filed with the SEC on March 8, 2019.
10.21	Amended and Restated Billing and Asset Management Agreement by and among CogenTwo LLC and the registrant, dated March 5, 2019, incorporated herein by reference to Exhibit 10.53 to the registrant's Current Report on Form 8-K filed with the SEC on March 8, 2019.
10.22	Letter Agreement dated July 22, 2019, amending Advisory Agreement, dated January 3, 2018, between registrant and John N. Hatsopoulos incorporated herein by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K filed with the SEC on July 24, 2019.
10.23	Loan Document for Paycheck Protection Program Loan through Webster Bank NA, dated April 17, 2020, incorporated herein by reference to Exhibit 10.61 to the registrant's Quarter Report on Form 10-Q, for the period ended March 31, 2020, filed with the SEC on May 14, 2020.
10.24*	Webster Bank, NA letter dated January 11, 2021, confirming receipt of payment in full of registrant's obligation under the Paycheck Protection Loan dated April 17, 2020.
10.25	Promissory Note for Paycheck Protection Program Second Draw Loan from Webster Bank, N.A. dated February 5, 2021 in the amount of \$1,874,269 incorporated herein by reference to Exhibit 10.27 to the registrant's Post-Effective Amendment No. 1 to Form S-3 on Form S-1 Registration Statement Under the Securities Act of 1933, filed with the SEC on March 12, 2021.
10.26+	Tecogen Change in Control Severance Benefit Plan, dated July 9, 2020, incorporated herein by reference to Exhibit 99.01 to the registrant's Current Report on Form 8-K filed with the SEC on July 21, 2020.
10.27	Post-Effective Amendment No. 1 to Form S-3 on Form S-1 Registration Statement Under the Securities Act of 1933, filed with the SEC on March 12, 2021, incorporated herein by reference.
21.1	List of subsidiaries incorporated by reference to Exhibit 21.1 to the registrants Post-Effective Amendment No. 1 to Form S-3 on Form S-1 Registration Statement Under the Securities Act of 1933, filed with the SEC on March 12, 2021.
23.1*	Consent of Wolf & Company, P.C.
31.1*	Rule 13a-14(a) Certification of Chief Executive Officer and Principal Financial Officer
32.1*	Section 1350 Certifications of Chief Executive Officer and Principal Financial Officer
101.INS*	XBRL Instance Document
101.SCH*	XBRL Taxonomy Extension Schema
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase
101.DEF*	XBRL Taxonomy Extension Definition Linkbase
101.LAB*	XBRL Taxonomy Extension Label Linkbase
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase

* Filed herewith.

Confidential Treatment has been granted for portions of this document. The confidential portions were omitted and filed separately, on a confidential basis, with the Securities and Exchange Commission.

+ Management contract or compensatory plan or agreement.

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Tecogen Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Tecogen Inc. (the "Company") as of December 31, 2020 and 2019, the related consolidated statements of operations, stockholders' equity, and cash flows, for each of the two years in the period ended December 31, 2020, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2020, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting, 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.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

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

Goodwill Impairment Assessment

As a result of their evaluation of goodwill for impairment analysis, management recognized a goodwill impairment charge of \$2.9 million in December 31, 2020 associated with the Company's energy production unit, as further described in Notes 5 and 9 to the financial statements.

We have identified the evaluation of goodwill for impairment as a critical audit matter as a result of (i) the significant judgment by management when developing the fair value measurements and; (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating management's significant assumptions related to financial projections.

Addressing the matter involved performing procedures and evaluation audit evidence in connection with forming our overall opinion on the financial statements. These procedures included, among others (i) testing management's process for developing the fair value estimates, including consideration of the appropriateness of the discounted cash flow model used; (ii) testing the completeness and accuracy of the underlying data used in the fair value estimates; and (iii) evaluating the significant assumptions used in developing financial projections. In evaluating management's assumptions used in the development of

financial projections we considered (i) the current and past performance of the reporting unit; (ii) whether these assumptions were consistent with evidence obtained in other areas of the audit and (iii) the sensitivity to change of the assumptions used.

/s/ WOLF & COMPANY, P.C.

We have served as the Company's auditor since 2014.

Boston, Massachusetts

March 18, 2021

CONSOLIDATED BALANCE SHEETS
As of December 31, 2020 and 2019

	2020	2019
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 1,490,219	\$ 877,676
Accounts receivable, net	8,671,163	14,569,397
Unbilled revenue	4,267,249	5,421,811
Inventory, net	7,168,596	6,405,229
Prepaid and other current assets	597,144	635,034
Total current assets	22,194,371	27,909,147
Property, plant and equipment, net	2,283,846	3,465,948
Right of use assets	1,632,574	2,173,951
Intangible assets, net	1,360,319	1,593,781
Goodwill	2,406,156	5,281,867
Other assets	196,387	691,941
TOTAL ASSETS	\$ 30,073,653	\$ 41,116,635
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Revolving line of credit, bank	\$ —	\$ 2,402,384
Note payable, current portion	837,861	—
Accounts payable	4,183,105	5,271,756
Accrued expenses	1,993,471	2,599,366
Deferred revenue	1,294,157	2,635,619
Lease obligations, current	506,514	536,443
Total current liabilities	8,815,108	13,445,568
Long-term liabilities:		
Note payable, net of current portion	1,036,339	—
Deferred revenue, net of current portion	115,329	145,464
Lease obligations, long-term	1,222,492	1,637,508
Unfavorable contract liability, net	1,617,051	2,534,818
Total liabilities	12,806,319	17,763,358
Commitments and contingencies (Note 11)		
Stockholders' equity:		
Tecogen Inc. stockholders' equity:		
Common stock, \$0.001 par value; 100,000,000 shares authorized; 24,850,261 and 24,849,261 issued and outstanding at December 31, 2020 and 2019, respectively	24,850	24,849
Additional paid-in capital	56,814,428	56,622,285
Accumulated deficit	(39,529,621)	(33,379,114)
Total Tecogen Inc. stockholders' equity	17,309,657	23,268,020
Noncontrolling interest	(42,323)	85,257
Total stockholders' equity	17,267,334	23,353,277
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	\$ 30,073,653	\$ 41,116,635

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

CONSOLIDATED STATEMENTS OF OPERATIONS
For the Years Ended December 31, 2020 and 2019

	2020	2019
Revenues		
Products	\$ 10,534,096	\$ 12,977,896
Services	15,883,302	17,307,718
Energy production	1,837,181	3,140,834
Total revenues	28,254,579	33,426,448
Cost of sales		
Products	6,473,768	8,385,574
Services	9,783,652	10,808,142
Energy production	1,169,645	1,753,980
Total cost of sales	17,427,065	20,947,696
Gross profit	10,827,514	12,478,752
Operating expenses		
General and administrative	10,311,086	10,380,143
Selling	2,593,168	2,685,200
Research and development	767,323	1,460,096
Gain on sale of assets	(11,367)	(1,081,304)
Long-lived asset impairment	251,906	—
Goodwill impairment	2,875,711	3,693,198
Total operating expenses	16,787,827	17,137,333
Loss from operations	(5,960,313)	(4,658,581)
Other income (expense)		
Interest and other income (expense)	(2,479)	933
Interest expense	(125,824)	(101,851)
Unrealized loss on investment securities	(98,404)	(19,680)
Total other expense, net	(226,707)	(120,598)
Loss before income taxes	(6,187,020)	(4,779,179)
State income tax provision	30,171	15,194
Consolidated net loss	(6,217,191)	(4,794,373)
Loss attributable to the noncontrolling interest	66,684	85,354
Net loss attributable to Tecogen Inc.	\$ (6,150,507)	\$ (4,709,019)
Net loss per share - basic and diluted	\$ (0.25)	\$ (0.19)
Weighted average shares outstanding - basic and diluted	24,850,258	24,839,957

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

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
For the Years Ended December 31, 2020 and 2019

	Common Stock Shares	Common Stock \$.001 Par Value	Additional Paid-In Capital	Accumulated Deficit	Noncontrolling Interest	Total
Balance at December 31, 2018	24,824,746	\$ 24,825	\$ 56,427,928	\$ (28,670,095)	\$ 255,116	\$ 28,037,774
Exercise of stock options	24,515	24	33,593	—	—	33,617
Stock issuance costs	—	—	(2,700)	—	—	(2,700)
Distributions to non-controlling interest	—	—	—	—	(84,505)	(84,505)
Stock-based compensation	—	—	163,464	—	—	163,464
Net loss	—	—	—	(4,709,019)	(85,354)	(4,794,373)
Balance at December 31, 2019	24,849,261	\$ 24,849	\$ 56,622,285	\$ (33,379,114)	\$ 85,257	\$ 23,353,277
Exercise of stock options	1,000	1	1,199	—	—	1,200
Distributions to non-controlling interest	—	—	—	—	(60,896)	(60,896)
Stock-based compensation	—	—	190,944	—	—	190,944
Net loss	—	—	—	(6,150,507)	(66,684)	(6,217,191)
Balance at December 31, 2020	24,850,261	\$ 24,850	\$ 56,814,428	\$ (39,529,621)	\$ (42,323)	\$ 17,267,334

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

CONSOLIDATED STATEMENTS OF CASH FLOWS
For the Years Ended December 31, 2020 and 2019

CASH FLOWS FROM OPERATING ACTIVITIES:	2020	2019
Consolidated net loss	\$ (6,217,191)	\$ (4,794,373)
<i>Adjustments to reconcile net loss to net cash used in operating activities:</i>		
Depreciation, accretion and amortization, net	414,127	437,102
Long-lived asset impairment	251,906	—
Gain on sale of assets	(11,367)	(1,081,304)
Provision for losses on accounts receivable	656,397	48,000
Provision for inventory reserve	86,000	—
Unrealized loss on investment securities	98,404	19,680
Stock-based compensation	190,944	163,464
Goodwill impairment	2,875,711	3,693,198
Non-cash interest expense	51,190	43,669
<i>Changes in operating assets and liabilities:</i>		
(Increase) decrease in:		
Accounts receivable	5,555,235	(440,945)
Unbilled revenue	1,154,562	(528,452)
Inventory, net	(849,367)	(110,367)
Due from related party	—	9,405
Prepaid expenses and other current assets	37,889	(9,545)
Other non-current assets	825,817	(317,970)
Increase (decrease) in:		
Accounts payable	(1,088,651)	(1,881,574)
Accrued expenses and other current liabilities	(524,358)	380,993
Deferred revenue	(2,100,011)	(115,223)
Net cash provided by (used in) operating activities	<u>1,407,237</u>	<u>(4,484,242)</u>
CASH FLOWS FROM INVESTING ACTIVITIES:		
Purchases of property and equipment	(59,952)	(95,643)
Proceeds on sale of property and equipment	26,335	5,000,000
Purchases of intangible assets	(123,252)	(110,683)
Payment of stock issuance costs	—	(2,700)
Distributions to non-controlling interest	(60,896)	(84,505)
Net cash (used in) provided by investing activities	<u>(217,765)</u>	<u>4,706,469</u>
CASH FLOWS FROM FINANCING ACTIVITIES:		
(Payments) proceeds on revolving line of credit, net	(2,452,329)	349,280
Proceeds from note payable	1,874,200	—
Proceeds from exercise of stock options	1,200	33,617
Net cash (used in) provided by financing activities	<u>(576,929)</u>	<u>382,897</u>
Change in cash and cash equivalents	612,543	605,124
Cash and cash equivalents, beginning of the year	877,676	272,552
Cash and cash equivalents, end of the year	<u>\$ 1,490,219</u>	<u>\$ 877,676</u>
Supplemental disclosure of cash flow information:		
Cash paid for interest	\$ 62,013	\$ 51,888
Cash paid for taxes	\$ 30,178	\$ 35,398

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

Note 1 – Nature of business and operations

Tecogen Inc. (together with its subsidiaries "we", "our", "us" or "Tecogen"), a Delaware Corporation, was incorporated on November 15, 2000, and acquired the assets and liabilities of the Tecogen Products division of Thermo Power Corporation. We produce commercial and industrial, natural-gas-fueled engine-driven, combined heat and power (CHP) products that reduce energy costs, decrease greenhouse gas emissions and alleviate congestion on the national power grid. Our products supply electric power or mechanical power for cooling, while heat from the engine is recovered and purposefully used at a facility. The majority of our customers are located in regions with the highest utility rates, typically California, the Midwest and the Northeast.

Our operations are comprised of two business segments. Our Products and Services segment designs, manufactures and sells industrial and commercial cogeneration systems as described above. Our Energy Production segment sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term sales agreements.

Note 2 – Summary of significant accounting policies

Principles of Consolidation and Basis of Presentation

The financial statements have been prepared in accordance with accounting standards set by the Financial Accounting Standards Board, or FASB. The FASB sets generally accepted accounting principles, or GAAP, to ensure financial condition, results of operations, and cash flows are consistently reported. References to GAAP issued by the FASB in these footnotes are to the FASB Accounting Standards Codification, or ASC. We adopted the presentation requirements for noncontrolling interests required by ASC 810 *Consolidation*. Under ASC 810, earnings or losses attributed to the noncontrolling interests are reported as part of the consolidated earnings and not a separate component of income or expense.

The accompanying consolidated financial statements include our accounts and the accounts of the entities in which we have a controlling financial interest. Those entities include our wholly-owned subsidiary, ADGE and a joint venture, American DG New York, LLC, or ADGNY, in which ADGE holds a 51.0% interest. As the controlling partner, all major decisions in respect of ADGNY are made by ADGE in accordance with the joint venture agreement. The interests in the individual underlying energy system projects in ADGNY vary between ADGE and its joint venture partner. The noncontrolling interest and distributions are determined based on economic ownership. The economic ownership is calculated by the amount invested by us and the noncontrolling partner in each site. Each quarter, we calculate a year-to-date profit/loss for each site that is part of ADGNY and the noncontrolling interest percent of economic ownership in each site is applied to determine the noncontrolling interest share in the profit/loss. The same methodology is used to determine quarterly distributions of available cash to the noncontrolling interest partner. On our balance sheet, noncontrolling interest represents the joint venture partner's investment in ADGNY, plus its share of after tax profits less any cash distributions. ADGE owned a controlling 51.0% legal and economic interest in ADGNY as of December 31, 2020.

Investments in partnerships and companies in which we do not have a controlling financial interest but where we have significant influence, if any, are accounted for under the equity method.

Noncontrolling interests in the net assets and operations of ADGNY are reflected in the caption "Noncontrolling interest" in the accompanying consolidated financial statements. All intercompany transactions have been eliminated.

Reclassification

Certain prior period amounts have been reclassified to conform with current year presentation.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America 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 revenues and expenses during the reporting period. Actual results could differ from those estimates.

TECOGEN INC.
Notes to Audited Consolidated Financial Statements for December 31, 2020 and 2019

Concentration of Credit Risk

Financial instruments that expose us to concentrations of credit risk consist primarily of cash and cash equivalents and accounts receivable. We maintain our cash balances in bank accounts, which at times may exceed the Federal Deposit Insurance Corporation's general deposit insurance limits. The amount on deposit at December 31, 2020 and 2019 which exceeded the \$250,000 federally insured limit were approximately \$770,098 and \$627,676, respectively. We have not experienced any losses in such accounts and thus believe that we are not exposed to any significant credit risk on cash.

There was one customer who represented more than 10% of revenues for the year ended December 31, 2020 and one customer who represented more than 10% of revenues for the year ended December 31, 2019. We have approximately five hundred thirty-three customers who represented 100% of the revenues for the year ended December 31, 2020. There was no customer who represented more than 10% of the accounts receivable balance as of December 31, 2020, and one as of December 31, 2019.

Cash and Cash Equivalents

We consider all highly liquid instruments with an original maturity date of three months or less when purchased to be cash and cash equivalents. We have cash balances in certain financial institutions in amounts which occasionally exceed current federal deposit insurance limits. The financial stability of these institutions is continually reviewed by senior management. We believe that we are not exposed to any significant credit risk on cash and cash equivalents.

Accounts Receivable

Accounts receivable are stated at the amount management expects to collect from outstanding balances. An allowance for doubtful accounts is provided for those accounts receivable considered to be uncollectible based upon historical experience and management's evaluation of outstanding accounts receivable at the end of the year. Bad debts are written off against the allowance when identified. At December 31, 2020 and 2019, the allowance for doubtful accounts was \$418,000 and \$75,000, respectively.

Inventory

Raw materials, work in process, and finished goods inventories are stated at the lower of cost, as determined by the average cost method, or net realizable value. We periodically review inventory quantities on hand for excess and/or obsolete inventory based primarily on historical usage, as well as based on estimated forecast of product demand. Any reserves that result from this review are charged to cost of sales.

Property, Plant and Equipment

Property, plant and equipment are recorded at cost. Depreciation is provided using the straight-line method over the estimated useful life of the asset, which range from three to fifteen years. Leasehold improvements are amortized using the straight-line method over the lesser of the estimated useful lives of the assets or the term of the related leases. Expenditures for maintenance and repairs are expensed currently, while renewals and betterments that materially extend the life of an asset are capitalized.

Intangible Assets

Intangible assets subject to amortization include costs incurred by us to acquire product certifications, certain patent costs and developed technologies. These costs are amortized on a straight-line basis over the estimated economic life of the intangible asset. Indefinite life intangible assets such as trademarks are recorded at cost and not amortized.

The favorable contract asset which relates to existing ADGE customer contracts is more fully described in Note 7. "Intangible assets and liabilities other than goodwill".

Impairment of Long-lived Assets

Long-lived assets, including intangible assets and property, plant and equipment, are evaluated for impairment whenever events or changes in circumstances have indicated that an asset may not be recoverable and are grouped with other assets to the lowest level for which identifiable cash flows are largely independent of the cash flows of other groups of assets and liabilities. If the sum of the projected undiscounted cash flows (excluding interest charges) is less than the carrying value of the assets, the assets will be written down to the estimated fair value and such loss is recognized in income from continuing operations in the period in which the determination is made. Management determined that an impairment of \$251,906 of long-lived assets existed as of December 31, 2020.

For the year ended December 31, 2020, we recorded impairment of long-lived assets as follows:

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Year Ended	December 31, 2020	
Energy production asset impairment	\$	524,972
Energy production reversal of unfavorable contract liability		(478,411)
Patent applications abandonment		205,345
Long-lived asset impairment	\$	251,906

Goodwill

Goodwill is the excess of the acquisition cost of businesses over the fair value of the identifiable net assets acquired. Impairment testing for goodwill is performed annually, generally in the fourth fiscal quarter, or more frequently if impairment indicators are present.

To determine if goodwill is potentially impaired, we have the option to perform a qualitative assessment. However, we may elect to bypass the qualitative assessment and perform an impairment test even if no indications of a potential impairment exist. The impairment test for goodwill is performed at the reporting unit level and compares the fair value of the reporting unit (calculated using a discounted cash flow method) to its carrying value, including goodwill. The discount rate represents our estimate of the weighted-average cost of capital, or expected return, that a marketplace participant would have required as of the valuation date. If the carrying value exceeds the fair value, an impairment charge is recorded for the excess carrying value over fair value, limited to the total amount of goodwill of that reporting unit. Our assessment in 2020 indicated that the carrying value of our energy production reporting unit exceeded its fair value and therefore resulted in an impairment of goodwill (see Note 9."Goodwill").

We early-adopted the provisions of ASU 2017-04, during 2018, which simplified the impairment testing process by eliminating the requirement to determine the implied fair value of goodwill. We test goodwill for impairment on either a qualitative basis under certain conditions, or a quantitative basis. On a quantitative basis, fair value of the reporting units is primarily determined using a probability weighted discounted cash flow analysis.

Leases

On January 1, 2019, we adopted the guidance under ASU No. 2016-02, "Leases" ("the new lease standard" or "ASC 842") under the cumulative-effect method of transition where comparative information has not been restated and continues to be reported under the standards in effect for those periods. The adoption did not result in any cumulative-effect adjustment to beginning retained earnings. We elected certain practical expedients upon adoption and therefore have not reassessed whether any expired or existing contracts contain leases, have not reassessed the lease classification for any expired or existing leases and have not reassessed initial direct costs for any existing leases.

The new standard requires lessees to recognize most leases on their balance sheets as a right-of-use ("ROU") asset with a corresponding lease liability. ROU assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. Lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. See Note 13."Leases".

Income (loss) per Common Share

We compute basic income (loss) per share by dividing net income (loss) for the period by the weighted-average number of shares of common stock outstanding during the period. We compute our diluted earnings per common share using the treasury stock method. For purposes of calculating diluted earnings per share, we consider our shares issuable in connection with the convertible debentures, stock options and warrants to be dilutive common stock equivalents when the exercise/conversion price is less than the average market price of our common stock for the period.

Segment Information

Our operations are comprised of two business segments. Our Products and Services segment designs, manufactures and sells industrial and commercial cogeneration systems as described above. Our Energy Production segment sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term sales agreements.

TECOGEN INC.
Notes to Audited Consolidated Financial Statements for December 31, 2020 and 2019

Income Taxes

We use the asset and liability method of accounting for income taxes. The current or deferred tax consequences of transactions are measured by applying the provisions of enacted tax laws to determine the amount of taxes payable currently or in future years. Deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities and expected future tax consequences of events that have been included in the financial statements or tax returns using enacted tax rates in effect for the years in which the differences are expected to reverse. Under this method, a valuation allowance is used to offset deferred taxes if, based upon the available evidence, it is more likely than not that some or all of the deferred tax assets may not be realized. Management evaluates the recoverability of deferred taxes and the adequacy of the valuation allowance annually.

We have adopted the provisions of the accounting standards relative to accounting for uncertainties in tax positions. These provisions provide guidance on the recognition, derecognition and measurement of potential tax benefits associated with tax positions. We elected to recognize interest and penalties related to income tax matters as a component of income tax expense in the statements of operations. We have analyzed our current tax return compliance positions and determined that no uncertain tax positions have been taken that would require recognition.

With few exceptions, we are no longer subject to possible income tax examinations by federal, state or local taxing authorities for tax years before 2017, with the exception of loss carryforwards in the event they are utilized in future years. Our tax returns are open to adjustment from 2001 forward, as a result of the fact that we have loss carryforwards from those years, which may be adjusted in the year those losses are utilized.

Fair Value of Financial Instruments

Our financial instruments are cash and cash equivalents, accounts receivable, available-for-sale securities, accounts payable and revolving line of credit. The recorded values of cash and cash equivalents, accounts receivable, accounts payable and line of credit approximate their fair values based on their short-term nature. See Note 15. "Fair value measurements".

Revenue Recognition

Revenue is recognized when performance obligations under the terms of a contract with our customer are satisfied; generally this occurs with the transfer of control of our products, services and energy production. Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services or energy to customers.

Shipping and handling fees billed to customers in a sales transaction are recorded in revenue and shipping and handling costs incurred are recorded in general and administrative expenses. For the years ended December 31, 2020 and 2019, \$418,180 and \$480,966 of shipping and handling costs were included in general and administrative expenses in the accompanying consolidated statements of operations, respectively. We elected to exclude from revenue any value add sales and other taxes which we collect concurrent with revenue-producing activities. These accounting policy elections are consistent with the manner in which we have historically recorded shipping and handling fees and taxes. Incremental costs incurred by us in obtaining a contract with a customer are negligible, if any, and are expensed ratably in proportion to the related revenue recognized.

The application of ASU 2014-09 did not have an impact upon adoption or on the amounts reported for 2018 as compared with the guidance that was in effect before the adoption and application of ASU 2014-09.

Disaggregated Revenue

In general, our business segmentation are aligned according to the nature and economic characteristics of our products and customer relationships and provides meaningful disaggregation of each business segment's results of operations.

The following table further disaggregates our revenue by major source by segment for the years ended December 31, 2020 and 2019.

Year Ended		December 31, 2020		
		Products and Services	Energy Production	Total
Products	\$	10,534,096	\$ —	\$ 10,534,096
Installation services		5,805,497	—	5,805,497
Maintenance services		10,077,805	—	10,077,805
Energy production		—	1,837,181	1,837,181
Total revenue	\$	26,417,398	\$ 1,837,181	\$ 28,254,579

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Year Ended	December 31, 2019		
	Products and Services	Energy Production	Total
Products	12,977,896	\$ —	\$ 12,977,896
Installation services	7,505,964	—	7,505,964
Maintenance services	9,801,754	—	9,801,754
Energy production	—	3,140,834	3,140,834
Total revenue	\$ 30,285,614	\$ 3,140,834	\$ 33,426,448

Product and Services Segment

Products. We transfer control and generally recognize a sale when we ship a product from our manufacturing facility at which point a customer takes ownership of the product. Payment terms on product sales are generally 30 days.

We recognize revenue in certain circumstances before delivery to the customer has occurred (commonly referred to as bill and hold transactions). We recognize revenue related to such transactions once, among other things, the customer has made a written fixed commitment to purchase the product(s) under normal billing and credit terms, the customer has requested the product(s) be held for future delivery as scheduled and designated by them, risk of ownership has been assumed by the customer, and the product(s) are tagged as sold and segregated for storage awaiting further direction from the customer. Due to the infrequent nature and duration of bill and hold arrangements, the value associated with custodial storage services is deemed immaterial in the context of the contract and in total, and accordingly, none of the transaction price is allocated to such service.

Depending on the product and terms of the arrangement, we may defer the recognition of a portion of the transaction price received because we have to satisfy a future obligation (e.g., product start-up service). Amounts allocated to product start-up services are recognized as revenue when the start-up service has been completed. We use an observable selling price to determine standalone selling prices where available and either a combination of an adjusted market assessment approach, an expected cost plus a margin approach, and/or a residual approach to determine the standalone selling prices for separate performance obligations as a basis for allocating contract consideration when an observable selling price is not available. Amounts received but not recognized pending completion of performance are recognized as contract liabilities and are recorded as deferred revenue along with deposits by customers.

Installation Services. We provide both complete turnkey installation services and what we refer to as light installation services. Complete turnkey installation services typically include all necessary engineering and design, labor, subcontract labor and service, and ancillary products and parts necessary to install a cogeneration unit including integration into the customers' existing electrical and mechanical systems. Light installation services typically include some engineering and design as well as certain ancillary products and parts necessary for the customers' installation of a cogeneration unit.

Under light installation contracts, revenue related to ancillary products and parts is recognized when we transfer control of such items to the customer, generally when we ship them from our manufacturing facility, with revenue related to engineering and design services being recognized at the point where the customer can benefit from the service, generally as completed. Generally billings under light installation contracts are made when shipped and/or completed, with payment terms generally being 30 days.

Under complete turnkey installation service contracts revenue is recognized over time using the percentage-of-completion method determined on a cost to cost basis. Our performance obligation under such contracts are satisfied progressively over time as enhancements are made to customer owned and controlled properties. We measure progress towards satisfaction of the performance obligation based on an input method based on cost which we believe is the most faithful depiction of the transfer of products and services to the customer under these contracts. When the financial metrics of a contract indicate a loss, our policy is to record the entire expected loss as soon as it is known. Contract costs and profit recognized to date under the percentage-of-completion method in excess of billings are recognized as contract assets and are recorded as unbilled revenue. Billings in excess of contract costs and profit are recognized as contract liabilities and are recorded as deferred revenue. Generally billings under complete turnkey installation contracts are made when contractually determined milestones of progress have been achieved, with payment terms generally being 30 days.

Maintenance Services. Maintenance services are provided under either long-term maintenance contracts or one-time maintenance contracts. Revenue under one-time maintenance contracts is recognized when the maintenance service is completed. Revenue under long-term maintenance contracts is recognized either ratably over the term of the contract where the contract price is fixed or when the periodic maintenance activities are completed where the invoiced cost to the customer is

based on run hours or kilowatts produced in a given period. We use an output method to measure progress towards completion of our performance obligation which results in the recognition of revenue on the basis of a direct measurement of the value to the customer of the services transferred to date relative to the remaining services promised under the contract. We use the practical expedient at ASC 606-10-55-18 of recognizing revenue in an amount equal to that amount to which we have the right to invoice the customer under the contract.

Energy Production Segment

Energy Production. Revenue from energy contracts is recognized when electricity, heat, hot and/or chilled water is produced by our owned on-site cogeneration systems. Each month we bill the customer and recognize revenue for the various forms of energy delivered, based on meter readings which capture the quantity of the various forms of energy delivered in a given month, under a contractually defined formula which takes into account the current month's cost of energy from the local power utility.

As the various forms of energy delivered by us under energy production contracts are simultaneously delivered and consumed by the customer, our performance obligation under these contracts is considered to be satisfied over time. We use an output method to measure progress towards completion of our performance obligation which results in the recognition of revenue on the basis of a direct measurement of the value to the customer of the services transferred to date relative to the remaining services promised under the contract. We use the practical expedient at ASC 606-10-55-18 of recognizing revenue in an amount equal to that amount to which we have the right to invoice the customer under the contract. Payment terms on invoices under these contracts are generally 30 days.

Contract Balances

The timing of revenue recognition, billings and cash collections result in billed accounts receivable, unbilled revenue (contract assets) and deferred revenue, consisting of customer deposits and billings in excess of revenue recognized (contract liabilities) on the Consolidated Balance Sheets.

Revenue recognized during the year ended December 31, 2020 that is included in unbilled revenue is approximately \$2.0 million. Approximately \$3.2 million of revenue was billed in this period that had been recognized in previous periods.

Revenue recognized during the year ended December 31, 2020 that was included in deferred revenue at the beginning of the period was approximately \$512,670.

Remaining Performance Obligations

Remaining performance obligations related to ASC 606 represent the aggregate transaction price allocated to performance obligations with an original contract term greater than one year, excluding certain maintenance contracts and all energy production contracts where a direct measurement of the value to the customer is used as a method of measuring progress towards completion of our performance obligation. Exclusion of these remaining performance obligations is due in part to the inability to quantify values based on unknown future levels of delivery and in some cases rates used to bill customers. Remaining performance obligations therefore consist of unsatisfied or partially satisfied performance obligations related to fixed price maintenance contracts and installation contracts.

As of December 31, 2020, the aggregate amount of the transaction price allocated to remaining performance obligations was approximately \$1.2 million. We expect to recognize revenue of approximately 96% of the remaining performance obligations over the next 24 months, 6% recognized in the first 12 months and 90% recognized over the subsequent 12 months, and the remainder recognized thereafter.

Advertising Costs

We expense the costs of advertising as incurred. For the years ended December 31, 2020 and 2019, advertising expense was approximately \$23,000 and \$142,000, respectively.

Research and Development Costs

Research and development expenditures are expensed as incurred. Our total research and development expenditures were approximately \$767,000 and \$1,460,000 for the years ended December 31, 2020 and 2019, respectively.

Stock-Based Compensation

Stock-based compensation cost is measured at the grant date, based on the estimated fair value of the award, and is recognized as an expense in the statements of operations over the requisite service period.

The determination of the fair value of share-based payment awards is affected by our stock price. For the awards issued prior to our being publicly traded, we considered the sales price of the Common Stock in private placements to unrelated third parties as a measure of the fair value of its Common Stock.

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We utilize actual forfeitures when calculating the expense for the period. Stock-based compensation expense recognized is based on awards that are ultimately expected to vest. We evaluate the assumptions used to value awards regularly and if factors change and different assumptions are employed, stock-based compensation expense may differ significantly from what has been recorded in the past. If there are any modifications or cancellations of the underlying unvested securities, we may be required to accelerate, increase or cancel any remaining unearned stock-based compensation expense.

In the year ended December 31 2020, we adopted Accounting Standards Update No. 2018-07 *Improvements to Nonemployee Share-Based Payment Accounting* ("ASU 2018-07"), which substantially aligns the share-based payment accounting of non-employee awards with the accounting for employee awards. Upon the adoption on January 1, 2020, we re-measured the fair value of non-employee awards. There was no material impact on our consolidated financial statements as a result of the adoption of this guidance.

See Note 14, "Stockholders' equity" for a summary of the restricted stock and stock option activity under our stock-based employee compensation plan for the years ended December 31, 2020 and 2019.

Significant New Accounting Standards Adopted this Period

Measurement of Credit Losses on Financial Instruments. In June 2016, the FASB issued Accounting Standards Update 2016-13, *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 an entity's expected credit losses on financial instruments and other commitments to extend credit at each reporting date. To achieve this objective, the amendments in this update replace the incurred loss impairment methodology in current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to develop credit loss estimates. Subsequent to issuing ASU 2016-13, the FASB issued ASU 2018-19, *Codification Improvements to Topic 326, Financial Instruments - Credit Losses*, for the purpose of clarifying certain aspects of ASU 2016-13. ASU 2018-19 has the same effective date and transition requirements as ASU 2016-13. We adopted ASU 2016-13 on January 1, 2020, the adoption of which did not have a material effect on our consolidated financial statements.

Significant New Accounting Standards or Updates Not Yet Effective

Reference Rate Reform. In March 2020, the FASB issued Accounting Standards Update, 2020-04 (Topic 848), *Reference Rate Reform - Facilitation of the Effects of Reference Rate Reform on Financial Reporting* ("ASU 2020-04"), which provides temporary optional expedients and exceptions to the existing guidance on contract modifications and hedge accounting to ease the financial reporting burdens related to the expected market transition from the London Interbank Offered Rate (LIBOR) and other interbank offered rates to alternative reference rates, such as the Secured Overnight Financing Rate. The standard was effective upon issuance and may generally be applied through December 31, 2022, to any new or amended contracts, hedging relationships, and other transactions that reference LIBOR. We are currently evaluating the impact of the transition and disclosure requirements of the standard on its consolidated financial statements, but do not believe that the adoption of ASU 2020-04 will have a material impact on our consolidated financial statements.

Simplifying the Accounting for Income Taxes. In December 2019, the FASB issued ASU No. 2019-12 (Topic 740) *Income Taxes — Simplifying the Accounting for Income Taxes*, which enhances and simplifies various aspects related to accounting for income taxes. This ASU is to be applied on a prospective basis with the exception of certain amendments that are to be applied on either a retrospective or modified retrospective basis. The new standard is effective for interim and annual periods beginning after December 15, 2020. We do not expect the adoption to have a material impact on its consolidated financial statements.

Note 3 – Loss per common share:

Basic and diluted loss per share for the years ended December 31, 2020 and 2019, respectively, was as follows:

	2020	2019
Net loss attributable to stockholders	\$ (6,150,507)	\$ (4,709,019)
Weighted average shares outstanding - Basic and diluted	24,850,258	24,839,957
Loss per share - Basic and diluted	\$ (0.25)	\$ (0.19)
Anti-dilutive shares underlying stock options outstanding	178,224	142,756

Note 4 – Acquisition of American DG Energy Inc.

On May 18, 2017, we completed our acquisition, by means of a stock-for-stock merger, of 100% of the outstanding common shares of American DG Energy Inc. ("American DG Energy" or "ADGE"), a company which installs, owns, operates and maintains complete distributed generation of electricity systems, or DG systems or energy systems, and other complementary systems at customer sites and sells electricity, hot water, heat and cooling energy under long-term contracts at prices guaranteed to the customer to be below conventional utility rates, by means of a merger of one of our wholly owned subsidiaries with and into ADGE such that ADGE became a wholly owned subsidiary of Tecogen. We acquired ADGE to, among other reasons, expand our product offerings and benefit directly from the long-term contracted revenue streams generated by these installations. We gained control of ADGE on May 18, 2017 by issuing shares of our Common Stock to the prior stockholders of ADGE.

Acquisition related costs, which was largely legal costs related to the litigation that followed the merger, were included in general and administrative expenses and totaled \$22,566 for the year ended December 31, 2018. Stock issuance related costs totaling \$377,246 were netted against additional paid in capital during the year ended December 31, 2018.

Goodwill of \$13.3 million arising from the acquisition is primarily attributable to the going concern element of ADGE's business, including its assembled workforce and the long-term contractual nature of its business, as well as expected cost synergies from the merger related primarily to the elimination of administrative overhead and duplicative personnel. None of the goodwill recognized is expected to be deductible for income tax purposes.

The favorable contract asset and the unfavorable contract liability, both of which relate to existing customer contracts, and the estimated amortization are more fully described in Note 7. "Intangible assets and liabilities other than goodwill".

Note 5. Sale of Energy Producing Assets and Goodwill Impairment

During the first quarter of 2019, we recognized two individual sales of energy producing assets, for a total of eight power purchase agreements, including the associated energy production contracts for total consideration of \$7 million, which resulted in a combined gain on sale of assets of \$1,081,049 included in the Consolidated Statement of Operations for the year ended December 31, 2019.

In connection with the asset sales, we entered into agreements with the purchaser to maintain and operate the assets over the remaining periods of the associated energy production contracts (through August 2033 and January 2034, respectively) in exchange for monthly fees for both maintenance and operation. These agreements contain provisions whereby we have guaranteed to the purchaser a minimum level or threshold of cash flows from the associated energy production contracts. Actual results are compared to the minimum threshold bi-annually and we reimburse any shortfall to the purchaser. To the extent actual results are in excess of the minimum threshold, we are entitled to fifty percent of such excess under the agreements. For the year ended December 31, 2020, we received an excess threshold payment of \$2,064 and issued shortfall threshold payments aggregating to \$474,448 in the year ended December 31, 2019.

The foregoing agreements also contain provisions whereby we have agreed to make whole the purchaser in the event the counterparty to the energy production contract(s) defaults on or otherwise terminates before the stated expiration of the energy production contract. Should we be required to make whole the purchaser under such provisions, we would be entitled to seek recovery from the counterparty to the energy production contract(s) under a similar provision contained in those contracts in respect of early termination. We did not recognize any counterparty contract default costs in the years ended December 31, 2020 and 2019.

We are also responsible under the agreements for site decommissioning costs, if any, in excess of certain threshold amounts by site. Decommissioning of site assets is performed when, if and as requested by the counterparty to the energy production contract upon termination of the energy production contract. We did not recognize any site decommissioning costs in the years ended December 31, 2020 and 2019.

The combined gain on sale of these assets of \$1,081,049 was determined after deducting from the gross proceeds the remaining net book value of the assets sold and an estimate of the remaining costs to complete installation of certain of the site assets as well as deducting an estimate of amounts which we believe will be required to pay under the minimum cash flow guarantee described above. In determining the gain on the sale of these assets, no amount of goodwill assigned to the energy production segment and reporting unit was included as individual sites and related site energy producing assets are not considered businesses. The aggregate of the assets sold represents a significant portion of the energy production segment and reporting unit's assets and cash flows which is the basis for determination of the fair value of the energy production reporting unit as used for goodwill impairment determinations. Accordingly, the sale of these assets required us to assess the impact of

the sales on the valuation of remaining goodwill assigned to the energy production reporting unit. That assessment included a determination of whether the remaining carrying value of the energy production reporting unit including goodwill exceeded its fair value. Following a goodwill impairment charge in 2018 which reduced the carrying value of the energy production reporting unit including goodwill to fair value based on discounted cash flows, exclusion of the discounted cash flows related to the assets sold resulted in impairment of the remaining goodwill assigned to the energy production reporting unit in an amount proportionate to the discounted cash flows related to the assets sold to the total discounted cash flows of the energy production reporting unit before the sales. The goodwill impairment as a result of the sales and recognized in the first quarter of 2019 totaled approximately \$3.7 million, reducing the remaining carrying value of the energy production reporting unit, including goodwill to the discounted cash flow of the remaining sites or fair value.

Note 6 – Inventory

Inventories at December 31, 2020 and 2019 consisted of the following.

	2020	2019
Raw materials, net	\$ 5,846,591	\$ 5,153,987
Work-in-process	329,702	439,067
Finished goods	992,303	812,175
	<u>\$ 7,168,596</u>	<u>\$ 6,405,229</u>

Note 7 – Intangible Assets and Liabilities Other Than Goodwill

We did not capitalize any product certification costs during the years ended December 31, 2020 and 2019, respectively. Also included in intangible assets are the costs incurred by us to acquire certain patents. These patents, once in service, are amortized on a straight-line basis over the estimated economic life of the associated product, which range from approximately 7-10 years. We capitalized \$43,252 and \$106,539 of patent-related costs during the years ended December 31, 2020 and 2019, respectively. We capitalized \$0 and \$4,144 in trademarks during the years ended December 31, 2020 and 2019, respectively. We capitalized \$80,000 and \$0 in favorable contract obligations in the years ended December 31, 2020 and 2019, respectively.

Intangible assets and liabilities at December 31, 2020 and 2019 consist of the following:

Intangible assets	December 31, 2020			December 31, 2019		
	Cost	Accumulated Amortization	Net	Cost	Accumulated Amortization	Net
Product certifications	\$ 726,159	\$ (478,357)	\$ 247,802	\$ 726,159	\$ (399,906)	\$ 326,253
Patents	855,014	(220,764)	634,250	1,017,108	(206,499)	810,609
Developed technology	240,000	(124,000)	116,000	240,000	(108,000)	132,000
Trademarks	26,896	—	26,896	26,896	—	26,896
R&D In process	263,936	—	263,936	263,936	—	263,936
Favorable contract assets	384,465	(313,031)	71,434	304,465	(270,378)	34,087
	<u>\$ 2,496,470</u>	<u>\$ (1,136,152)</u>	<u>\$ 1,360,318</u>	<u>\$ 2,578,564</u>	<u>\$ (984,783)</u>	<u>\$ 1,593,781</u>
Intangible liability						
Unfavorable contract liability	\$ 2,534,818	\$ (917,767)	\$ 1,617,051	\$ 4,689,025	\$ (2,154,207)	\$ 2,534,818

The aggregate amortization expense related to intangible assets exclusive of contract related intangibles was \$13,723 and \$92,209 during the years ended December 31, 2020 and 2019, respectively. The net credit to cost of sales related to the amortization of the contract related intangible asset and liability for the years ended December 31, 2020 and 2019 was \$400,404 and \$502,729, respectively. We abandoned certain patent applications in the year ended December 31, 2020 and recorded a non-cash charge of \$205,345 as long-lived asset impairment in the Consolidated Statement of Operations.

Contract Asset and Liability

The favorable contract asset and unfavorable contract liability in the foregoing table represent the fair value of ADGE's customer contracts (both positive for favorable contracts and negative for unfavorable contracts) which were acquired by us on May 18, 2017 (see Note 4. "Acquisition of American DG Energy Inc."), reduced by those sold during Q1 2019. See Note 5. "Sale of Energy Producing Assets and Goodwill Impairment".

During the year ended December 31, 2020, we determined that certain of the ADGE customer contracts terminated due to the customers failure to perform their obligations pursuant to the contractual agreements and accordingly reversed \$478,411 of unfavorable contract liability related to these contacts. The adjustments are included in the Consolidated Statement of Operations for the year ended December 31, 2020, as non-cash benefits within long-lived asset impairment.

Amortization of intangibles including contract related amounts is calculated using the straight line method over the remaining useful life or contract term and charged against cost of sales in the accompanying consolidated statement of operations. Aggregate future amortization over the next five years is estimated to be as follows:

	Non-contract related intangibles	Contract related intangibles	Total
2021	\$ 185,341	\$ (317,275)	\$ (131,934)
2022	178,264	(320,008)	(141,744)
2023	171,191	(253,372)	(82,181)
2024	150,054	(208,448)	(58,394)
2025	141,109	(130,116)	10,993
Thereafter	455,459	(335,828)	119,631
	<u>\$ 1,281,418</u>	<u>\$ (1,565,047)</u>	<u>\$ (283,629)</u>

Note 8 – Property, plant and equipment

Property, plant and equipment at December 31, 2020 and 2019 consisted of the following:

	Estimated Useful Life (in Years)	2020	2019
Energy systems	10 - 15 years	\$ 3,526,514	\$ 4,372,638
Machinery and equipment	5 - 7 years	1,448,024	1,462,208
Furniture and fixtures	5 years	193,698	193,698
Computer software	3 - 5 years	192,865	192,865
Leasehold improvements	*	450,792	450,792
		<u>5,811,893</u>	<u>6,672,201</u>
Less - accumulated depreciation and amortization		<u>(3,528,047)</u>	<u>(3,206,253)</u>
Net property, plant and equipment		<u>\$ 2,283,846</u>	<u>\$ 3,465,948</u>

* Lesser of estimated useful life of asset or lease term

Depreciation and amortization expense on property and equipment for the years ended December 31, 2020 and 2019 was \$702,113 and \$847,622, respectively.

During the year ended December 31, 2020, we determined that certain of the ADGE customer contracts terminated due to the customers failure to perform their obligations pursuant to the contractual agreements and deemed the assets related to the contracts at these sites to be impaired. We recorded a non-cash impairment of \$524,972 which is included in the Consolidated Statement of Operations for the year ended December 31, 2020, within long-lived asset impairment.

In March 2019, we sold certain energy systems related assets and related energy production contracts. See Note 5. "Sale of Energy Producing Assets and Goodwill Impairment" for further discussion.

Note 9. Goodwill

Changes in the carrying amount of goodwill by reportable segment during the year was as follows:

	Product and Service	Energy Production	Total Company
Balance at December 31, 2018	\$ 40,870	\$ 8,934,195	\$ 8,975,065
Impairment	—	(3,693,198)	(3,693,198)
Balance at December 31, 2019	\$ 40,870	\$ 5,240,997	\$ 5,281,867
Impairment	—	(2,875,711)	(2,875,711)
Balance at December 31, 2020	\$ 40,870	\$ 2,365,286	\$ 2,406,156

Following a goodwill impairment charge in 2018 which reduced the carrying value of the energy production reporting unit including goodwill to fair value based on discounted cash flows, exclusion of the discounted cash flows related to the assets sold during the year ended December 31, 2019 resulted in impairment of the goodwill assigned to the energy production reporting unit in an amount proportionate to the discounted cash flows related to the assets sold. The goodwill impairment as a result of the sales and recognized in the first quarter of 2019 totaled \$3,693,198, reducing the remaining carrying value of the energy production reporting unit, including goodwill to the discounted cash flow of the remaining sites or fair value.

We recorded an impairment loss of \$2,875,711 following the performance of our 2020 annual goodwill impairment test. The impairment loss represented the excess of the carrying value of our energy production business over the estimated fair value based on a discounted cash flow analysis. The impairment recognizes the shortening of remaining contract terms with customers without replacement and without further growth, the impact of COVID-19 on the financial performance of certain customer contracts, as well as less than expected cost savings and increased profitability from our initiatives to optimize the long-term profitability of its various site operations, and a price peak of our common stock on the date of the business combination to which the goodwill relates.

See Note 5. "Sale of Energy Producing Assets and Goodwill Impairment" for further discussion.

Note 10 – Revolving line of credit and Notes Payable

On May 4, 2018 ("Closing Date") we entered into a Credit Agreement with Webster Business Credit Corporation ("Webster") that originally matured in May 2021, provided a line of credit of up to \$0 million on a revolving and secured basis, with availability based on certain accounts receivables, raw materials, and finished goods.

Borrowings under the Credit Agreement bore interest at a rate equal to, at our option, to either (1) One Month LIBOR, plus 0.00%, or (2) Webster's Base Rate, plus 1.5%. Webster's Base Rate is defined as the highest of (a) the Federal Funds rate plus 0.5%, (b) Webster's Prime Rate as adjusted by the bank from time to time, and (c) One Month LIBOR, plus 2.75%, 6.25% as of December 31, 2019.

The Credit Agreement contained certain affirmative and negative covenants applicable to us, which include, among other things, restrictions on our ability to (i) incur additional indebtedness, (ii) make certain investments, (iii) acquire other entities, (iv) dispose of assets and (v) make certain payments including those related to dividends or repurchase of equity. The Credit Agreement also contained financial covenants including maintaining a fixed charge coverage ratio of not less than 1.10:1.00 and we could not make any unfinanced capital expenditures in excess of \$500,000 in the aggregate in any fiscal year.

The \$145,011 of costs incurred in connection with the issuance of the revolving credit facility were capitalized and were being amortized to interest expense on a straight-line basis over three years based on the contractual term of the Credit Agreement. The unamortized portion of debt issuance cost related to the Credit Agreement was \$— and \$49,946, respectively, as of December 31, 2020 and 2019, and is included as a reduction to the revolving line of credit in the accompanying Consolidated Balance Sheets.

On May 11, 2020, we terminated our Credit Agreement, dated May 4, 2018, with Webster Business Credit Corporation, together with related agreements, including a Revolving Note, Security Agreement, Blocked Account Agreement, and Master Letter of Credit Agreement. We paid an early termination fee in the amount of \$25,000 in connection with the termination of the Credit Agreement, and continue to use depository and cash management services provided by Webster Bank. Upon termination of the Credit Agreement, the unamortized balance of debt issuance cost of \$37,861 was expensed in the accompanying Condensed Consolidated Statement of Operations. As of December 31, 2020 and 2019, the outstanding balance on the line of credit was \$0 and \$2,452,330, respectively.

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On April 17, 2020, we obtained an unsecured loan through Webster Bank, N.A. in the amount of \$,874,200 in connection with the Paycheck Protection Program pursuant to the Coronavirus Aid, Relief, and Economic Security Act (the CARES Act) administered by the United States Small Business Administration (the "SBA"). The loan is guaranteed by the SBA. Interest on the loan balance is at the rate of 1% per year, and as a result of the enactment of the Paycheck Protection Program Flexibility Act of 2020 (the "PPP Flexibility Act"), repayment of the loan balance could be deferred until August 2021, at which time the balance would be payable in 18 monthly installments of \$106,356 with the final payment due in January 2023 if not forgiven in accordance with the CARES Act and the terms of the Promissory Note executed by us in connection with the loan. The PPP loan may be prepaid at any time without penalty. The loan agreement and promissory note include customary provisions for a loan of this type, including prohibitions on our payment of dividends or repurchase of shares of our common stock while the PPP loan remains outstanding. The loan agreement and promissory note also defines events of default to include, among other things, payment defaults, breaches of provisions of the loan agreement or the promissory note and cross-defaults on other loans, if applicable.

On January 19, 2021, we received a letter dated January 12, 2021 from Webster Bank, NA confirming that the Paycheck Protection Program Loan to us pursuant to the Coronavirus Aid, Relief, and Economic Recovery Act, as amended, in the original principal amount of \$1,874,200 together with accrued interest of \$12,733 was forgiven in full as of January 11, 2021.

Subsequent to the year end, on February 5, 2021, we obtained a Paycheck Protection Program Second Draw unsecured loan through Webster Bank, N.A. in the amount of \$,874,269 in connection with the Paycheck Protection Program pursuant to the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act"), as amended. The loan is guaranteed by the United States Small Business Administration. Interest on the loan balance is at the rate of 1% per year, and repayment of the loan balance is deferred until June 5, 2022. If not forgiven in accordance with the CARES Act, as amended, the loan is repayable in forty-four (44) monthly installments of \$43,400 beginning July 5, 2022 with final payment due February 5, 2026. We intend to use the loan proceeds for payroll, rent, utilities and other operating expenses, and expect to apply for forgiveness of the loan balance as permitted under the CARES Act, as amended. The PPP loan may be prepaid at any time without penalty. The loan agreement and promissory note include customary provisions for a loan of this type, including prohibitions on our payment of dividends or repurchase of shares of our common stock while the PPP loan remains outstanding. The loan agreement and promissory note also defines events of default to include, among other things, payment defaults, breaches of provisions of the loan agreement or the promissory note and cross-defaults on other loans, if applicable.

Note 11 – Commitments and contingencies

Operating Lease Obligations

We lease office space and warehouse facilities under various lease agreements which expire through August 2026. Total rent expense for the years ended December 31, 2020 and 2019 amounted to \$40,577 and \$744,781, respectively. See Note 13. "Leases" for further discussion.

Guarantees

We guarantee certain obligations of a former subsidiary of ADGE, EuroSite Power Inc. These guarantees include a payment performance guarantee in respect of collateralized equipment financing loans, with a remaining principal amount outstanding subject to the guarantee at December 31, 2020 of approximately \$138,000 due ratably in equal installments through September 2021, and certain guarantees of performance in respect of certain customer contracts. Based on current conditions, we do not believe there to be any amounts probable of payment by us under any of the guarantees and has estimated the value associated with the non-contingent aspect of the guarantees is approximately \$7,000 which is recorded as a liability in the accompanying financial statements.

In connection with the sale of energy producing assets, we made certain guarantees to the purchaser as discussed in Note 6. "Sale of Energy Producing Assets and Goodwill Impairment." In the first quarter of 2019 we recorded a reduction on the gain on sale and a corresponding liability of \$350,000 in the consolidated financial statements to reserve for such future costs. After incurring net shortfall payments of approximately \$472,384 and recording a provision of \$81,960, the remaining balance in this reserve was an excess of \$40,425 at December 31, 2020. On February 23, 2021, we received the excess payment from the purchaser.

Change in Control Severance Benefit Plan

On July 9, 2020, our compensation committee of the board of directors adopted the Tecogen Inc. Change in Control Severance Benefit Plan ("Plan"). The Plan provides for up to 12 months of severance benefits for certain of our key management employees who are selected as plan participants by the plan administrator and who have executed a Change in Control Severance Benefit Plan Participation Notice. On July 9, 2020, Robert A. Panora, our President and Chief Operating Officer, and John K. Whiting, IV, our General Counsel and Secretary, were each designated as participants in the Plan, and on July 20, 2020, effective as of July 15, 2020, Mr. Benjamin M. Locke was identified as a participant in the plan.

Under the Plan, upon the occurrence of certain termination events following a change in control of the Company, the executive participants would receive cash severance payments equal to 12 months' salary and bonus payments, continuation of certain health benefits, the acceleration of bonus awards, and immediate vesting of outstanding unvested options (including performance options) to acquire our common stock. The severance payments are required to be paid in a single lump sum. The Plan has a term of three years and will automatically extend for successive additional one-year terms unless we provide written notice at least six months in advance of a then current term.

An executive will be entitled to severance under the Plan only if there has been a "Change in Control" of the Company and the termination of employment or service occurs during the period that is three months prior to and 18 months following a change in control of the Company. Also, a participant's employment with the Company must be terminated by a participant for "Good Reason" or be an "Involuntary Termination Without Cause" by the Company, as those terms are defined in the Plan. In order to be eligible to receive severance benefits under the Plan, an executive must comply with the terms of the Plan, including the release and non-revocation of claims in favor of the Company and certain confidentiality, non-compete, non-solicitation, and non-disparagement covenants during and following termination of employment. The Plan will be administered by the compensation committee of the board of directors (or by the full board of directors or such other committee as the board may designate).

Note 12 – Product warranty

We reserve an estimate of our exposure to warranty claims based on both current and historical product sales data and warranty costs incurred. The majority of our products are sold with a one-year warranty. We assesses the adequacy of our recorded warranty liability periodically and adjust the reserve as necessary. The warranty liability is included in accrued expenses on the accompanying consolidated balance sheets.

Changes in our warranty reserve were as follows:

Warranty reserve, December 31, 2018	\$	140,600
Warranty provision for units sold		535,700
Costs of warranty incurred		<u>(471,000)</u>
Warranty reserve, December 31, 2019		205,300
Warranty provision for units sold		185,696
Costs of warranty incurred		<u>(226,196)</u>
Warranty reserve, December 31, 2020	\$	<u>164,800</u>

Note 13 – Leases

On January 1, 2019, we adopted the guidance under ASU No. 2016-02, "Leases" ("ASC 842") under the cumulative-effect method of transition where comparative information has not been restated and continues to be reported under the standards in effect for those periods. The adoption did not result in any cumulative-effect adjustment to beginning retained earnings. We elected certain practical expedients upon adoption and therefore has not reassessed whether any expired or existing contracts contain leases, has not reassessed the lease classification for any expired or existing leases and has not reassessed initial direct costs for any existing leases.

Our leases principally consist of operating leases related to our corporate office, field offices, and our research, manufacturing and storage facilities. Our lease terms do not include options to extend or terminate the lease until we are reasonably certain that we will exercise that option.

At inception, we determined if an arrangement contains a lease and whether that lease meets the classification criteria of a finance or operating lease. Some of our lease arrangements contain lease components (e.g. minimum rent payments) and non-lease components (e.g. maintenance, labor charges, etc.). We account for each component separately based on the estimated standalone price of each component.

Operating leases are included in Right-of-use assets, Lease obligations, current and Lease obligations, long term on the Consolidated Balance Sheets. These assets and liabilities are recognized at the commencement date based on the present value of remaining lease payments over the lease term using an incremental borrowing rate consistent with the lease terms or implicit rates, when readily determinable. Short-term operating leases, which have an initial term of 12 months or less, are not recorded on the balance sheet.

Lease expense for operating leases, which principally consists of fixed payments for base rent, is recognized on a straight-line basis over the lease term. Lease expense for the years ended December 31, 2020 and 2019 was \$740,577 and \$744,781, respectively.

Supplemental information related to leases for the year ended December 31, 2020 was as follows:

liabilities	Cash paid for amounts included in the measurement of operating lease	\$	650,194
liabilities	Right-of-use assets obtained in exchange for new operating lease	\$	2,772,072
	Weighted-average remaining lease term - operating leases		3.3 years
	Weighted-average discount rate - operating leases		6 %

Future minimum lease commitments under non-cancellable operating leases as of December 31, 2020 were as follows:

	Operating Leases	
2021	\$	594,772
2022		577,260
2023		585,797
2024		153,999
2025 and thereafter		34,628
Total lease payments		1,946,456
Less: imputed interest		217,450
Total	\$	1,729,006

Note 14 – Stockholders’ equity

Common Stock

The holders of our Common Stock have the right to vote their interest on a per share basis. At December 31, 2020 and 2019, there were 24,850,261 and 24,849,261 shares of our Common Stock outstanding, respectively.

Preferred Stock

On February 13, 2013, we authorized 10 million shares of preferred stock. As of December 31, 2020, no preferred shares were issued or outstanding.

Stock-Based Compensation

We adopted the 2006 Stock Option and Incentive Plan (the “Plan”), under which the board of directors may grant incentive or non-qualified stock options and stock grants to key employees, directors, advisors and our consultants. The Plan was amended at various dates by the Board of Directors to increase the reserved shares of common stock issuable under the Plan to 3,838,750 as of December 31, 2020, and in June 2017 stockholders approved an amendment to extend the termination date of the Plan to January 1, 2026 and to ratify all of our option grants issued after January 1, 2016 (the “Amended Plan”).

Stock options vest based upon the terms within the individual option grants, with an acceleration of the unvested portion of such options upon a change in control event, as defined in the Amended Plan. The options are not transferable except by will or domestic relations order. The option price per share under the Amended Plan cannot be less than the fair

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market value of the underlying shares on the date of the grant. The number of shares remaining available for future issuance under the Amended Plan as of December 31, 2020 and 2019 was 761,812 and 1,906,180, respectively.

In 2020, we granted nonqualified options to purchase an aggregate of 1,440,000 shares of common stock in a range of \$0.71 and \$0.78 per share to certain officers and employees. These options have a vesting schedule of four years and expire in ten years. Several of the options granted in 2020 include performance-based option vesting provisions, which vesting is subject to our estimate of future financial performance and could require changes to the vesting in future periods. The fair value of the options issued in 2020 was \$404,460. The weighted-average grant date fair value of stock options granted during 2020 was \$0.28 per option.

In 2019, we granted nonqualified options to purchase an aggregate of 88,500 shares of common stock for between \$3.40 and \$3.80 per share to certain employees and a director. These options have a vesting schedule of four years and expire in ten years. The fair value of the options issued in 2019 was \$89,772. The weighted-average grant date fair value of stock options granted during 2019 was \$1.01 per option.

In 2020 and 2019, option holders exercised 1,000 and 24,515 options, respectively, with an aggregate intrinsic value of \$20 and \$19,794, respectively.

Stock option activity for the year ended December 31, 2020 was as follows:

Common Stock Options	Number of Options	Exercise Price Per Share	Weighted Average Exercise Price	Weighted Average Remaining Life	Aggregate Intrinsic Value
Outstanding, December 31, 2019	1,352,874	\$0.79-\$10.33	\$ 3.57	5.30 years	\$ 95,381
Granted	1,440,000	\$0.71-\$0.78	0.72		
Exercised	(1,000)	\$1.20	1.20		20
Canceled and forfeited	(295,632)	\$1.20-\$5.65	3.42		
Outstanding, December 31, 2020	2,496,242	\$0.71-\$10.33	\$ 1.94	7.37 years	\$ 731,744
Exercisable, December 31, 2020	828,825		\$ 3.61		\$ 11,044
Vested and expected to vest, December 31, 2020	2,246,565		\$ 2.04		\$ 623,639

We used a forfeiture rate of 15% to calculate the expected to vest shares in the table above. We use the Black-Scholes option pricing model to determine the fair value of stock options granted. Use of a valuation model requires management to make certain assumptions with respect to selected model inputs. Expected volatility was calculated based on the average volatility of four comparable publicly traded companies. The average expected life was estimated using the simplified method to determine the expected life based on the vesting period and contractual terms, since we do not have the necessary historical exercise data to determine an expected life for stock options. We use a single weighted-average expected life to value option awards and recognize compensation on a straight-line basis over the requisite service period for each separately vesting portion of the awards. The risk-free interest rate is based on U.S. Treasury zero-coupon issues with a remaining term which approximates the expected life assumed at the date of grant.

The weighted average assumptions used in the Black-Scholes option pricing model for options granted in 2020 and 2019 are as follows:

Stock option awards:	2020	2019
Expected life	6.25 years	6.25 years
Risk-free interest rate	0.41%	2.56%
Expected volatility	40.10%	22.50%

During the years ended December 31, 2020 and 2019, we recognized stock-based compensation expense of \$190,944 and \$163,464, respectively, related to the issuance of stock options. No tax benefit was recognized related to the stock-based compensation expense recorded during either of the years. At December 31, 2020 and 2019, the total compensation cost related to unvested stock option awards not yet recognized is \$523,989 and \$340,503, respectively. This amount will be recognized over a weighted average period of 2.10 years.

Note 15 – Fair value measurements

The fair value topic of the FASB Accounting Standards Codification defines fair value as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. The accounting guidance also establishes a fair value hierarchy which requires an entity to maximize the use of observable inputs, where available, and minimize the use of unobservable inputs when measuring fair value. There are three levels of inputs that may be used to measure fair value:

Level 1 - Unadjusted quoted prices in active markets for identical assets or liabilities. We currently do not have any Level 1 financial assets or liabilities.

Level 2 - Observable inputs other than quoted prices included in Level 1. Level 2 inputs include quoted prices for identical assets or liabilities in non-active markets, quoted prices for similar assets or liabilities in active markets and inputs other than quoted prices that are observable for substantially the full term of the asset or liability.

Level 3 - Unobservable inputs reflecting management’s own assumptions about the input used in pricing the asset or liability. We currently do not have any Level 3 financial assets or liabilities.

The following table presents the asset reported in the consolidated balance sheet measured at its fair value on a recurring basis as of December 31, 2020 and 2019 by level within the fair value hierarchy.

December 31, 2020	Quoted prices in active markets for identical assets				Significant other observable inputs	Significant unobservable inputs	Total losses
	Total	Level 1	Level 2	Level 3			
Recurring fair value measurements							
Available-for-sale equity securities							
EuroSite							
Power Inc.	\$ 118,084	\$ —	\$ 118,084	\$ —			\$ (98,403)
Total recurring fair value measurements	\$ 118,084	\$ —	\$ 118,084	\$ —			\$ (98,403)
December 31, 2019							
Recurring fair value measurements							
Available-for-sale equity securities							
EuroSite							
Power Inc.	\$ 236,167	\$ —	\$ 236,167	\$ —			\$ (19,680)
Total recurring fair value measurements	\$ 236,167	\$ —	\$ 236,167	\$ —			\$ (19,680)

We utilize a Level 2 category fair value measurement to value its investment in EuroSite Power Inc. as an available-for-sale security at period end. That measurement is equal to the quoted market closing price at period end. Since this security is not actively traded we are classifying as Level 2.

Note 16 – Retirement plans

We have a defined contribution retirement plan (the “Plan”), which qualifies under Section 401(k) of the Internal Revenue Code (IRC). Under the Plan, employees meeting certain requirements may elect to contribute a percentage of their salary up to the maximum allowed by the IRC. We matched a variable amount based on participant contributions up to a maximum of 4.5% of each participant’s salary. In May 2020, we discontinued the matching of employee contributions for those employees not covered under a collective bargaining agreement. We contributed approximately \$124,507 and \$265,280 in matching contributions to the Plan in 2020 and 2019, respectively.

Note 17 – Segments

As of December 31, 2020, we were organized into two operating segments through which senior management evaluates our business. These segments, as described in more detail in Note 1, are organized around the products and services provided to customers and represent our reportable segments. Prior to the acquisition of ADGE (see Note 4. "Acquisition of American DG Energy Inc."), our operations consisted of a single segment. The following table presents information by reportable segment for the years ended December 31, 2020 and 2019:

	Products and Services	Energy Production	Corporate, other and elimination (1)	Total
Year ended December 31, 2020				
Revenue - external customers	\$ 26,417,398	\$ 1,837,181	\$ —	\$ 28,254,579
Intersegment revenue	399,744	—	(399,744)	—
Total revenue	\$ 26,817,142	\$ 1,837,181	\$ (399,744)	\$ 28,254,579
Gross profit	\$ 10,159,978	\$ 667,536	\$ —	\$ 10,827,514
Identifiable assets	\$ 25,706,960	\$ 4,366,693	\$ —	\$ 30,073,653
Year ended December 31, 2019				
Revenue - external customers	\$ 30,285,614	\$ 3,140,834	\$ —	\$ 33,426,448
Intersegment revenue	609,530	—	(609,530)	—
Total revenue	\$ 30,895,144	\$ 3,140,834	\$ (609,530)	\$ 33,426,448
Gross profit	\$ 11,091,898	\$ 1,386,854	\$ —	\$ 12,478,752
Identifiable assets	\$ 32,508,704	\$ 8,607,931	\$ —	\$ 41,116,635

(1) Corporate, intersegment revenue, other and elimination includes various corporate assets.

Note 18 – Income taxes

A reconciliation of the federal statutory income tax provision to our actual provision for the years ended December 31, 2020 and 2019 is as follows:

	2020	2019
Pre-tax book income (loss)	\$ (6,187,020)	\$ (4,779,179)
Expected tax at 21%	(1,299,274)	(1,008,353)
Permanent differences:		
Mark to market	20,665	4,133
Goodwill impairment	613,677	775,572
Intangible Amortization	(84,085)	(105,573)
Other	2,757	684
State taxes:		
Current	30,171	15,194
Deferred	(161,203)	(110,517)
Other items:		
Federal research and development credits	(13,161)	(48,153)
Change in valuation allowance	1,049,000	1,479,000
Deferred tax past year true-up's	11,767	(30,981)
Other	(140,143)	(955,812)
Income tax provision	\$ 30,171	\$ 15,194

The components of net deferred tax assets recognized in the accompanying consolidated balance sheets at December 31, 2020 and 2019 are as follows:

	2020	2019
Net operating loss carryforwards	\$ 9,341,000	\$ 8,299,000
R&D and ITC credit carryforwards	313,000	317,000
Accrued expenses and other	267,000	1,224,000
Intangibles	191,000	—
Leases	25,000	—
Accounts receivable	108,000	20,000
Stock options	238,000	—
Inventory	217,000	78,000
Property, plant and equipment	790,000	779,000
Other	276,000	—
Deferred tax assets	11,766,000	10,717,000
Valuation allowance	(11,766,000)	(10,717,000)
Deferred tax assets, net	\$ —	\$ —

At December 31, 2020, we had approximately \$37,638,000 of Federal net operating loss carryforwards ("NOL") of which \$27,640,000 expire beginning in 2021 through 2037 and \$9,998,000 have an indefinite carryforward. In addition, we have \$1,437,000 of state net operating losses, expiring at various dates starting in 2021 through 2039.

The Tax Cuts and Jobs Act was enacted on December 22, 2017. A significant provision of the act was to reduce the statutory Federal tax rate from 34% to 21%. During 2020, our valuation allowance increased by \$1,049,000. This increase is affected by the absorption of deferred tax attributes associated with its acquisition of American DG Energy, Inc. along with permanent book to tax differences and provision to return adjustments.

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act ("CARES"), a sweeping stimulus bill intended to bolster the U.S. economy, and provide emergency assistance to qualifying businesses and individuals, was enacted and signed into law in response to the COVID-19 pandemic. The CARES Act, among other things, permits net operating loss carryovers and carrybacks to offset 100% of taxable income for taxable years beginning before 2021. In addition, the CARES Act allows net operating losses incurred in tax years 2018 through 2020 to be carried back to each of the five preceding taxable years to generate a refund of previously paid income taxes. We are currently evaluating the impact of this provision, but do not expect the net operating loss carryback provision will yield a material benefit. The CARES Act also modifies the limitation of business interest expense for the tax years beginning in 2019 and 2020. The modifications to Section 163(j) of the Internal Revenue Code increases the allowable business interest deduction from 30% of adjusted taxable income to 50%. This modification is not expected to materially effect us, as our adjusted taxable income is below zero for the tax years beginning in 2019 and 2020.

On April 17, 2020, we obtained an unsecured loan through Webster Bank, N.A. in the amount of \$,874,200 in connection with the Paycheck Protection Program ("PPP") pursuant to CARES and as administered by the United States Small Business Administration ("SBA"). On November 10, 2020, we submitted a loan forgiveness application to Webster seeking full forgiveness of the PPP loan. On January 19, 2021, we received a letter dated January 12, 2021 from Webster Bank, NA confirming that the Paycheck Protection Program Loan granted to us pursuant to the Coronavirus Aid, Relief, and Economic Recovery Act, as amended, in the original principal amount of \$1,874,200 together with all accrued interest thereon was forgiven in full as of January 11, 2021. The loan forgiveness amount which aggregates to \$,886,933, including \$12,733 of accrued interest, will be recognized in the first quarter of Fiscal 2021 (see Note 18. "Subsequent Events.") The funds received by us are expected to be nontaxable and have been treated accordingly.

In accordance with the provisions of the Income Taxes topic of the Codification, we have evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets, which are comprised principally of net operating losses. Management has determined that it is more likely than not that we will not recognize the benefits of federal and state deferred tax assets and, as a result, a full valuation allowance has been established for 2019 and 2020 respectively.

Utilization of the NOL and research and development credit carryforwards are subject to a substantial annual limitation due to ownership changes, as provided by Section 382 of the Internal Revenue Code of 1986, as well as similar state provisions. Ownership changes may limit the amount of NOL and tax credit carryforwards that can be utilized to offset future taxable income and tax, respectively. In general, an ownership change, as defined by Section 382, results from transactions increasing the ownership of certain shareholders or public groups in the stock of a corporation by more than 50 percentage points over a three-year period.

We acquired American DG Energy, Inc. during 2017, by acquiring 100 percent of the company's stock. Accordingly, utilization of their consolidated and/or separately computed NOL and/or tax credit carryforwards will be subject to an annual limitation under Internal Revenue Code Section 382. Any such limitation may result in expiration of a portion of the NOL or tax credit carryforwards before utilization. The extent of the limitation, and related allocation and impact upon the NOL and credit carryforwards has been determined to be \$391,940 per year for a 20 year period at the ADGE level. However, we have sufficient pre-merger NOLs to offset anticipated taxable income for the taxable year ended December 31, 2020 and is not expected to be limited in NOL utilization for the period.

A full valuation allowance has been provided against our loss carryforwards and, if an adjustment is required under Section 382, it would be offset by a corresponding adjustment to the valuation allowance. Thus, there would be no impact to the balance sheet or statement of operations if an adjustment were required.

We have not recorded any amounts for unrecognized tax benefits as of December 31, 2020 or 2019.

We file tax returns as prescribed by the tax laws of the jurisdiction in which it operates. In the normal course of business, we are subject to examination by federal and state jurisdictions, where applicable. There are currently no pending tax examinations. Our tax returns from tax year 2017 are still open for examination for both federal and state jurisdictions.

Note 19 - Subsequent Events

We have evaluated events through the date of this filing, and, except as described below, have determined that no material subsequent events occurred that would require recognition in the consolidated financial statements or disclosure in the notes thereto.

On January 19, 2021, we received a letter dated January 12, 2021 from Webster Bank, NA confirming that the Paycheck Protection Program Loan granted to us pursuant to the Coronavirus Aid, Relief, and Economic Recovery Act, as amended, in the original principal amount of \$1,874,200 together with all accrued interest thereon was forgiven in full as of January 11, 2021. The loan forgiveness amount which aggregates to \$1,886,933, including \$12,733 of accrued interest, will be recognized in the first quarter of Fiscal 2021 and will be accounted for as debt extinguishment in accordance with Accounting Standards Update 2020-09, *Debt (Topic 470)* ("ASU 2020-09") and reported as a separate component of operating income in the consolidated statements of earnings.

On February 5, 2021, we obtained a Paycheck Protection Program Second Draw unsecured loan through Webster Bank, N.A. in the amount of \$,874,269 in connection with the Paycheck Protection Program pursuant to the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act"), as amended. The loan is guaranteed by the United States Small Business Administration. We intend to use the loan proceeds for payroll, rent, utilities and other operating expenses, and expects to apply for forgiveness of the loan balance as permitted under the CARES Act, as amended.

On March 5, 2021, we formed a wholly owned Canadian subsidiary Tecogen CHP Solutions, Inc. that was registered under the Ontario Business Corporation Act. Tecogen CHP Solutions Inc. will provide maintenance services in Canada.



01/12/21

TECOGEN INC
45 FIRST AVENUE
WALTHAM, MA 02451

RE: LOAN# 00004750845009

DEAR CUSTOMER,

PLEASE ACCEPT THIS LETTER AS CONFIRMATION THAT THE ABOVE-REFERENCED SBA PAYCHECK PROTECTION PROGRAM LOAN ('LOAN') IS PAID IN FULL FOR THE AMOUNT OF \$1,887,858.55 EFFECTIVE 01/11/21. THERE IS A ZERO BALANCE ON THIS LOAN, AND NOTHING FURTHER IS OWED TO WEBSTER BANK, NATIONAL ASSOCIATION IN RELATION TO THIS ACCOUNT.

THANK YOU AND PLEASE CONTACT US AT THE NUMBER LISTED BELOW SHOULD YOU HAVE ANY QUESTIONS.

RESPECTFULLY,

WEBSTER BANK, NA
(800)482-2220

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in this Registration Statements (Nos. 333-218244 and 333-187928) on Form S-8 and the Registration Statements (Nos. 333-199634, 333-205147 and 333-212433) on Form S-3 of Tecogen Inc. of our report dated March 18, 2021, relating to the consolidated financial statements of Tecogen Inc., appearing in the 2020 Annual Report on Form 10-K of Tecogen Inc. for the year ended December 31, 2020.

Wolf & Company, P.C.

Boston, Massachusetts

March 18, 2021

EXHIBIT 31.1

**TECOGEN INC.
CERTIFICATION**

I, Benjamin M. Locke, certify that:

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

Date: March 18, 2021

/s/ Benjamin M. Locke

Benjamin M. Locke
Chief Executive and Financial Officer

EXHIBIT 32.1

**TECOGEN INC.
CERTIFICATION PURSUANT TO 18 U.S.C. SEC. 1350**

I, Benjamin M. Locke, or the Company, certify, pursuant to Section 1350, Chapter 63 of Title 18, United States Code, that, to his or her knowledge:

1. The Annual Report on Form 10-K of the Company for the year ended December 31, 2020, or the Report, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)); and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 18, 2021

/s/ Benjamin M. Locke

Benjamin M. Locke
Chief Executive and Financial Officer

The foregoing certification is being furnished solely pursuant to 18 U.S.C. § 1350 and is not being filed as part of the Report or as a separate disclosure document.

A signed original of this written statement required by 18 U.S.C. § 1350 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.