

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, 2021
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

Securities registered pursuant to Section 12(g) of the Securities Exchange Act: **Common Stock, \$0.001 par value per share**

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, 2021, 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: \$28,812,496. 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, 2022, 24,850,261 shares of common stock, \$0.001 par value per share, of the registrant were issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Certain information required for Part III of this Annual Report on Form 10-K is incorporated by reference to Tecogen Inc.'s definitive proxy statement for its 2022 Annual Meeting of Stockholders which will be filed with the Securities and Exchange Commission ("SEC") pursuant to Regulation 14A under the Securities Act of 1934, as amended, within 120 days following its fiscal year ended December 31, 2021.

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, identify 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 on 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 and 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.

ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2021

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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. These include natural gas engine driven combined heat and power (CHP) systems, chillers and heat pumps for multi-family residential, commercial, recreational and industrial use. We are known for products that provide customers with substantial energy savings, resiliency from utility power outages and for significantly reducing a customer's carbon footprint. Our products are sold with our patented Ultra® emissions technology which nearly eliminates all criteria pollutants such as NOx and CO. We are also developing Ultra® for other applications including stationary engines and forklifts. See "Our Products - Ultra Low-Emissions Technology" for a more in-depth discussion of our Ultra emissions technology. We were incorporated in the State of Delaware on September 15, 2000.

We have wholly-owned subsidiaries American DG Energy, Inc. ("ADGE") and Tecogen CHP Solutions, Inc., 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.

Our operations are comprised of three business segments:

- our Products segment, which designs, manufactures and sells industrial and commercial cogeneration systems at our customers' facilities;
- our Services segment, which provides operations and maintenance ("O&M") services and turn-key installation for our products under long term service contracts and
- our Energy Production segment, which sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term energy sales agreements.

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 impacted supply chains, curtailed global economic activity, and caused significant volatility and disruption in global 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 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. We have made every effort to keep our employees who operate our business safe and minimize unnecessary risk of exposure to the virus.

Paycheck Protection Program Loan

On April 17, 2020, we obtained an unsecured loan in the principal amount of \$1,874,200 from Webster Bank, NA ("Webster") under the Paycheck Protection Program adopted pursuant to the Coronavirus Aid, Relief and Economic Recovery Act, as amended ("CARES Act"). The loan was forgivable if the proceeds were utilized by us for payroll, utilities, and rent expenses. On January 19, 2021 we received confirmation from Webster that the Paycheck Protection Program Loan in the original principal amount of \$1,874,200 together with accrued interest of \$13,659 was forgiven in full effective as of January 11, 2021. The loan forgiveness of \$1,887,859 was accounted for as a debt extinguishment and is reported as a separate component of other income (expense), net in our condensed consolidated statement of operations.

Paycheck Protection Program Second Draw Loan

On February 5, 2021, we obtained a Paycheck Protection Program Second Draw unsecured loan through Webster 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 United States Small Business Administration. On September 20, 2021, we received a letter dated September 13, 2021 from Webster Bank, NA confirming that the Paycheck Protection Program Second Draw Loan issued to us pursuant to the CARES Act in the original principal amount of \$1,874,269 together with accrued interest of \$11,386 was forgiven in full as of September 8, 2021. The loan forgiveness of \$1,885,655 was accounted for as debt extinguishment and is reported as a separate component of other income (expense), net in our condensed consolidated statement of operations.

Employee Retention Credit

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act") was signed into law providing numerous tax incentives and other stimulus measures, including an employee retention credit ("ERC"), which is a refundable tax credit against certain employment taxes. The Taxpayer Certainty and Disaster Tax Relief Act of 2020 and the American Rescue Plan Act of 2021 extended and expanded the availability of the ERC. The ERC was available with respect to periods through October 1, 2021 and was equal to 70% of qualified wages (which includes employer qualified health plan expenses) paid to employees. In addition, the availability of the ERC was permitted to entities that received a Paycheck Protection Loan subject to certain conditions. During each quarter in 2021, a maximum of \$10,000 in qualified wages for each employee was eligible for the ERC. Therefore, the maximum tax credit that can be claimed by an eligible employer in 2021 is \$7,000 per employee per calendar quarter. Section 2301(c)(2)(B) of the CARES Act permits an employer to use an alternative quarter to calculate gross receipts and the employer may determine if the decline in gross receipts tests is met for a calendar quarter in 2021 by comparing its gross receipts for the immediately preceding calendar quarter with those for the corresponding calendar quarter in 2019. Accordingly, for the first quarter of 2021, we elected to use our gross receipts for the fourth calendar quarter of 2020 compared to our gross receipts for the fourth calendar quarter of 2019. As a result of our election to use an alternative quarter, we qualified for the ERC in the first, second and third quarters of 2021 because our gross receipts decreased by more than 20% from the first, second and third quarters of 2019. As a result of averaging 500 or fewer full-time employees in 2019, all wages paid to employees in the first, second and third quarters of 2021 were eligible for the ERC. Note, wages used towards PPP loan forgiveness can not be used as qualified wages for purposes of the ERC. During the year ended December 31, 2021 we recorded ERC benefits of \$1,276,021 shown in other income (expense), net in our condensed consolidated statements of operations and such claimed ERCs are disclosed within accounts receivable in our consolidated balance sheet.

Air Cooled Chiller Development

In Q3 2021 we began development on a hybrid air-cooled chiller. We recognized that there were many applications where the customer wanted an easy to install roof top chiller. Using the inverter design from our InVerde e+ cogeneration module, we developed the novel concept of a hybrid chiller. This system can simultaneously take two inputs, one from the grid or a renewable energy source and one from our natural gas engine. This allows a customer to have the optimum blend of operational cost savings and greenhouse gas benefits while providing added resiliency from two power sources. We expect to have a prototype operational by Q4 2022 and to see incremental revenue by the early part of 2023. A provisional patent based on this concept has been filed with the US Patent and Trademark Office.

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 these sales, 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. In October 2021 the minimum guarantee with respect to one of the energy purchase agreements was modified by reducing the guaranteed minimum collections by \$35,000 per year, the guaranteed minimum collection amount associated with one site that was sold by the customer.

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

Tecogen products offer customers energy savings, resiliency and a cleaner environmental footprint. Our cogeneration, chiller and heat pump systems use an engine to generate electricity or shaft work and recover the waste heat from the engine. Our systems are greater than 88% efficient compared to typical electrical grid efficiencies of 40% to 50%. As a result, our greenhouse gas (GHG) emissions are typically half that of the electrical grid. Our systems generate electricity and hot water or in the case of our Tecochill product, both chilled water and hot water. 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.

Our commercial product lines include:

- the InVerde e+® and TecoPower® cogeneration units; these systems supply electricity and hot water;
- Tecochill® air-conditioning and refrigeration chillers; these systems produce chilled water and hot water;
- Tecofrost® gas engine-driven refrigeration compressors; these systems circulate refrigerant and provide hot water as a byproduct;
- Ilios® high-efficiency water heaters; These provide hot water at a significantly higher efficiency than a conventional boiler (250% vs 75%);
- Ultera® emissions control technology.

Traditional customers for our InVerde and Tecopower products have a simultaneous need for electrical power and hot water. These include hospitals, nursing homes, schools, universities, health clubs, spas, hotels and motels, office and multi-unit residential buildings. Conversely our Tecochill product benefits customers who have a simultaneous need for cooling and hot water which is typical in sites such as hospitals, ice rinks, indoor agriculture and food processing. Our Tecofrost 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.

Our cooling and refrigeration products provide both cooling and high grade waste heat. This is of particular advantage in facilities that control both temperature and humidity. In such facilities, climate control is achieved by cooling the facility to remove humidity and then reheating to the required temperature. Using engine waste heat to perform the reheat while utilizing natural gas to generate the cooling provides significant economic and environmental benefits. As a result our product has significant competitive advantages in applications that operate year round such as controlled environment agriculture, indoor ice rinks, and hospitals.

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 including 26 cogeneration units sold in this territory during 2020 to serve public housing facilities.

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 engine exhaust. This technology's U.S. and foreign patents were granted beginning in October 2013 and other domestic and foreign patents granted or applications are 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. In 2018, a group of natural gas engine-generators fitted with the Ultera system were successfully permitted in the Los Angeles region for 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 retrofitting 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. This approach has significant advantages over utilizing a single larger cogeneration or chiller unit, allowing 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.

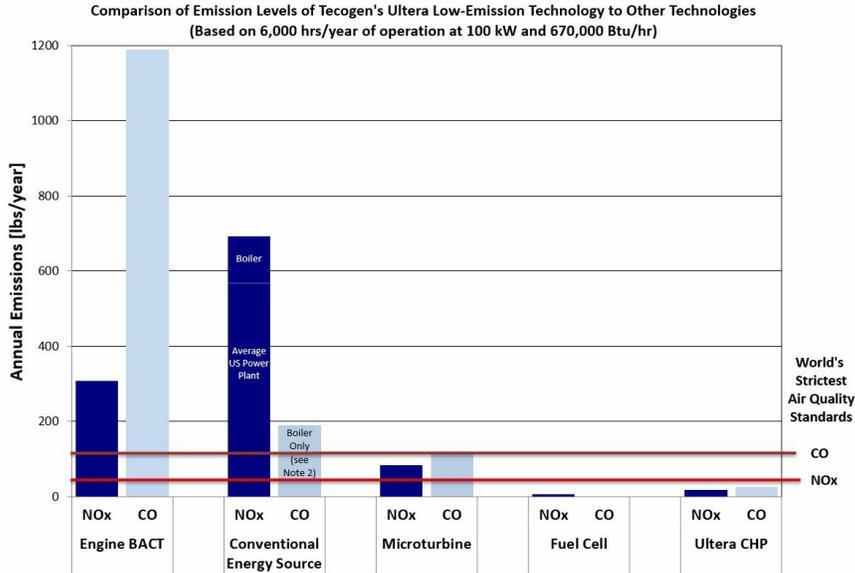
Our products are sold directly to customers by our in-house marketing team, and by established sales agents and representatives.

Our operations are comprised of three business segments. Our Products segment designs, manufactures and sells industrial and commercial cogeneration systems as described above. Our Services segment provides O&M services for our products under long term service contracts. Our Energy Production segment sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term sales agreements.

Ultra Low-Emissions Technology

All of our CHP products are available with the patented Ultera® 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 chart below compares emission levels of our Ultera technology to other technologies. As of December 31, 2021, our Ultera CHP and fuel cell technologies are the only technologies that we know of which comply with California's air quality standards for CO and NOx, 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. We believe that as environmental regulation becomes more stringent in the United States, our emissions technology may be used in markets including generators, fork trucks and biogas engines.



(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 2015.
 (5) Stationary Engine BACT as defined by SCAQMD.

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 increased 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 with regulatory requirements.

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 current regulations in the Los Angeles region became effective.

It is noteworthy that these engine-generators have been used in California to power dispersed loads in a fire-prone area where frequent de-energizing of the electric overhead power lines is required for safety. We believe this application to be a new and significant application for the Ultera technology in light of the widely publicized widespread outages in California in 2019 and 2020.

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.

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 inroads 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. In 2018, the PERC funded portion of the project concluded successfully. Mitsubishi Caterpillar Forklift America ("MCFA"), a major supplier in North and South America, provided technical and marketing support and supplied a test truck. In 2019, engineers from MCFA collaborated with our research staff to finalize the engine tuning for optimization of the Ultera process. This work successfully demonstrated highly improved emissions levels for the fork truck.

Services

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 cogeneration equipment.

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 7.1% and 6.5% our consolidated revenues for the years ended December 31, 2021 and 2020, respectively. See Note 17 "Segments" of the Notes to the Consolidated Financial Statements.

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 manufacturer's representatives and outside sales representatives who are compensated by commissions for designated territories and product lines. During the year ended December 31, 2021 no customer accounted for more than 10% of our revenues. During the year ended December 31, 2020 one customer accounted for more than 10% of our revenues. We typically sell our chiller products through our manufacturing representatives with assistance from our internal sales team. Our combined heat and power products are typically sold direct to end customers by our internal sales team.

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% to 50%.

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. Cogeneration, 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. We believe that if cogeneration were applied on a large scale, global fuel usage might be dramatically curtailed and the utility grid made far more resilient. Furthermore, with

technology we have introduced, like the Ultera 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.

Our 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.

Decentralizing power generation or reducing energy requirements at a customer's site 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 current values, and that electric rates are expected to continue to rise more significantly 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, more than 23 states recognize CHP as part of their Renewable Portfolio Standards or Energy Efficiency Resource Standards.

The traditional markets for CHP systems are buildings with long hours of operation and with corresponding demand for electricity or cooling and heat. Traditional customers for our cogeneration systems include controlled environment agriculture, 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.

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.

InVerde and Tecopower

Our combined heat and power products that produce electricity and hot water 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. Our products are highly competitive between 60KW and 1.5MW in electrical generation capacity. In this size range we have other reciprocating engine competitors, although we have strong competitive advantages when it comes to ease of utility interconnection and our microgrid capabilities. 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 fuel cell 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 Ultra 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.

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

- Provide a more efficient solution that provides operational savings for a facility's energy needs including cooling, electricity and hot water;
- Provide power when a utility grid is not available or goes out of service;
- Reduce emissions of criteria pollutants (NOx and CO) to near-zero levels and cut the emission of greenhouse gases such as carbon dioxide due to increased efficiencies compared to the electric grid;
- Provide reliable on-site power generation, heating and cooling services; and

We believe that no other company has developed a product that provides the features and benefits provided by our inverter-based InVerde e+, which offers UL-certified grid connection and sophisticated off-grid and microgrid capabilities. 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 for time-limited 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 driven chillers continue to have an efficiency advantage over absorption machines. Tecochill chillers reach efficiencies well above levels achieved by similarly sized absorption systems. 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. In 2022 we plan to expand our Tecochill range of products to include a hybrid air cooled chiller based on the inverter design used in the InVerde. The hybrid air-cooled chiller will take simultaneous inputs from the electrical grid and the natural gas engine so that it can operate with the lowest cost and/or greenhouse gas footprint at any time based on changing conditions.

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.

Research & Development

Our long and rich research and development tradition and sustained programs have 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 Ultra 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 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 mobile application. This effort focuses on the evaluation of advanced catalyst formulations tailored to the Ultera process and is ongoing.

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, 2021, such royalties accrued in accordance with this grant agreement were less than \$13,000 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.

Our current internal R&D efforts are focused on the hybrid air cooled chiller that utilizes the basic inverter design used in the InVerde e+. Management believes that this chiller will address a significant market segment that is currently unaddressed by our existing Tecochill product. For the years ended December 31, 2021 and 2020, we spent \$542,079 and \$767,323, respectively, on research and development activities.

Intellectual Property

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

- 10,774,720: "NOx 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.

Our patents expire between 2022 and 2037.

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 \$13,000 on an annual basis through the year ended December 31, 2021. 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.

One other company has developed a product that seeks to compete with our inverter-based InVerde, although it does not offer all of the same benefits and features offered by our InVerde products. We anticipate that an inverter-based product with at least some of the features offered by our InVerde products 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) provides 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 although our Waltham lease expires March 31, 2024 and we will need to identify and move to alternate space prior to expiration of the Waltham lease.

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 to reduce the electricity they take from the utility and to preserve electric capacity available 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 Rohrabcher-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 distributed generation of energy, a critical element of our business model. 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 distributed generation facility's ability to obtain reliable and affordable back-up power through interconnection with the grid is essential to our business model. Utility policies and regulations in most states often do not accommodate widespread on-site generation. Barriers erected by electric utility companies and unfavorable regulations, where applicable, make our ability to connect to the electric grid at customer sites more difficult or uneconomic and is an impediment to the growth of our business. The development of our business 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 seek to do business.

Environmental Matters

We are regulated by federal, state and international environmental laws governing our use, transport and disposal of substances and control of emissions. In addition to governing our manufacturing and service operations, these laws often impact the development of our products, including, but not limited to, required compliance with air emissions standards applicable to internal combustion engines. We have made, and will continue to make, the necessary research and development and capital expenditures to comply with these emissions standards.

On occasion, we may be engaged in remedial activities at a location, often with other companies, pursuant to federal and state laws. When it is probable, we will pay remedial costs at a site, and those costs can be reasonably estimated, the investigation, remediation, and operating and maintenance costs of the remedial action are accrued against our earnings. Costs are accrued based on consideration of currently available data and information with respect to each individual site, including available technologies, current applicable laws and regulations, and prior remediation experience. The amount recorded for environmental remediation is not material.

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 and 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. 2021 was unique due to 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.
- Limiting 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.

Employees

As of December 31, 2021, we employed 77 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 has and could continue to have a material and adverse effect on our business, financial condition and results of operations. During the year ended December 31, 2021, our revenues were negatively impacted due to supply chain issues and project deferrals. 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. 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 together with proceeds of loans under the CARES Act, as amended ("CARES Act") that we have obtained and were forgiven as described below 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 in full by the SBA.

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 utilized the loan for payroll, rent, and utilities during the applicable covered period. Effective September 8, 2021, the loan together with all accrued interest thereon was forgiven in full by the SBA.

Based upon our operating and cash flow plan and the proceeds of our Paycheck Protection 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 losses and there can be no assurance we will be able to increase our sales and sustain profitability in the future.

Although we made a net profit of \$3.7 million in 2021 as a result of the Paycheck Protection Program Loans and Employee Retention Credits in the amount of \$5.0 million in the aggregate, we have historically incurred annual operating losses, including an operating loss of \$1.2 million for 2021, an operating loss of \$6.0 million for 2020, and an operating loss of \$4.7 million for 2019. Our business 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, 2021 was \$11,321,043 compared to \$8,273,879 as of December 31, 2020. 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, and both the cost of natural gas and the cost of electricity for base load and peak load may be adversely affected by geopolitical disruptions such as Russian expansion into the Ukraine and political and other responses to such expansionist activity.

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.

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, including 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 contracts with energy production sites.

Our revenue from energy billing may be adversely impacted by increases in the price of natural gas, reductions in utility rates for electrical power, weather conditions, or by an increase in remote work and study environments, 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. In addition, increases in the cost of natural gas may increase the cost of power generation in comparison to the cost of power from the electric grid and may result in decreased revenue and adversely affect our results of operation. Increased remote work and remote study environments during the COVID-19 pandemic has resulted in decreased commercial electricity and revenue generated by our systems, and has adversely affected 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, 2021, our goodwill was \$2,406,156, and our intangible assets were \$1,181,023. We recognized goodwill impairment relating to our energy production segment of \$2,875,711 for the year ended December 31, 2020. 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 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 increase costs to 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. For example, we are eligible for 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 was \$549,206 as of December 31, 2021, an increase of \$131,206 when compared to the provision for doubtful accounts as of December 31, 2020. 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 our share price may 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 13.85% of our issued and outstanding shares. John Hatsopoulos, a director, beneficially owns approximately 9.45% 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 stock holdings 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, 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 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. 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 Inc.'s OTCQX Best Market 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 seek to list our stock for trading on a national securities exchange or be 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 the company. 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 the company. 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, is costly and puts 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 our principal financial 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, 2021, our principal executive officer and principal financial officer performed an evaluation of our 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, 2021. 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

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, 2021, no customer accounted for more than 10% of our revenues. During the year ended December 31, 2020, one customer accounted for more than 10% of our revenues. There were two customers who represented more than 10% of the accounts receivable balance as of December 31, 2021, and zero customers who accounted for more than 10% of the accounts receivable balance as of December 31, 2020. 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 \$131,206 to \$549,206 in the year ended December 31, 2021, compared to the year ended December 31, 2020. 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 our business, financial condition and results of operations.

Item 1B. Unresolved Staff Comments.

None.

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 \$43,609. 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, 2021, 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, 2022, 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 any bank or other indebtedness that we may enter into, 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 number of shares of common stock issuable under the Plan to 3,838,750 as of December 31, 2021, 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, 2021 and 2020 was 764,768 and 1,022,768, respectively.

The following table provides information as of December 31, 2021, regarding Common Stock that may be issued under the 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	2,386,842	\$ 1.81	764,768
Equity compensation plans not approved by security holders	—	—	—
Total	2,386,842	\$ 1.81	764,768

Item 6. [Reserved].

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, markets, and maintains high efficiency, ultra-clean cogeneration products. These include natural gas engine driven combined heat and power (CHP) systems, chillers and heat pumps for multi-family residential, commercial, recreational and industrial use. We are known for products that provide customers with substantial energy savings, resiliency from utility power outages and for significantly reducing a customer's carbon footprint. Our products are sold with our patented Ultera® technology which nearly eliminates all criteria pollutants such as NOx and CO. Our systems are greater than 88% efficient compared to typical electrical grid efficiencies of 40% to 50%. As a result, our greenhouse gas (GHG) emissions are typically half that of the electrical grid. Our systems generate electricity and hot water or in the case of our Tecochill product, both chilled water and hot water. These result in savings of energy related costs of up to 60% for our customers. Our products are expected to run on Renewable Natural Gas (RNG) as it is introduced into the US gas pipeline infrastructure.

Our products are sold directly to end-users by our in-house sales 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.

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 O&M service revenue which has 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 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 years ended December 31, 2021 and 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 segment revenue 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 Tecopower, Ilios heat pumps, and Tecochill products. In 2019, we also reintroduced our TecoFrost refrigeration line. The sales cycle varies between 6 months to a year or more. Therefore, our product revenue can be difficult to predict and the expected margin can vary. In most cases we work with consulting engineers who specify our product in new and retrofit applications. We also work with building owners directly, in some limited cases offering a full turn-key installation.

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 three business segments, as follows:

- Products segment - designs, manufactures and sells industrial and commercial cogeneration systems
- Services segment - provides O&M services for Tecogen supplied products at customer sites
- 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

Paycheck Protection Program Loan

On April 17, 2020, we obtained an unsecured loan in the principal amount of \$1,874,200 from Webster Bank, NA ("Webster") under the Paycheck Protection Program adopted pursuant to the Coronavirus Aid, Relief and Economic Recovery Act, as amended ("CARES Act"). On January 19, 2021 we received confirmation from Webster that the Paycheck Protection Program Loan in the original principal amount of \$1,874,200 together with accrued interest of \$13,659 was forgiven in full effective as of January 11, 2021. The loan forgiveness of \$1,887,859 was accounted for as a debt extinguishment and is reported as a separate component of other income (expense), net in our condensed consolidated statement of operations.

Paycheck Protection Program Second Draw Loan

On February 5, 2021, we obtained a Paycheck Protection Program Second Draw unsecured loan through Webster in the amount of \$1,874,269 in connection with the Paycheck Protection Program pursuant to the CARES Act. On September 20, 2021, we received a letter dated September 13, 2021 from Webster confirming that the Paycheck Protection Program Second Draw Loan issued to us pursuant to the CARES Act in the original principal amount of \$1,874,269 together with accrued interest of \$11,386 was forgiven in full as of September 8, 2021. The loan forgiveness of \$1,885,655 was accounted for as debt extinguishment and is reported as a separate component of other income (expense), net in our condensed consolidated statement of operations.

Employee Retention Credit

On March 27, 2020, the CARES Act was signed into law providing numerous tax incentives and other stimulus measures, including an employee retention credit ("ERC"), which is a refundable tax credit against certain employment taxes. The Taxpayer Certainty and Disaster Tax Relief Act of 2020 and the American Rescue Plan Act of 2021 extended and expanded the availability of the ERC. The ERC is available with respect to periods through October 1, 2021 and is equal to 70% of qualified wages (which includes employer qualified health plan expenses) paid to employees. In addition, the availability of the ERC was permitted to entities that received a Paycheck Protection Loan subject to certain conditions. During each quarter in 2021, a maximum of \$10,000 in qualified wages for each employee is eligible for the ERC. Therefore, the maximum tax credit that can be claimed by an eligible employer in 2021 is \$7,000 per employee per calendar quarter. Section 2301(c)(2)(B) of the CARES Act permits an employer to use an alternative quarter to calculate gross receipts and the employer may determine if the decline in gross receipts tests is met for a calendar quarter in 2021 by comparing its gross receipts for the immediately preceding calendar quarter with those for the corresponding calendar quarter in 2019. Accordingly, for the first quarter of 2021, we elected to use our gross receipts for the fourth calendar quarter of 2020 compared to our gross receipts for the fourth calendar quarter of 2019. As a result of our election to use an alternative quarter, we qualified for the ERC in the first, second and third quarters of 2021 because our gross receipts decreased by more than 20% from the first, second and third quarters of 2019. As a result of averaging 500 or fewer full-time employees in 2019, all wages paid to employees in the first,

second and third quarters of 2021 were eligible for the ERC. Wages used towards PPP loan forgiveness cannot be used as qualified wages for purposes of the ERC. During the year ended December 31, 2021 we recorded ERC benefits of \$1,276,021 shown in other income (expense), net in our condensed consolidated statements of operations and such claimed ERC's are disclosed within accounts receivable in our consolidated balance sheet.

Air Cooled Chiller Development

In Q3 2021 we began development on a hybrid air-cooled chiller. We recognized that there were many applications where the customer wanted an easy to install roof top chiller. Using the inverter design from our InVerde e+ cogeneration module, we came up with the novel concept of a hybrid chiller. This system can simultaneously take two inputs, one from the grid or a renewable energy source and one from our natural gas engine. This allows a customer to seek the optimum blend of operational cost savings and greenhouse gas benefits while providing added resiliency from two power sources. We expect to have a prototype operational by Q4 2022 and expect to see incremental revenue by early part of 2023. A provisional patent based on this concept has been filed with the US Patent and Trademark Office.

Energy Sales Agreements

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. In October 2021 the minimum guarantee with respect to one of the energy purchase agreements was modified by reducing the guaranteed minimum collections by \$35,000 per year, the guaranteed minimum collection amount associated with one site that was sold by the customer.

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 allocatable 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 our 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 requires 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.

At a minimum, we 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. We performed a quantitative goodwill impairment test of our energy production reporting unit in the fourth quarter of 2021, utilizing a discounted cash flow approach to estimate fair value of the reporting unit. Based on this analysis there was no impairment at December 31, 2021. See Note 5. "Sale of Energy Producing Assets and Goodwill Impairment".

The impairment analysis 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 our 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**Year Ended December 31, 2021 Compared to Year Ended December 31, 2020**

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 for the years ended December 31, 2021 and 2020:

	Years ended December 31,			
	2021		2020	
Revenues	100.0	%	100.0	%
Cost of Sales	52.5		61.7	
Gross Profit	47.5		38.3	
General and administrative	40.1		36.5	
Selling	10.1		9.2	
Research and development	2.2		2.7	
Long-lived asset impairment	—		0.9	
Goodwill impairment	—		10.2	
Total operating expenses	52.5		59.4	
Loss from operations	(5.0)		(21.1)	
Total other income (expense), net	20.4		(0.8)	
Consolidated net income (loss)	15.3		(22.0)	
(Income) loss attributable to the noncontrolling interest	(0.2)		0.2	
Net income (loss) attributable to Tecogen Inc.	15.1	%	(21.8)	%

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

Revenues	Years Ended					
	December 31, 2021		December 31, 2020		Increase (Decrease) \$	Increase (Decrease) %
Product:						
Cogeneration	\$	3,264,313	\$	9,233,613	\$	(5,969,300) (64.6) %
Chillers		5,723,157		1,300,483		4,422,674 340.1 %
Engineered Accessories		1,145,859		932,620		213,239 22.9 %
Total product revenue		10,133,329		11,466,716		(1,333,387) (11.6) %
Service:						
Service contracts		11,586,763		10,077,805		1,508,958 15.0 %
Installations		938,831		4,872,877		(3,934,046) (80.7) %
Total service revenue		12,525,594		14,950,682		(2,425,088) (16.2) %
Energy production		1,739,150		1,837,181		(98,031) (5.3) %
Total Revenue	\$	24,398,073	\$	28,254,579	\$	(3,856,506) (13.6) %

Revenues in 2021 were \$24,398,073 compared to \$28,254,579 in 2020, a decrease of \$3,856,506 or 13.6%. Product revenues in 2021 were \$10,133,329 compared to \$11,466,716 in 2020, a decrease of \$1,333,387 or 11.6%. This decrease from the year ended December 31, 2020 to 2021 is due primarily to a decrease in cogeneration sales of \$5,969,300 due to decreased unit volume, which is partially offset by an increase in chiller sales of \$4,422,674 and a \$213,239 increase in sales of engineered accessories. 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 2021 were \$12,525,594 compared to \$14,950,682 for the same period in 2020, a decrease of \$2,425,088 or 16.2%. 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.

Energy Production revenues for the year ended December 31, 2021 were \$1,739,150 compared to \$1,837,181 for 2020, a decrease of \$98,031, or 5.3%. This reduction in Energy Production revenue is primarily due to seasonal variations, the impact of COVID-19 resulting in the permanent closure of some hotel properties and a change to remote work and learning environments, resulting in decreased energy usage.

Cost of Sales

Cost of sales in 2021 was \$12,810,420 compared to \$17,427,065 in 2020, a decrease of \$4,616,645 or 26.5%. Our overall gross margin was 47.5% in 2021 compared to 38.3% in 2020, an increase of 11.1%. 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 a reduction in lower margin installation activities.

Cost of sales for Energy Production for the year ended December 31, 2021 was \$1,074,421 compared to \$1,169,645 in 2020, decreased primarily due to reduced operations in 2021. 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 \$88,710.

Operating Expenses

Operating expenses decreased in 2021 to \$12,806,745 compared to \$16,787,827 in 2020, a decrease of \$3,981,082 or (23.7)%.

	Years Ended		Increase (Decrease)	
	December 31, 2021	December 31, 2020	\$	%
Operating Expenses				
General and administrative	9,795,823	10,311,086	\$ (515,263)	(5.0)%
Selling	2,471,929	2,593,168	(121,239)	(4.7)%
Research and development	542,079	767,323	(225,244)	(29.4)%
Gain on sale of assets	(10,486)	(11,367)	881	(7.8)%
Long-lived asset impairment	7,400	251,906	(244,506)	(97.1)%
Goodwill impairment	—	2,875,711	(2,875,711)	(100.0)%
Total	<u>\$ 12,806,745</u>	<u>\$ 16,787,827</u>	<u>\$ (3,981,082)</u>	<u>(23.7)%</u>

General and administrative expenses decreased \$515,263 to \$9,795,823 in the year ended December 31, 2021 compared to \$10,311,086 in 2020 due primarily to a \$525,191 reduction in bad debt expense and in part due to management's effort to control overhead costs, resulting in a \$347,457 decrease in payroll and related costs, partially offset by an increase in travel related expenses of \$93,701, increased business insurance of \$88,154, increased rent and facility cost of \$78,012 and a \$70,255 increase in depreciation and amortization recognized in 2021. In addition, selling expenses decreased in 2021 to \$2,471,929 compared to \$2,593,168 in 2020, a decrease of \$121,239 due to a \$61,491 decrease in payroll and related benefits and a \$45,308 decrease in royalties. Research and development expenses decreased by \$225,244 as certain R&D projects were curtailed or stopped entirely as a consequence of COVID-19.

Gains on the sale of assets of \$10,486 were recognized in 2021 in connection with the sale of certain assets, which compares to a gain on the sale of assets of \$11,367 recognized in 2020 due to the sales of certain assets.

Impairment of long-lived assets decreased \$244,506 to \$7,400 in the year ended December 31, 2021 compared to \$251,906 in 2020 due primarily to the impairment of certain energy production assets and the abandonment of patent applications recorded in 2020.

During the year ended December 31, 2020 we recorded a goodwill impairment of \$2,875,711 as discussed in Note 9."Goodwill".

Loss from Operations

Loss from operations for the year ended December 31, 2021 was \$1,219,092 compared to a loss of \$5,960,313 in 2020, a decrease in the loss from operations of \$4,741,221. The decrease in the net loss from operations is primarily due to a decrease in the goodwill impairment of \$2,875,711 and a decrease in long-lived asset impairment of \$244,506 when compared to 2020, as discussed in Note 9."Goodwill", Note 7. "Intangible assets and liabilities other than goodwill" and Note 8. "Property, plant and equipment" in the accompanying consolidated financial statements. Improvement in loss from operations was also helped by the higher gross margin of 47.5% in 2021 compared to 38.3% in 2020, and a 23.7% reduction in operating costs.

Other Income (Expense), net

Other income, net, for the year ended December 31, 2021 was \$4,979,600 compared to an expense of \$226,707 for the same period in 2020. The extinguishment of Paycheck Protection Program debt and the Employee Retention Credit contributed \$3,773,014 and \$1,276,021 for the year ended December 31, 2021. Other income (expense) includes interest and other expense

of \$23,746 and net interest expense on debt of \$14,238 in 2021. For the same period in 2020, interest and other expense was \$2,479 and interest expense was \$125,824. For the year ended December 31, 2021, other expense, net also includes the unrealized loss on securities of \$37,497 compared to \$98,404 for the same period in 2020, 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 \$45,017 income for the year ended December 31, 2021 and loss of \$66,684 in 2020. The noncontrolling interest recognized a loss in the year ended December 31, 2020 due to the goodwill impairment recognized.

Net Income Attributable to Tecogen Inc

Net income for the year ended December 31, 2021 was \$3,696,000 compared to a net loss of \$6,150,507 for the comparable period in 2020. This was primarily due to the Paycheck Protection Program loan forgiveness and Employee Retention Credit contributing \$3,773,014 and \$1,276,021 respectively in 2021. Additionally, the reduction in loss from operations of \$4,741,221 or 79.5% further contributed to a profitable 2021.

Net Income Per Share

Net income per share for the year ended December 31, 2021 was \$0.15 compared to a \$0.25 loss per share for the same period in 2020. The basic and diluted weighted average shares outstanding for the year ended December 31, 2021 were 24,850,261 and 25,115,518, respectively. For the year ended December 31, 2020, basic and diluted shares were 24,850,258.

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)	Years End	
	December 31, 2021	December 31, 2020
Operating activities	\$ 465,033	\$ 1,407,237
Investing activities	(215,058)	(217,765)
Financing activities	1,874,269	(576,929)
Change in cash and cash equivalents	\$ 2,124,244	\$ 612,543

Consolidated working capital at December 31, 2021 was \$16,193,881, compared to \$13,023,598 at December 31, 2020, an increase of \$3,170,283 or 24.3%. Included in working capital were cash and cash equivalents of \$3,614,463 at December 31, 2021, compared to \$1,490,219 at December 31, 2020, an increase of \$2,124,244 or 142.5%. The increase in consolidated working capital is primarily due to the second draw Paycheck Protection Program loan and positive cash flow from operations.

Net cash provided by operating activities for the years ended December 31, 2021 and 2020 were \$465,033 and \$1,407,237, respectively, a decrease of \$942,204 in net cash provided by operating activities. Our accounts receivable balance decreased by \$57,618 at December 31, 2021 compared to December 31, 2020. Unbilled revenues also decreased by \$1,009,060 in connection with turnkey projects as some revenues are recognized prior to contractual milestones for invoicing. Our inventory increased by \$596,393 as of December 31, 2021 compared to December 31, 2020 and other non-current assets decreased by \$231,478 as of December 31, 2021 as compared to December 31, 2020.

Accounts payable decreased by \$674,750 from December 31, 2020 to December 31, 2021. Accrued expenses from operations decreased by \$602,073 as of December 31, 2021 compared to December 31, 2020 due to lower operating expenses. Deferred revenues decreased by \$756,722 as of December 31, 2021 as compared to December 31, 2020.

During 2021, our cash flows used by investing activities were \$215,058, and included purchases of property and equipment of \$91,451, distributions to non-controlling interests of \$82,633, capital outlays related to intangible assets such as patents and product certification of \$63,097.

During 2021, our cash flows from financing activities were \$1,874,269, being the receipt of proceeds from the Second Draw Paycheck Protection Program loan of \$1,874,269.

Our total product and installation backlog as of December 31, 2021 was \$11.3 million compared to \$8.3 million as of December 31, 2020. Backlog does not include maintenance contract service revenues or energy contract revenues.

At December 31, 2021 and 2020, we had cash and cash equivalents of \$3,614,463 and \$1,490,219, an increase of \$2,124,244 or 142.5%. During the year ended December 31, 2021, 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 \$1,276,021 of proceeds anticipated to be received from the Employee Retention Credit, 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 or equity financing 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 February 2026. Future minimum lease commitments under non-cancellable operating leases as of December 31, 2021 were \$1,956,277. 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. Chiller units for space conditioning applications 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. Chillers in indoor cultivation and other process cooling applications run year round.

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-25 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, 2021 ("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. Our management has decided that the expense associated with continued implementation of new systems is justified and continues to implement systems to 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, 2021.

At December 31, 2021, we employed 77 active full-time employees and 2 part-time employees. 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.

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 implemented a company-wide ERP system in 2019. We continue to make progress in remediating internal control weaknesses. 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, 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspection.

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this Item is incorporated by reference to our 2022 definitive proxy statement to be filed with the SEC within 120 days following the registrant's fiscal year ended December 31, 2021.

Item 11. Executive Compensation.

The information required by this Item is incorporated by reference to our 2022 definitive proxy statement to be filed with the SEC within 120 days following the registrant's fiscal year ended December 31, 2021.

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

The information required by this Item is incorporated by reference to our 2022 definitive proxy statement to be filed with the SEC within 120 days following the registrant's fiscal year ended December 31, 2021.

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

The information required by this Item is incorporated by reference to our 2022 definitive proxy statement to be filed with the SEC within 120 days following the registrant's fiscal year ended December 31, 2021.

Item 14. Principal Accountant Fees and Services.

The information required by this Item is incorporated by reference to our 2022 definitive proxy statement to be filed with the SEC within 120 days following the registrant's fiscal year ended December 31, 2021.

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, 2021 and 2020

Consolidated Statements of Operations for the years ended December 31, 2021 and 2020

Consolidated Statements of Stockholders' Equity for the years ended December 31, 2021 and 2020

Consolidated Statements of Cash Flows for the years ended December 31, 2021 and 2020

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 1 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.
4.5	Form of Non-Qualified Stock Option Award Agreement (Employee Form) under the registrant's 2022 Stock Incentive Plan filed with the registrant's Current Report on Form 8-K filed with the SEC on March 9, 2022.
4.6	Form of Incentive Stock Option Award Agreement under the registrant's 2022 Stock Incentive Plan filed with the registrant's Current Report on Form 8-K filed with the SEC on March 9, 2022.
4.7	Form of Restricted Stock Award Agreement under registrant's 2022 Stock Incentive Plan filed with the registrant's Current Report on Form 8-K filed with the SEC on March 9, 2022.
4.9	Form of Non-Qualified Stock Option Award Agreement (Non-Employee Director Form) under the registrant's 2022 Stock Incentive Plan filed with the registrant's Current Report on Form 8-K filed with the SEC on March 9, 2022.
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 10.13 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., TTeogen 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, TTeogen 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 Quarterly 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 incorporated herein by reference to Exhibit 10.24 to the registrant's Annual Report on Form 10-K for the year ended December 31, 2020, filed with the SEC on March 18, 2021.
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.
10.28	Webster Bank N.A. Letter dated September 13, 2021 regarding forgiveness of Second Draw Paycheck Protection Loan to Tecogen Inc. incorporated herein by reference to Exhibit 99.01 to the registrant's Current Report on Form 8-K filed with the SEC on September 21, 2021.
10.29	Tecogen Inc. 2022 Stock Incentive Plan adopted as of March 8, 2022 incorporated herein by reference to Exhibit 10.1 to the registrant's Current Report on Form 8-K filed with the SEC on March 9, 2022.
10.30	Tecogen Inc. Policy Regarding Compensation of Non-Employee Directors filed with the Current Report on Form 8-K filed with the SEC on March 9, 2022.

TECOGEN INC.

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.
24.1*	Power of Attorney (included on Signature pages of this Annual Report on Form 10-K)
31.1*	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2*	Certification of Chief Financial Officer pursuant to Rule 13a-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. 1350 adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
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
	<hr/>
*	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, 2021 and 2020, the related consolidated statements of operations, stockholders' equity, and cash flows, for each of the two years in the period ended December 31, 2021, 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, 2021 and 2020, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2021, 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 Matters

Critical audit matters are matters arising from the current period audit of the financial statements that were 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.

We have determined that there are no critical audit matters in the current period.

/s/ WOLF & COMPANY, P.C.

PCAOB ID 392

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

Boston, Massachusetts

March 10, 2022

CONSOLIDATED BALANCE SHEETS

ASSETS	2021	2020
Current assets:		
Cash and cash equivalents	\$ 3,614,463	\$ 1,490,219
Accounts receivable, net	8,482,286	8,671,163
Unbilled revenue	3,258,189	4,267,249
Inventory, net	7,764,989	7,168,596
Employee Retention Credit	1,276,021	—
Prepaid and other current assets	578,801	597,144
Total current assets	24,974,749	22,194,371
Property, plant and equipment, net	1,782,944	2,283,846
Right of use assets	1,869,210	1,632,574
Intangible assets, net	1,181,023	1,360,319
Goodwill	2,406,156	2,406,156
Other assets	148,140	196,387
TOTAL ASSETS	\$ 32,362,222	\$ 30,073,653
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Note payable, current	—	837,861
Accounts payable	3,508,354	4,183,105
Accrued expenses	2,343,728	1,993,471
Deferred revenue	1,957,752	1,294,157
Lease obligations, current	641,002	506,514
Unfavorable contract liabilities, current	330,032	355,665
Total current liabilities	8,780,868	9,170,773
Long-term liabilities:		
Deferred revenue, net of current portion	208,456	115,329
Note payable, net of current portion	—	1,036,339
Lease obligations, long-term	1,315,275	1,222,492
Unfavorable contract liability, long-term	929,474	1,261,386
Total liabilities	11,234,073	12,806,319
Stockholders' equity:		
Common stock, \$0.001 par value; 100,000,000 shares authorized; 24,850,261 and 24,850,261 issued and outstanding at December 31, 2021 and 2020, respectively	24,850	24,850
Additional paid-in capital	57,016,859	56,814,428
Accumulated deficit	(35,833,621)	(39,529,621)
Total Tecogen Inc. stockholders' equity	21,208,088	17,309,657
Noncontrolling interest	(79,939)	(42,323)
Total stockholders' equity	21,128,149	17,267,334
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	\$ 32,362,222	\$ 30,073,653

As of December 31, 2021 and 2020

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

CONSOLIDATED STATEMENTS OF OPERATIONS
For the Years Ended December 31, 2021 and 2020

	2021	2020
Revenues		
Products	\$ 10,133,329	\$ 11,466,716
Services	12,525,594	14,950,682
Energy production	1,739,150	1,837,181
Total revenues	24,398,073	28,254,579
Cost of sales		
Products	5,601,046	6,899,942
Services	6,134,953	9,357,478
Energy production	1,074,421	1,169,645
Total cost of sales	12,810,420	17,427,065
Gross profit	11,587,653	10,827,514
Operating expenses		
General and administrative	9,795,823	10,311,086
Selling	2,471,929	2,593,168
Research and development	542,079	767,323
Gain on sale of assets	(10,486)	(11,367)
Long-lived asset impairment	7,400	251,906
Goodwill impairment	—	2,875,711
Total operating expenses	12,806,745	16,787,827
Loss from operations	(1,219,092)	(5,960,313)
Other income (expense)		
Interest and other income	(23,746)	(2,479)
Interest expense	(14,238)	(125,824)
Gain on extinguishment of debt	3,773,014	—
Employee Retention Credit	1,276,021	—
Gain on the sale of investments	6,046	—
Unrealized loss on investment securities	(37,497)	(98,404)
Total other income (expense), net	4,979,600	(226,707)
Income (loss) before income taxes	3,760,508	(6,187,020)
State income tax provision	19,491	30,171
Consolidated net income (loss)	3,741,017	(6,217,191)
(Income) loss attributable to the noncontrolling interest	(45,017)	66,684
Net income (loss) attributable to Tecogen Inc.	\$ 3,696,000	\$ (6,150,507)
Net income (loss) per share - basic	\$ 0.15	\$ (0.25)
Weighted average shares outstanding - basic	24,850,261	24,850,258
Net income (loss) per share - diluted	\$ 0.15	\$ (0.25)
Weighted average shares outstanding -diluted	25,115,518	24,850,258

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

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
For the Years Ended December 31, 2021 and 2020

	Common Stock Shares	Common Stock \$.001 Par Value	Additional Paid-In Capital	Accumulated Deficit	Non-controlling Interest	Total
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
Distributions to non-controlling interest	—	—	—	—	(82,633)	(82,633)
Stock-based compensation	—	—	202,431	—	—	202,431
Net income	—	—	—	3,696,000	45,017	3,741,017
Balance at December 31, 2021	24,850,261	\$ 24,850	\$ 57,016,859	\$ (35,833,621)	\$ (79,939)	\$ 21,128,149

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

CONSOLIDATED STATEMENTS OF CASH FLOWS
For the Years Ended December 31, 2021 and 2020

	2021	2020
CASH FLOWS FROM OPERATING ACTIVITIES:		
Consolidated net income (loss)	\$ 3,741,017	\$ (6,217,191)
<i>Adjustments to reconcile net income (loss) to net cash used in operating activities:</i>		
Depreciation, accretion and amortization, net	469,854	414,127
Gain on the extinguishment of debt	(3,773,014)	—
Employee Retention Credit	(1,276,021)	—
Long-lived asset impairment	7,400	251,906
Gain on sale of assets	(10,486)	(11,367)
Provision for losses on accounts receivable	131,206	656,397
Gain on the sale of investments	(6,046)	—
Provision for inventory reserve	—	86,000
Unrealized loss on investment securities	37,497	98,404
Stock-based compensation	202,431	190,944
Goodwill impairment	—	2,875,711
Non-cash interest expense	—	51,190
<i>Changes in operating assets and liabilities:</i>		
<i>(Increase) decrease in:</i>		
Accounts receivable	57,618	5,555,235
Inventory, net	(596,393)	(849,367)
Unbilled revenue	1,009,060	1,154,562
Prepaid expenses and other current assets	18,343	37,889
Other non-current assets	(231,478)	825,817
<i>Increase (decrease) in:</i>		
Accounts payable	(674,750)	(1,088,651)
Accrued expenses and other current liabilities	602,073	(524,358)
Deferred revenue	756,722	(2,100,011)
Net cash provided by operating activities	<u>465,033</u>	<u>1,407,237</u>
CASH FLOWS FROM INVESTING ACTIVITIES:		
Purchases of property and equipment	(91,451)	(59,952)
Proceeds on sale of property and equipment	10,486	26,335
Purchases of intangible assets	(63,097)	(123,252)
Proceeds from sale of investments	11,637	—
Distributions to non-controlling interest	(82,633)	(60,896)
Net used in investing activities	<u>(215,058)</u>	<u>(217,765)</u>
CASH FLOWS FROM FINANCING ACTIVITIES:		
Payments on revolving line of credit, net	—	(2,452,329)
Proceeds from note payable	1,874,269	1,874,200
Proceeds from exercise of stock options	—	1,200
Net cash provided by (used in) financing activities	<u>1,874,269</u>	<u>(576,929)</u>
Change in cash and cash equivalents	2,124,244	612,543
Cash and cash equivalents, beginning of the year	1,490,219	877,676
Cash and cash equivalents, end of the year	<u>\$ 3,614,463</u>	<u>\$ 1,490,219</u>

Supplemental disclosure of cash flow information:

Cash paid for interest	\$ 241	\$ 62,013
Cash paid for taxes	\$ 19,491	\$ 30,178

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 three business segments. Our Products segment designs, manufactures and sells industrial and commercial cogeneration systems as described above. Our Services segment provides operation and maintenance services to customers for our products. 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, American DG Energy Inc. ("ADGE"), Tecogen CHP Solutions, Inc., 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, 2021.

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.

Employee Retention Credit

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act") was signed into law providing numerous tax incentives and other stimulus measures, including an employee retention credit ("ERC"), which is a refundable tax credit against certain employment taxes. The Taxpayer Certainty and Disaster Tax Relief Act of 2020 and the American Rescue Plan Act of 2021 extended and expanded the availability of the ERC.

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Section 2301(c)(2)(B) of the CARES Act permits an employer to use an alternative quarter to calculate gross receipts and the employer may determine if the decline in gross receipt tests is met for a calendar quarter in 2021 by comparing its gross receipts for the immediately preceding calendar quarter with those for the corresponding calendar quarter in 2019. Accordingly, for the first quarter of 2021, we elected to use our gross receipts for the fourth calendar quarter of 2020 compared to our gross receipts for the fourth calendar quarter of 2019. As a result of our election to use an alternative quarter, we qualified for the ERC in the first, second and third quarters of 2021 because our gross receipts decreased by more than 20% from the first, second and third quarters of 2019. As a result of averaging 500 or fewer full-time employees in 2019, all wages paid to employees in the first, second and third quarters of 2021 were eligible for the ERC. Wages used towards PPP loan forgiveness can not be used as qualified wages for purposes of the ERC.

Accounting Standards Codification 105, "Generally Accepted Accounting Principles," describes the decision-making framework when no guidance exists in US GAAP for a particular transaction. Specifically, ASC 105-10-05-2 instructs companies to look for guidance for a similar transaction within US GAAP and apply that guidance by analogy. As such, forms of government assistance, such as the ERC, provided to business entities would not be within the scope of ASC 958, but it may be applied by analogy under ASC 105-10-05-2. We accounted for the Employee Retention Credit as a government grant in accordance with Accounting Standards Update 2013-06, *Not-for-Profit Entities (Topic 958) ("ASU 2013-06")* by analogy under ASC 105-10-05-2. Under this standard, government grants are recognized when the conditions or conditions on which they depend are substantially met. The conditions for recognition of the ERC include, but are not limited to:

- An entity has been adversely affected by the COVID-19 pandemic
- We have not used qualifying payroll for both the Paycheck Protection Program and the ERC
- We incurred payroll costs to retain employees
- The process for filing for the credit is an administrative task and not a barrier to receiving the credits

During the year ended December 31, 2021, we recorded ERC benefits of \$1,276,021, respectively in other income (expense), net in our condensed consolidated statements of operations. A current receivable in the amount of \$1,276,021 is included in our condensed consolidated balance sheet as of December 31, 2021.

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, 2021 and 2020 which exceeded the \$250,000 federally insured limit were approximately \$3,092,111 and \$770,098, 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 no customer who represented more than 10% of revenues for the year ended December 31, 2021 and one customer who represented more than 10% of revenues for the year ended December 31, 2020. We have approximately five hundred thirty-five customers who represented 100% of the revenues for the year ended December 31, 2021. There were two customers who represented more than 10% of the accounts receivable balance as of December 31, 2021, and zero as of December 31, 2020.

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, 2021 and 2020, the allowance for doubtful accounts was \$549,206 and \$418,000, 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.

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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 \$7,400 and \$251,906 of long-lived assets existed as of December 31, 2021 and December 31, 2020, respectively.

For the years ended December 31, 2021 and December 31, 2020, we recorded impairment of long-lived assets as follows:

Years Ended	December 31, 2021	December 31, 2020
Energy production asset impairment	\$ —	\$ 524,972
Energy production reversal of unfavorable contract liability	—	(478,411)
Patent applications abandonment	7,400	205,345
Long-lived asset impairment	<u>\$ 7,400</u>	<u>\$ 251,906</u>

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

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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.

ASC 842 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 expected 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 three business segments. Our Products segment designs, manufactures and sells industrial and commercial cogeneration systems as described above. Our Services segment installs and maintains our cogeneration systems. Our Energy Production segment sells energy in the form of electricity, heat, hot water and cooling to our customers under long-term sales agreements.

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 2018, 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 and accounts payable. The recorded values of cash and cash equivalents, accounts receivable and accounts payable 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, 2021 and 2020, \$385,351 and \$418,180 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.

TECOGEN INC.
Notes to Audited Consolidated Financial Statements for December 31, 2021 and 2020

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, 2021 and 2020.

Year Ended		December 31, 2021		
		Products and Services	Energy Production	Total
Products		\$ 10,133,329	\$ —	\$ 10,133,329
Installation				
services		938,831	—	938,831
Maintenance				
services		11,586,763	—	11,586,763
Energy				
production		—	1,739,150	1,739,150
Total				
revenue		\$ 22,658,923	\$ 1,739,150	\$ 24,398,073

Year Ended		December 31, 2020		
		Products and Services	Energy Production	Total
Products		11,466,716	\$ —	\$ 11,466,716
Installation				
services		4,872,877	—	4,872,877
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

Products Segment

Products. Our Product revenues include cogeneration systems that supply electricity and hot water, chillers that provide air-conditioning and hot water and engineered accessories, which consist of ancillary products and parts necessary to install a cogeneration unit including integration into the customers' existing electrical and mechanical systems. Prior to January 1, 2021, engineered accessories revenue and cost of sales had been reported in our financial statements under Installation Services. Engineered accessories revenue and cost of sales from prior periods have been reclassified to conform with the current year presentation. We refer to the package of engineered accessories and engineering and design services necessary for the customers' installation of a cogeneration unit as light installation services.

We transfer control and generally recognize a sale when we ship a product from our manufacturing facility at which point the 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.

Services Segment

Maintenance Services. Maintenance services are provided under either long-term maintenance contracts or time and material maintenance contracts. Revenue under time and material 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 the amount we have the right to invoice the customer under the contract. Payment terms for maintenance services are generally 30 days.

Installation Services. We provide both complete turnkey installation services which typically include all necessary engineering and design, labor, subcontract labor to install a cogeneration unit including integration into the customers' existing electrical and mechanical systems. 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.

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, 2021 that is included in unbilled revenue is approximately \$86,218. Approximately \$1,078,332 of revenue was billed in this period that had been recognized in previous periods.

Revenue recognized during the year ended December 31, 2021 that was included in deferred revenue at the beginning of the period was approximately \$,731,965.

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.

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As of December 31, 2021, the aggregate amount of the transaction price allocated to remaining performance obligations was approximately \$2,166,208. We expect to recognize revenue of approximately 93% of the remaining performance obligations over the next 24 months, 3% 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, 2021 and 2020, advertising expense was approximately \$47,000 and \$23,000, respectively.

Research and Development Costs

Research and development expenditures are expensed as incurred. Our total research and development expenditures were approximately \$542,000 and \$767,000 for the years ended December 31, 2021 and 2020, 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.

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.

On January 1, 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 adoption 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, 2021 and 2020.

Significant New Accounting Standards Adopted this Period

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. The adoption of ASU 2020-04 did not 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 adopted ASU 2019-12 on January 1, 2021, the adoption of which did not have a material effect on our consolidated financial statements.

Note 3 – Income (loss) per common share:

Basic and diluted income (loss) per common share for the years ended December 31, 2021 and 2020, respectively, was as follows:

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	2021	2020
Numerator:		
Net income (loss) attributable to stockholders	\$ 3,696,000	\$ (6,150,507)
Denominator:		
Weighted average shares outstanding - Basic	24,850,261	24,850,258
Effect of dilutive securities:		
Stock options	265,257	—
Weighted average shares outstanding - Diluted	25,115,518	24,850,258
Basic income (loss) per share	\$ 0.15	\$ (0.25)
Diluted income (loss) per share	\$ 0.15	\$ (0.25)
Anti-dilutive shares underlying stock options outstanding	931,396	178,224

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 installed, owned, operated and maintained 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.

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 sold certain energy producing assets, including the associated energy production contracts for total consideration of \$9 million.

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. We received excess payments in both the years ended December 31, 2021 and 2020.

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, 2021 and 2020.

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, 2021 and 2020.

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Note 6 – Inventory

Inventories at December 31, 2021 and 2020 consisted of the following.

	2021	2020
Raw materials, net	\$ 6,691,991	\$ 5,846,591
Work-in-process	549,802	329,702
Finished goods	523,196	992,303
	<u>\$ 7,764,989</u>	<u>\$ 7,168,596</u>

Note 7 – Intangible Assets and Liabilities Other Than Goodwill

We capitalized \$39,691 and \$0 in product certification costs during the years ended December 31, 2021 and 2020, respectively. Also included in intangible assets are legal costs incurred by us to obtain patents for our intellectual property. These patents, once they are placed in service, are amortized on a straight-line basis over the estimated economic life of the associated product, which ranges from approximately 7-10 years. We capitalized \$23,406 and \$43,252 of patent-related costs during the years ended December 31, 2021 and 2020, respectively. We capitalized nothing in trademarks during the years ended December 31, 2021 and 2020, respectively. We capitalized \$0 and \$80,000 in favorable contract obligations in the years ended December 31, 2021 and 2020, respectively.

Intangible assets and liabilities at December 31, 2021 and 2020 consist of the following:

assets	Intangible	December 31, 2021			December 31, 2020		
		Cost	Accumulated Amortization	Net	Cost	Accumulated Amortization	Net
	Product certifications	\$ 765,850	\$ (532,676)	\$ 233,174	\$ 726,159	\$ (478,357)	\$ 247,802
	Patents	871,021	(314,997)	556,024	855,014	(220,764)	634,250
	Developed technology	240,000	(140,000)	100,000	240,000	(124,000)	116,000
	Trademarks	26,896	—	26,896	26,896	—	26,896
	R&D In process	263,936	(28,279)	235,657	263,936	—	263,936
	Favorable contract assets	384,465	(355,193)	29,272	384,465	(313,031)	71,434
		<u>\$ 2,552,168</u>	<u>\$ (1,371,145)</u>	<u>\$ 1,181,023</u>	<u>\$ 2,496,470</u>	<u>\$ (1,136,152)</u>	<u>\$ 1,360,318</u>
	Intangible liability						
	Unfavorable contract liability	\$ 3,056,655	\$ (1,797,149)	\$ 1,259,506	\$ 2,534,818	\$ (917,767)	\$ 1,617,051

The aggregate amortization expense related to intangible assets exclusive of contract related intangibles was \$97,788 and \$113,723 during the years ended December 31, 2021 and 2020, 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, 2021 and 2020 was \$319,084 and \$400,404, respectively. We abandoned certain patent applications and recorded non-cash charges of \$7,400 and \$205,345 as long-lived asset impairment in the consolidated statement of operations for the years ended December 31, 2021 and 2020, respectively.

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, which range from approximately 1-11 years, and is charged against cost of sales in the

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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
2022	\$ 205,807	\$ (318,198)	\$ (112,391)
2023	198,762	(253,372)	(54,610)
2024	178,196	(208,448)	(30,252)
2025	173,624	(130,116)	43,508
2026	169,484	(81,899)	87,585
Thereafter	214,710	(253,929)	(39,219)
	<u>\$ 1,140,583</u>	<u>\$ (1,245,962)</u>	<u>\$ (105,379)</u>

Note 8 – Property, plant and equipment

Property, plant and equipment at December 31, 2021 and 2020 consisted of the following:

	Estimated Useful Life (in Years)	2021	2020
Energy systems	10 - 15 years	\$ 3,556,488	\$ 3,526,514
Machinery and equipment	5 - 7 years	1,463,153	1,448,024
Furniture and fixtures	5 years	193,698	193,698
Computer software	3 - 5 years	192,865	192,865
Leasehold improvements	*	466,789	450,792
		<u>5,872,993</u>	<u>5,811,893</u>
Less - accumulated depreciation and amortization		<u>(4,090,049)</u>	<u>(3,528,047)</u>
Net property, plant and equipment		<u>\$ 1,782,944</u>	<u>\$ 2,283,846</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, 2021 and 2020 was \$91,047 and \$702,113, 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.

During the year ended December 31, 2021 there were no ADGE contract terminations.

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
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
Impairment	—	—	—
Balance at December 31, 2021	\$ 40,870	\$ 2,365,286	\$ 2,406,156

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.

We performed a goodwill impairment test at December 31, 2021 and determined that the estimated fair value of the energy production business assets, based on a discounted cash flow analysis, exceeded the carrying value of the assets and did not record a goodwill impairment for the year 2021.

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

Note 10 – Notes Payable

On April 17, 2020, we obtained an unsecured loan through Webster Bank, N.A. in the amount of \$1,874,200 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").

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. We have accounted for the loan forgiveness of \$1,887,859 as debt extinguishment in accordance with Accounting Standards Update 2020-09, *Debt (Topic 470) ("ASU 2020-09")* and reported as a separate component of other income (expense), net in our condensed consolidated statement of operations for the year ended December 31, 2021. The loan forgiveness is considered to be nontaxable for both state and federal purposes and has been treated accordingly in our condensed consolidated financial statements.

On February 5, 2021, we obtained a Paycheck Protection Program Second Draw unsecured loan through Webster 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 United States Small Business Administration.

On September 20, 2021, we received a letter dated September 13, 2021 from Webster Bank, NA confirming that the Paycheck Protection Program Second Draw Loan issued to us pursuant to the CARES Act, as amended, in the original principal amount of \$1,874,269 together with accrued interest of \$11,386 was forgiven in full as of September 8, 2021. We have accounted for the loan forgiveness of \$1,885,655 as debt extinguishment in accordance with Accounting Standards Update 2020-09, *Debt (Topic 470) ("ASU 2020-09")* and reported as a separate component of other income (expense), net in our condensed consolidated statement of operations for the year ended December 31, 2021. The loan forgiveness is considered to be nontaxable for both state and federal purposes and has been treated accordingly in our condensed consolidated financial statements.

Note 11 – Commitments and contingencies*Operating Lease Obligations*

We lease office space and warehouse facilities under various lease agreements which expire through February 2026. Total rent expense for the years ended December 31, 2021 and 2020 amounted to \$802,409 and \$740,577, respectively. See Note 13. "Leases" for further discussion.

Guarantees

We guaranteed 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. In October 2021, the loan was paid in full. We have no further obligation to Eurosite Power Inc. under this guarantee.

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." On February 16, 2022, we received the excess payment for the year 2021 from the purchaser. Based upon an analysis of these energy producing assets expected future performance, as of December 31, 2021 we do not expect to make any material payments under the guarantee.

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 2 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, 2019	\$	205,300
Warranty provision for units sold		185,696
Costs of warranty incurred		<u>(226,196)</u>
Warranty reserve, December 31, 2020		164,800
Warranty provision for units sold		119,752
Costs of warranty incurred		<u>(119,752)</u>
Warranty reserve, December 31, 2021	\$	<u>164,800</u>

Note 13 – Leases

On January 1, 2019, we adopted the guidance under ASU No. 2016-02, "Leases" ("ASC 842").

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.

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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, 2021 and 2020 was \$802,409 and \$740,577, respectively.

Supplemental information related to operating leases for the years ended December 31, 2021 and 2020 was as follows:

	December 31, 2021		December 31, 2020	
Cash paid for amounts included in the measurement of operating lease liabilities	\$	715,639	\$	650,194
Right-of-use assets obtained in exchange for operating lease liabilities	\$	825,848	\$	93,087
Weighted-average remaining lease term - operating leases		4.0 Years		3.3 Years
Weighted-average discount rate - operating leases		6.0 %		6.0 %

Supplemental balance sheet information related to operating leases for the years ended December 31, 2021 and 2020 was as follows:

	December 31, 2021		December 31, 2020	
Operating leases				
Right-of-use assets	\$	1,869,210	\$	1,632,574
Operating lease liability, current	\$	641,002	\$	506,514
Operating lease liability, long-term		1,315,275		1,222,492
Total operating lease liability	\$	1,956,277	\$	1,729,006

Future minimum lease commitments under non-cancellable operating leases as of December 31, 2021 were as follows:

	Operating Leases	
2022	\$	733,693
2023		744,981
2024		298,980
2025		108,762
2026		102,978
Thereafter		228,150
Total lease payments		2,217,544
Less: imputed interest		261,267
Total	\$	1,956,277

Note 14 – Stockholders' equity

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Common Stock

The holders of our Common Stock have the right to vote their interest on a per share basis. At December 31, 2021 and 2020, there were 24,850,261 and 24,850,261 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, 2021, 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, 2021, 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 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, 2021 and 2020 was 764,768 and 1,022,768, respectively.

In 2021, we granted nonqualified options to purchase an aggregate of 258,000 shares of common stock at \$1.75 per share to certain officers and employees. These options have a vesting schedule of four years and expire in ten years. The fair value of the options issued in 2021 was \$66,474. The weighted-average grant date fair value of stock options granted during 2021 was \$0.65 per share.

During 2020, we granted nonqualified options to purchase an aggregate of 1,440,000 shares of common stock for between \$0.71 and \$0.78 per share to certain employees and a director. 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 share.

In 2021 and 2020, option holders exercised 0 and 1,000 options, respectively, with an aggregate intrinsic value of \$0 and \$20, respectively.

Stock option activity for the year ended December 31, 2021 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, 2020	2,496,242	\$ 0.71 — \$10.33	\$ 1.94	7.37 years	\$ 731,744
Granted	258,000	\$1.75	1.75		
Exercised	—	—			
Canceled and forfeited	(367,400)	\$ 0.08 — \$4.50	2.70		
Outstanding, December 31, 2021	<u>2,386,842</u>	\$ 0.71 — \$10.33	\$ 1.81	7.56 years	\$ 697,935
Exercisable, December 31, 2021	<u>719,633</u>		\$ 3.53		\$ 71,785
Vested and expected to vest, December 31, 2021	<u>2,136,731</u>		\$ 1.89		\$ 604,012

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.

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The weighted average assumptions used in the Black-Scholes option pricing model for options granted in 2021 and 2020 are as follows:

Stock option awards:	2021	2020
Expected life	6.25 years	6.25 years
Risk-free interest rate	1.09%	0.41%
Expected volatility	35.86%	40.10%

During the years ended December 31, 2021 and 2020, we recognized stock-based compensation expense of \$202,431 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, 2021 and 2020, the total compensation cost related to unvested stock option awards not yet recognized is \$470,063 and \$340,503, respectively. This amount will be recognized over a weighted average period of 1.99 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, 2021 and 2020 by level within the fair value hierarchy.

	Total	Quoted prices	Significant other	Significant	Total losses
		in active markets for identical assets	observable inputs	unobservable inputs	
		Level 1	Level 2	Level 3	
December					
31, 2021					
Recurring fair value measurements					
Available-for-sale equity securities					
EuroSite					
Power Inc.	\$ 74,995	\$ —	\$ 74,995	\$ —	\$ (37,497)
Total recurring fair value measurements	\$ 74,995	\$ —	\$ 74,995	\$ —	\$ (37,497)
December					
31, 2020					
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)

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.

The following table summarizes changes in Level 2 assets which are comprised of marketable equity securities for the years ended December 31, 2021 and 2020:

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Fair value at December 31, 2019	\$	216,487
Unrealized loss		(98,403)
Fair value at December 31, 2020	\$	118,084
Fair value at December 31, 2020	\$	118,084
Sale of 93,187 shares		(5,592)
Unrealized loss		(37,497)
Fair value at December 31, 2021	\$	74,995

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 until May 2020 when we discontinued the matching of employee contributions for those employees not covered under a collective bargaining agreement. We contributed approximately \$37,560 and \$124,507 in matching contributions to the Plan in 2021 and 2020, respectively.

Note 17 – Segments

As of December 31, 2021, we were organized into three 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, 2021 and 2020:

	Products and Services	Energy Production	Corporate, other and elimination (1)	Total
Year ended December 31, 2021				
Revenue - external customers	\$ 22,658,923	\$ 1,739,150	\$ —	\$ 24,398,073
Intersegment revenue	321,618	—	(321,618)	—
Total revenue	\$ 22,980,541	\$ 1,739,150	\$ (321,618)	\$ 24,398,073
Gross profit	\$ 10,922,924	\$ 664,729	\$ —	\$ 11,587,653
Identifiable assets	\$ 28,264,287	\$ 4,097,935	\$ —	\$ 32,362,222
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

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

Notes to Audited Consolidated Financial Statements for December 31, 2021 and 2020

Note 18 – Income taxes

A reconciliation of the federal statutory income tax provision to our actual provision for the years ended December 31, 2021 and 2020 is as follows:

	2021	2020
Pre-tax book income (loss)	3,760,508	\$ (6,187,020)
Expected tax at 21%	789,707	(1,299,274)
Permanent differences:		
Mark to market	6,605	20,665
Goodwill impairment	—	613,677
Intangible amortization	(67,008)	(84,085)
Paycheck Protection Program loan forgiveness	(792,333)	—
Other	3,873	2,757
State taxes:		
Current	19,491	30,171
Deferred	(6,121)	(161,203)
Other items:		
Federal research and development credits	—	(13,161)
Change in valuation allowance	84,000	1,049,000
Deferred tax past year true-up's	(15,228)	11,767
Other	(3,495)	(140,143)
Income tax provision	<u>\$ 19,491</u>	<u>\$ 30,171</u>

The components of net deferred tax assets recognized in the accompanying consolidated balance sheets at December 31, 2021 and 2020 are as follows:

	2021	2020
Net operating loss carryforwards	\$ 9,293,000	\$ 9,341,000
R&D and ITC credit carryforwards	303,000	313,000
Accrued expenses and other	338,000	267,000
Intangibles	176,000	191,000
Leases	22,000	25,000
Accounts receivable	141,000	108,000
Stock options	288,000	238,000
Inventory	265,000	217,000
Property, plant and equipment	754,000	790,000
Other	270,000	276,000
Deferred tax assets	11,850,000	11,766,000
Valuation allowance	(11,850,000)	(11,766,000)
Deferred tax assets, net	<u>\$ —</u>	<u>\$ —</u>

At December 31, 2021, we had approximately \$37,515,000 of Federal net operating loss carryforwards ("NOL") of which \$27,640,000 expire beginning in 2022 through 2037 and \$9,875,000 have an indefinite carryforward. In addition, we have \$1,414,000 of state net operating losses, expiring at various dates starting in 2022 through 2040.

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 2021, our valuation allowance increased by \$84,000. 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.

Notes to Audited Consolidated Financial Statements for December 31, 2021 and 2020

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act ("CARES Act"), 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. 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 January 12, 2021, we received confirmation 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. On September 20, 2021, we received confirmation that the Paycheck Protection Program Second Draw Loan issued to us pursuant to the CARES Act, as amended, in the original principal amount of \$1,874,269 together with accrued interest of \$11,386 was forgiven in full as of September 8, 2021. The PPP loan forgiveness are considered to be nontaxable for both state and federal purposes and has been treated accordingly in our condensed consolidated financial statements.

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 2020 and 2021 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, 2021 and do not expect 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, 2021 or 2020.

We file tax returns as prescribed by the tax laws of the jurisdiction in which we operate. 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 2018 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 21, 2022 our Board of Directors approved the issuance of non-qualified stock options, aggregating to approximately 720,650 shares, to a significant number of employees at the market price of \$1.10 per share. The options vest in two equal annual installments commencing on the first anniversary from the date of grant and expire in ten years. The fair value of the options issued was approximately \$310,000. The weighted-average grant date fair value of stock options granted on that date was \$0.43 per share. The shares granted represented substantially all of the remaining shares reserved for issuance under the 2006 Option Plan.

TECOGEN INC.

Notes to Audited Consolidated Financial Statements for December 31, 2021 and 2020

On March 8, 2022, our Board of Directors adopted the 2022 Stock Incentive Plan, adoption of which is subject to approval by our shareholders.

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statements (Nos. 333-218244 and 333-187928) on Form S-8, the Registration Statements (Nos. 333-199634, 333-205147 and 333-212433) on Form S-3 and the Post-Effective Amendment No. 2 on Form S-3 (Registration No. 333-212433) on Form S-1 of Tecogen Inc. of our report dated March 10, 2022, relating to the consolidated financial statements of Tecogen Inc., appearing in the 2021 Annual Report on Form 10-K of Tecogen Inc. for the year ended December 31, 2021.

/s/ Wolf & Company, P.C.
Boston, Massachusetts
March 10, 2022

TECOGEN INC.
CERTIFICATION REQUIRED BY EXCHANGE ACT RULES 13a-14(a) and 15d-14(a),
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Benjamin 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. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 10, 2022

/s/ Benjamin Locke
Benjamin Locke
Chief Executive Officer

TECOGEN INC.
CERTIFICATION REQUIRED BY EXCHANGE ACT RULES 13a-14(a) and 15d-14(a),
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Abinand Rangesh, 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. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 10, 2022

/s/ Abinand Rangesh
Abinand Rangesh
Chief Financial Officer

TECOGEN INC.
CERTIFICATION REQUIRED BY EXCHANGE ACT RULES 13a-14(b) and 15d-14(b),
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Each of, Benjamin Locke, Chief Executive Officer, and Abinand Rangesh, Chief Financial Officer, of Tecogen Inc., or the Company, certify, pursuant to Section 1350, Chapter 63 of Title 18, United States Code that, to his knowledge:

1. The Annual Report on Form 10-K of the Company for the year ended December 31, 2021 (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 10, 2022

/s/ Benjamin Locke
Benjamin Locke
Chief Executive Officer

/s/ Abinand Rangesh
Abinand Rangesh
Chief Financial Officer