

Tecogen Inc. (TGEN)

Company Report – August 26, 2017

Tecogen Inc. designs, manufactures and sells industrial and commercial CHP (Combined Heat & Power), or cogeneration, systems that produce combinations of electricity, hot water, and air conditioning. It's a well-established Company that has already shipped over 2,500 units, some of which have been operating for more than 25 years.

Tecogen's second quarter was impressive, with double digit product and service revenue growth. In addition, the Company is off to an outstanding start of its third quarter with an almost constant flow of new sales agreements being announced.

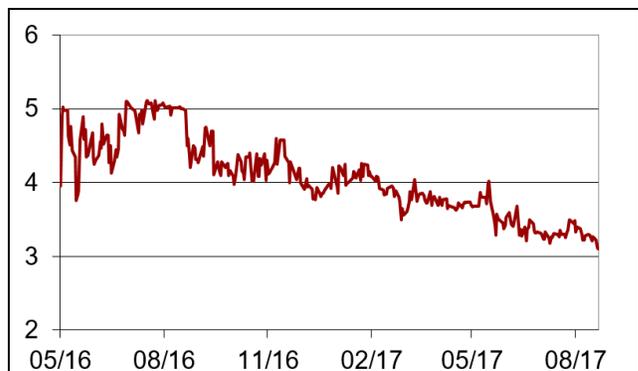
Revenue in the second quarter, ended June 30, 2017 was \$7,590,540 compared with \$5,687,308 for the same period in 2016. An impressive surge of 33.5% and the highest quarterly revenue ever in the Company's history.

This is truly an exciting time for Tecogen and its shareholders. Its sales are growing substantially, the positive impact of the American DG Energy (ADGE) acquisition will improve quarter by quarter, and success with only one of the Ultra applications will take the Company into another category.

Based on the intrinsic value of Tecogen's shares derived from our model, we reiterate our buy recommendation for Tecogen Inc. with a price target of \$8.97, which is 193% above today's stock price.



- ▣ Thanks to the successful acquisition of American DG Energy, which added the onsite utility business to Tecogen, the Company is now completely vertically integrated, making it a clean technology company able of offering equipment design, manufacturing, installation, financing and long-term maintenance service.
- ▣ With ADGE, about half of Tecogen's total sales consist of steady, predictable revenue, softening the ebbs and flows of the sales cycle.
- ▣ Another rapidly emerging opportunity for growth is indoor agriculture, particularly for the TECOCHILL line of natural gas powered chillers. To date, Tecogen has inked six transactions in the cannabis space for a total of 12 chillers, and with a total sales value of over \$2.3 million. More chiller sales are expected during the coming weeks and months in the marijuana sector.



Market Data	
Price	\$3.06
Sector	Technology
52-Week Price Range	\$3.00 - \$4.87
Shares Issued (m)	24.71
Market Cap (m)	\$75.63
Listings	TGEN (NASDAQ)
Website	www.tecogen.com

THE COMPANY

Tecogen designs, manufactures and sells industrial and commercial cogeneration systems that produce combinations of electricity, hot water, and air conditioning using engines that have been specially adapted to run on natural gas. This technology is called cogeneration, or Combined Heat and Power (CHP).

Cogeneration systems are efficient because they drive electric generators or compressors, which reduce the amount of electricity purchased from the utility. Plus they use the engine's waste heat for water heating, space heating, and/or air conditioning at the customer's building, vastly improving fuel efficiency.

The main drivers for end users to opt for a CHP system are a significant reduction in energy costs, fuel efficiency, emissions reduction, backup power generation and Microgrid capabilities that allow for participation in demand response and load shaving incentive programs.

Existing customers for CHP systems 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, and greenhouses.

The Company's products are sold directly to end-users by its own sales team and by established sales agents and representatives, who are compensated by commissions. Various agreements are in place with distributors and outside sales representatives for certain territories and product lines.

The Company is supported by an established network of engineering, sales, and service personnel across the United States. Service contracts make up a reliable and growing part of the Company's total sales.

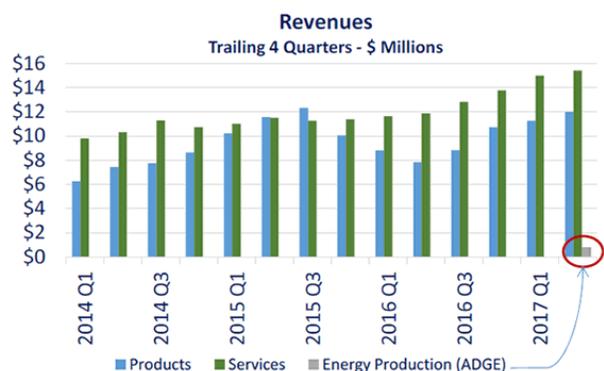
Tecogen is a well-established and respected Company in the industry. It has shipped over 2,500 units so far,

some of which have been operating for almost 25 years.

With great curiosity, investors were looking forward to Tecogen's second quarter financial results, as they were the first to be made public after the Company's acquisition of American DG Energy (ADGE) on May 18th.

Tecogen certainly delivered on expectations. Revenue in the second quarter, ended June 30, 2017 was \$7,590,540 compared with \$5,687,308 for the same period in 2016. An impressive surge of 33.5% and the highest quarterly revenue ever in the Company's history.

The merger with American DG added \$774,192 in revenue to the quarterly result. Note that this number only represents ADGE's revenue that was earned over the six week period after the merger date on May 18th, 2017, NOT the entire quarter.



Tecogen's almost consistent revenue growth is obvious in this 3 1/2 year chart.

Revenue results were driven by solid growth in both product and services related revenue. Total services related revenue grew 12.9% over the prior year period, driven primarily by installation activity, while product revenue grew 29.4% compared to second quarter of 2016, helped by strong cogeneration sales.

Cost control initiatives, product upgrades and improvements, and the addition of energy production revenue from the merger with American DG Energy generated a 6.2% combined gross margin improvement in the quarter, bringing gross margin up to a solid 39.3% compared to 37.0% in the second quarter of 2016.

As a result, gross profit for the quarter was \$3 million, up no less than 43% versus \$2.1 million in the second quarter of 2016.

Despite these wonderful results, Tecogen delivered a net loss for the quarter of \$293,540 compared to a loss of \$415,539 in the second quarter 2016. However, when excluding non-recurring merger expenses in the quarter and non-cash depreciation and amortization, as well as stock compensation, the Company showed an adjusted EBITDA of approximately \$64,000 for the quarter, an improvement of about \$276,000 over the second quarter adjusted EBITDA loss in 2016, when the depreciation and amortization of Tecogen alone was much less (Also read Financials).

Finally, the Company's sales backlog of equipment and installations currently stands at \$16.1 million, well ahead of management's goal to exceed \$10 million in product and turnkey service revenue.

Note that the backlog does not include service contract revenues, or sales of TEDOM products by the TTCogen joint venture. The backlog for TEDOM products was \$813 thousand at quarter-end and had climbed to \$884 thousand as of Friday, August 11th. Additionally, ADGE's estimated discounted future energy production revenue, which is not included in these backlog figures, exceeds \$50 million.

Tecogen Co-Chief Executive Officer Benjamin Locke commented, "Aside from one-time merger related expenses, the second quarter of 2017 is the fourth consecutive quarter of positive operating results for the company. We are pleased with these results, and hope to continue this trend through the second half of 2017."

As of year-end 2016, Tecogen had 83 full-time employees and 3 part-time employees, including 7 sales and marketing personnel and 35 service personnel.

Revenue Sources

Tecogen manufactures, sells, installs, and maintains four types of products:

- ❑ Combined Heat and Power (CHP) units that supply electricity and hot water;
- ❑ Chillers that provide air-conditioning and hot water; and
- ❑ High-efficiency water heaters

Next to the three products above, Tecogen also markets an emissions control technology called Ultera. This is a muffler-like kit that dramatically reduces a natural gas powered engine's harmful emissions such as NOx, CO, and hydrocarbons.

In 2012, a 75 kW CHP unit equipped with the Ultera system became the first unit to obtain a conditional air permit in Southern California, an area with one of the strictest emissions regulations worldwide.



The Ultera Emissions System mounted to a CHP unit. The Ultera is designed to deliver simple, cost-effective solutions for natural gas engines to meet stringent emissions standards.

Since then, the Ultera technology has been installed on hundreds of cogeneration systems and functions impeccably. **There is no comparable technology on the market today. It truly sets Tecogen apart from its competition** (also read Ultera on page 8).

Moreover, mid-May 2017, Tecogen added another important revenue source, as the Company completed its acquisition of American DG Energy (NYSE Mkt: ADGE). American DG offers On-Site Utility energy solutions without any capital or start-up costs to the customer and at lower costs than charged by conventional energy suppliers.

Thanks to the acquisition, Tecogen can offer a cost-free-installation option to customers who do not have access to financing, or who are not interested in owning and maintaining the CHP equipment.

Between May 18, 2017, the day the acquisition was completed, and June 30, 2017 ADGE contributed \$774,192 reliable revenue to Tecogen's second quarter result.

It is noteworthy that, when combined, approximately half of Tecogen's annual revenue will be derived from stable, long-term contracted sources (Tecogen Service revenue and American DG Energy revenue). This revenue base will provide a reliable funding source for both operating expense and growth initiatives, while also making Tecogen's revenue profile more predictable, as the revenue volatility caused by somewhat cyclical equipment sales and installations is reduced (Also read Growth Drivers).

Case Study – Toren Tower

The Company's business model, and its benefits for all parties involved, will become perfectly clear on the basis of a case study.

Toren is an iconic skyscraper that forever changed downtown Brooklyn. The 37 story building offers 240 condominium homes with breathtaking floor-to-ceiling views of the Manhattan skyline and New York Harbor as well as the opportunity to live in the most environmentally advanced high-rise residential building in New York, perhaps even in the U.S.

Toren uses five Tecogen InVerde 100kW cogeneration modules, located on-site, to meet much of the building's energy needs.

The cogen modules provide electricity, while the waste heat they produce is recovered and used to heat interior spaces, provide domestic hot water, heat the pool and even run the air conditioning.

That way, the remarkably efficient cogeneration system reduces Toren's carbon footprint by more than 2000 tons of CO₂ each year while providing annual cost savings of \$540,000.

Toren's CHP plant is designed to automatically follow the building's electric demand. As demand for electricity increases and decreases within the building, the electrical

output from each of the five CHP modules will also increase and decrease.

Thanks to highly sophisticated load control software built into each unit, the amount of electricity being purchased from Consolidated Edison, the electric utility in Brooklyn, can be held to less than 20kW.



Tecogen's cogeneration system reduces Toren's carbon footprint by more than 2000 tons of CO₂ each year while providing an annual energy cost savings of \$540,000.

Another innovative, unique and very desirable feature of Toren's cogen system is that it is a "Microgrid" with the ability to run independent from the grid in "Island Mode", providing power for the building if New York City should ever experience a blackout like the one in 2003.

Nationwide Factory Service

Besides selling machines, which in many cases are one-off deals, Tecogen generates plenty of revenues through service contracts. This is a reliable and growing part of the

Company's total sales. In fact, more than half of Tecogen's installed units have a service contract.

Most of the service revenue is in the form of annual service contracts. Customers are invoiced based on equipment run-time hours without unforeseen add-ons for such items as unscheduled repairs or engine replacements.

Tecogen offers service support on all its CHP products nationwide through a network of nine field service centers in California, the Midwest, and the Northeast. These centers are staffed by full-time Tecogen technicians and have been an essential part of Tecogen's growth and success through the years, as good factory support from Tecogen allows its customers to focus on their core missions and businesses. Factory service also keeps Tecogen in close touch with its customers and their specific site issues.

Government Regulations

Several kinds of government regulations affect the Company's current and future business, such as:

- Air pollution regulations, which govern the emissions allowed in engine exhaust;
- State and federal incentives for CHP technology; and
- Electric utility pricing and related regulations.

Strict regulations that control **air quality and greenhouse gases** increasingly favor Tecogen's low-emission products. In some states that have strict emissions regulations, such as California, the pollution from natural gas engines presents a challenge.

However, the development of the Ultera low-emissions technology has addressed this issue. In January 2013, a state-certified source test at a customer's site verified that emissions levels of a CHP unit equipped with the Ultera technology, were well below the new permitting requirements.

In addition, there are currently 23 states that recognize CHP as part of their Renewable Portfolio Standards. New York and New Jersey, for example, have **incentive**

programs that rebate a significant portion of the CHP project cost.

Similar incentive programs also exist in Massachusetts, Rhode Island, and Maryland albeit with different structures and terms. Massachusetts has an additional CHP incentive in the form of an annual rebate proportional to the carbon savings versus conventional technology.

Finally, the Company is targeting customers in states with **high electricity rates** in the commercial sector, such as California, Connecticut, Massachusetts, New Hampshire, New Jersey, and New York. These regions also have high peak demand rates, which favor utilization of modular units in groups so as to assure redundancy and peak demand savings.

Competition

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

The Company's CHP products use reciprocating engines originally designed for gasoline fuel that are modified to run on natural gas. Although gas-fueled CHP units are relatively common, Tecogen is confident that no other company has developed a product that competes with its inverter-based InVerde e+ CHP, which is highly efficient, facilitates battery or solar array integration, and is compliant with the NFPA 110 standard for emergency and standby power systems.

If competitors wanted to develop a similar product, development time and costs would be significant. In addition, certain Tecogen patents and licenses for microgrid software would prevent others from offering certain important functions.

JOINT VENTURES

ULTRATEK

In December 2015, following the outbreak of the Volkswagen emissions scandal, Tecogen

formed Ultra Emissions Technologies Ltd (ULTRATEK), with the goal to adapt the Ultera technology to gasoline fueled automotive engines. After all, the prospect of vehicle and stationary engines, with standard engine technology, but realizing fuel cell like emissions is tremendously compelling from a policy and market standpoint.

Tecogen formed the JV along with a small group of offshore investors.



Tecogen's Phase I and Phase II tests were conducted at the world-renowned AVL California Technical Center. (image used as illustration only)

Although the emissions scandal for vehicles has primarily been about diesel engines, for which the Ultera technology is not well suited, gasoline vehicles have been included in the larger problem of being certified in tests that underrepresent their true on-road emissions levels. In fact, European regulators are now implementing on-road, real-world driving tests for vehicle emissions compliance - the United States is considering similar testing standards.

The phase I and phase II tests, conducted on light duty trucks, have been extraordinarily successful. In fact, as far as we know no other technology in the world has ever accomplished similar results with gasoline powered engines (Also read Growth Drivers).

Recently, discussions have been initiated with potential automotive partners. More news from these initiatives is expected later in the year.

TTcogen

In May 2016, Tecogen formed a 50/50 joint venture corporation with the Czech company TEDOM, one of Europe's largest Combined Heat and Power manufacturers.

The new company, called TTcogen LLC offers a complete package of 27 different CHP modules, ranging in size from 35 kW up to 4 MW, making it the premier packaged CHP provider with the widest range available in the United States.

Most notably, TEDOM's specialized line of cogeneration equipment has the power to operate on biofuel, a renewable energy source with a rapidly growing market. This is an important feature as the United States is expected to implement new regulations in the coming years which require that all food and agricultural waste be recycled.

Soon after the formation of the JV, the initial sale was booked for a TEDOM Micro 35 kW Combined Heat and Power unit. The CHP was recently installed in a 138 unit multi-family residential building in Brooklyn, NY. Close on the heels of the initial one, the second order was received from an elementary school in New Jersey.

With a less than 3 year payback period after incentive rebates and annual savings estimated to be in excess of \$60,000, the Micro 35 kW unit is a natural fit for many residential buildings.

The true beauty of this joint venture is that Tecogen in the past often received inquiries from potential clients who ended up not buying a CHP unit from Tecogen because its equipment was not an appropriate size for the customer's facility.

The building's required load was either too big or too small for Tecogen's equipment. Now, thanks to the much expanded offering, TTcogen is able to service those potential customers, quadrupling Tecogen's addressable market for CHP.

The joint venture continues to make steady progress with increased interest from the industry and as such a growing backlog.

TECHNOLOGY

Combined Heat & Power (CHP) is truly a way to get “two for the price of one”. It produces the electricity or cooling power that a customer needs, and it captures much of the thermal energy that is normally lost during the energy conversion into power.

With CHP, the “waste” thermal energy gets captured and put to good use on site, for heating water or building spaces.

Following is an overview of the three types of CHP systems that Tecogen offers. Also, the highly efficient Ultera system that makes CHPs meet the most stringent emissions standards is described in more detail below.

Combined Heat and Power

Tecogen’s premier cogeneration product is the InVerde e+ CHP system. The revolutionary unit combines the best technologies in the field, and features a unique set of proprietary innovations.

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

Thanks to the cutting edge inverter technology, an innovative power control, and a new and improved engine, the InVerde e+ reaches an electrical efficiency of 33%, while its nearest competitor achieves efficiencies between 27 and 29 percent.

Note that this efficiency only refers to the produced electricity and that the harvested heat to produce thermal energy is not taken into account. A Tecogen CHP system that also uses the recovered heat, achieves efficiency between 80 to 90 percent.

The DC input capability, facilitating battery or solar array integration, is another huge innovation. It allows for a seamless transfer of

energy between the CHP unit, other energy generators, such solar panels, windmills, and backup batteries, eliminating the need for costly converters.

Moreover, the InVerde e+ automatically start up within 10 seconds in the event of a full blackout of the grid, making the CHP compliant with the new strict Type 110 standard for emergency and standby power systems by the National Fire Protection Association (NFPA). This is yet another innovation that very few competitors offer.

NFPA 110

The NFPA 110 standard covers performance requirements for emergency and standby power systems providing an alternate source of electrical power in buildings and facilities in the event that the normal electrical power source fails. Amongst these requirements is that the backup equipment needs to supply electrical power within 10 seconds of the blackout in order for it to qualify.

This is also the first engine-driven product to carry full UL 1741 Certification for "utility-safe" interconnection. So it doesn't need any additional permitting for interconnecting to the electric grid, speeding the installation process.

Ilios High-Efficiency Water Heaters

The Ilios high-efficiency water heater operates like an electric heat pump but uses a natural gas engine instead of an electric motor to power the system.

The water heater, uses a heat pump, which captures warmth from outdoor air even if it is moderately cool outside. Heat pumps work somewhat like a refrigerator, but in reverse. Refrigerators extract heat from inside the refrigerator and move it outside the refrigerator. Heat pumps extract heat from outside and move it indoors.

In both cases, fluids move the heat around by flowing through heat exchangers. At various points the fluids are compressed or expanded, which absorbs or releases heat.

The gas engine's waste heat is recovered and used in the process, unlike its electric counterpart, which runs on power that has already lost its waste heat.

The net effect is that the efficiency of an Ilios' heat pump far surpasses that of conventional boilers for water heating. This translates directly to lower fuel consumption and, for heavy use customers, significantly lower operating costs. Gas engine heat pumps can deliver efficiencies in excess of 200%.

The Ilios market continues to expand both geographically and into different end-market segments. The high-efficiency water heater is ideal for locations with a gas demand of at least 4000 Therms/month, such as water parks, swimming pools, hotels, hospitals, apartment buildings and recreation centers.

The Ilios system also attracts customers that consistently have the simultaneous need for heating and cooling, such as manufacturing and R&D type facilities.

Chillers

TECOCHILL natural gas engine-driven chillers provide building owners with a reliable, proven, efficient, and cost-effective alternative to conventional electric motor-powered chillers. It's the only natural gas engine-driven chiller on the North American market in its size range.

The engine drives a compressor that makes chilled water; while the engine's free waste heat can be recovered to satisfy the building's needs for hot water or heating. This process is sometimes referred to as "mechanical" cogeneration, as it generates no electrical power, and the equipment does not have to be connected to the utility grid.

A TECOCHILL's benefits are significant. It cuts a building's cooling costs in half, by eliminating most of the electrical demand (kW) associated with providing cooling. In addition, it offers optional "waste" heat that is always available at the same time. This high-quality heat source (up to 230°F hot water) literally comes for free, whenever the chiller is running.

The TECOCHILL chillers are available in capacities ranging from 25 to 400 tons, with the smaller units air-cooled and the larger ones water-cooled. They are ideal in facilities where new chilling capacity is desired, as replacements for aging electric chilling equipment, where the local electric utility's kW demand charges are high, or where the site's electrical capacity is limited.



The TECOCHILL dramatically reduces the energy cost, while reducing strain on the electrical and standby power systems.

Basically, they make sense wherever large chillers are needed, including hospitals, colleges, schools, office buildings, aquariums, government buildings, large residential facilities, industrial facilities, hotels, and ice rinks.

Ultra

In 2008 there was a dramatic change in the air quality regulations in Southern California. At that time no technology could meet the new, stricter, emission standards. In reaction to the new regulations, Tecogen developed the Ultra technology.

Tecogen decided to look at the chemistry of emissions instead of the mechanical controls of the engine to simultaneously get rid of NOx compounds, CO and hydrocarbons. They broke the catalyst process into two steps and ran each step at a different temperature.

By controlling the temperature in the first stage, the system could achieve very low NOx emissions. In a second stage process the remaining pollutants were oxidized by injecting a little air between the first and

second stages and altering the process conditions.

In 2012, a 75 kW CHP unit equipped with the Ultra system became the first unit to obtain a conditional air permit in Southern California since the strict regulations went into place in 2009. A state-certified source test, administered in January 2013, verified that the emissions levels of the system were well below the new permitting requirements, and the final permit version was approved in August 2013.

Tecogen originally developed and patented the Ultra-low emission control technology for its own CHP products but has since decided to make the technology available for retrofit on non-Tecogen applications.

The Ultra retrofit kits deliver simple, cost-effective and robust solutions for meeting even the most stringent emissions standards. The patented system provides peace of mind to its customers by lowering NOx and CO to near-zero levels without the need for complex additional controls or frequent maintenance.

RECENT EVENTS

Tecogen Sells Five CHPs to Leading Pharmaceutical Company

The 85,000 square foot corporate headquarters of a leading pharmaceutical company in San Francisco, CA will soon be powered by five 125kW InVerde e+ Combined Heat and Power units from Tecogen.

The 625 kilowatt cogeneration system will operate throughout the year, supplying the facility with electricity and thermal energy for space heating in the colder months and air-conditioning in the warmer periods. The five units will be installed in conjunction with absorption chillers that will provide air conditioning. This highly efficient natural gas powered system uses "free" waste heat energy in a process to generate chilled water supplementing the facility's existing cooling system.

The five CHPs will be equipped with Tecogen's unique and patented Ultra system. In addition, a long term maintenance contract was included in the order. Although no details were provided, it is estimated that the order is worth around \$2 million.



Five Tecogen CHP units will soon power the 85,000 square foot corporate headquarters of a leading pharmaceutical company in San Francisco, CA.

Next to the administrative offices, the facility will house a state-of-the-art research center and life sciences laboratories that all demand critical climate control and emergency standby power. The InVerde e+ is especially suited for these requirements thanks to its rapid blackstart emergency capability.

Importantly, if worse comes to worst, the facility will also be equipped with reserve propane tanks, which allow for fuel-switching in case of natural gas supply disruption.

Moreover, the InVerde e+ uses Tecogen's exclusively licensed CERTS microgrid technology that enables the five units to seamlessly balance demand from the facility and rapidly respond to load changes and outages.

Thanks to this technology, the Tecogen modules are able to operate as a conventional CHP application interconnected to the electric grid, but with the capacity to disconnect from the grid and continue operating as an "island" whenever a grid disruption occurs. This type of installation is also called a microgrid.

This deal is definitely another notch on Tecogen's belt. The pharmaceutical company would not have chosen Tecogen's technology if there were even the slightest concern of reliability.

Six More CHP Units Sold in Past Week

How well Tecogen is performing was again demonstrated in the past week, as the Company sold no less than six CHP units.

First, Tecogen sold two InVerde e+ units that will power a demonstration project of an advanced carbon capture technology. The units will provide the necessary electricity and process heat required by the technology. The project will be co-located on the site of a major food and beverage manufacturing company, which will utilize the captured CO₂ in its products.

Alton Reich of Streamline Automation, the company that's been hired to develop the project, said, "We are excited to employ Tecogen's InVerde e+ for this project. Tecogen's microgrid technology will enable us to optimize power generation to match the project's varying electricity needs."

And two days later, four Tecopower CM-75 CHP units were sold to a wastewater treatment plant on Long Island, NY. The machines, with a combined total electrical capacity of 300 KW, will utilize natural gas from the local gas distribution system as opposed to biogas produced on-site.

"This project is a great example of how we are expanding our reach into heretofore untapped markets," said Tecogen Co-CEO Benjamin Locke. "Each new application of our market-leading technology provides another successful data point for potential customers to consider. The Tecopower CM-75 provides a low-cost solution to both improve a facility's energy efficiency and partially mitigate its impact on the regional power grid, especially during periods of peak demand."

GROWTH DRIVERS

Ultra Applications With Tremendous Potential

The efforts of Tecogen to commercialize its extraordinary emissions technology for use beyond the Company's core products, continues to move forward.

In the first quarter of 2017, Tecogen began a research program, funded by PERC, the Propane Education and Research Council, to demonstrate the effectiveness of the Ultra emissions systems on **propane fueled fork trucks**.



The primary benefit of the Ultra-equipped propane fork truck will be the fuel cell like emissions.

The project has significant potential for the industry as these vehicles generally operate indoors, where health incidents are magnified. In recent years, the market share for propane trucks has been eroded by battery operated versions because of this issue. The market losses occurred despite the significant disadvantages to the battery systems. They are, for example, more costly and often unable to complete a full shift because of energy storage limitations.

So far, the Company has tested a standard propane powered fork truck to set the baseline emissions profile. These baseline tests indicated that most of the emissions output from the fork truck was during times when it was very active, such as lifting. This is a familiar problem, which the Ultra process was designed to remedy. It is therefore the Company's belief that the Ultra technology can be very impactful to the emissions profile of the fork truck.

At this moment the Ultra system is being designed so that it can be integrated into the fork truck without being outwardly visible or intrusive. This fabrication task is nearly complete and actual testing is scheduled to begin next month.

A second application for which the Ultra technology is being developed is for **use in**

light duty gasoline vehicles. Through the joint venture ULTRATEK - 43.09% owned by Tecogen - two phases of testing were completed, which were highly successful in demonstrating Ultera's effectiveness. These tests were conducted at the world-renowned AVL California Technical Center and were the subject of a peer-reviewed paper presented at the SAE World Congress in May 2017.

A key finding of the research is that conventional aftertreatment systems are far less effective during periods of aggressive driving. These kinds of conditions are common in a daily driving experience but not present in the simulations used for certification tests today. The Ultera system was extremely effective in reducing the emissions to compliant values under these conditions.

The so-called US06 standard drive cycle was performed. This cycle encompasses a high speed/quick acceleration loop that lasts 10 minutes, covers 8 miles (13 km), averages 48 mph (77 km/h) and reaches a top speed of 80 mph (130 km/h). It includes four stops and a brisk acceleration.

The test results show that carbon monoxide (CO) emissions are reduced by as much as 94%. In addition, levels of non-methane hydrocarbons (NMOG) are lowered by 81%. Needless to say these were outstanding test results!

	CO	NMOG	NOx	Nox + NMOG
Standard Vehicle	332	5.234	5.763	10.997
With Ultera	20	1.001	5.072	6.074
% Reduction	94%	81%	12%	45%
Drive cycle test results - Emissions (mg/mile).				
Source: Company Presentation				

This as a major benefit, especially in the EU where lab certification testing will be phased out in the next three years in favor of the RDE or Real Driving Experience protocol. The RDE will require the certification tests to be conducted on public roads through three types of conditions (rural, city, and highway), which will reduce the predictability of the vehicle operating conditions and consequently should favor the application of the robust Ultera system.

The past few months ULTRATEK has had several productive meetings with potential partners from the automotive industry. Based on the feedback from the auto industry, a more advanced Ultera device will be completed so that it can be incorporated in a vehicle and overseen by the vehicle's control system.

The refined Ultera prototype, which will be tested in an upcoming phase 3, will be a true showcase for the system, while providing a basis for accurate costing.

Finally, after successfully developing the Ultera technology for Tecogen's own equipment, the Company's Research & 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 standby generators from other manufacturers, including Generac and Caterpillar.

Historically, standby generators have not been subjected to the same 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, such as California, are subject to compliance with the same stringent regulations applied to a typical electric utility.

In 2015, Tecogen purchased a sample generator and retrofitted it with an Ultera. The results were extremely favorable. Meanwhile, an initial customer in California applied for permits to retrofit his existing onsite units. These permits were received, and Tecogen engineers are now in the final stages of retrofitting the last generator. Meanwhile, the already retrofitted units have been unofficially tested and show robust compliance.

Third party source testing, the final permitting step, should be completed in the current quarter. The significance of a successful outcome of this program can't be underestimated. As demand response

programs become more economically attractive and air quality regulations continue to become more stringent, this could potentially be a very lucrative new market for Tecogen.

American DG Energy Acquired by Tecogen

American DG Energy distributes, owns and operates natural gas powered cogeneration systems that produce electricity, hot water, heat and cooling. ADGE's business model is to own the equipment that it installs at customers' facilities and to sell the energy produced by these systems to the customer under long-term contracts at prices guaranteed to the customer to be below conventional utility rates.

Consequently, bringing American DG under the Tecogen umbrella allows Tecogen to offer a cost-free-installation option to customers without access to financing, sufficient capital on hand, or for those who may not be interested in owning and maintaining the equipment.

As of December 31, 2016, ADGE had 92 installed energy systems, representing an aggregate of approximately 5,445 kilowatts, or kW, 41.6 million British thermal units, or MMBtu's, of heat and hot water and 4,500 tons of cooling.

Approximately half of the revenue generated by the merged entity now comes from stable, long-term contracted sources (Tecogen Service revenue and American DG Energy revenue). This revenue base provides a reliable funding source for both operating expense and growth initiatives. In addition, it makes Tecogen's revenue profile more predictable, reducing the revenue volatility caused by somewhat cyclical equipment sales and installations.

Another major advantage of the acquisition is that there are plenty of cost saving opportunities. For instance, Tecogen is expected to benefit from approximately \$1 million of general and administrative cash savings annually as duplicative functions are eliminated. Also, the combined companies

allow for more efficient deployment of service technicians thanks to Tecogen's wide service network. In addition, the consolidated inventory improves purchasing economics and shipping costs.

The transaction has created a vertically integrated clean technology company able to offer equipment design, manufacturing, installation, financing, and long term maintenance service.

Tecogen Significantly Expanding in Booming Cannabis Industry

A great deal of the marijuana that is produced in the U.S. and Canada is grown indoors. In these growing facilities an environment can be created that is ideal for the cannabis plants. Key factors that may be controlled include temperature, levels of light and shade, irrigation, fertilizer application, atmospheric humidity, etc.

Unfortunately, the equipment that is used to create these peak conditions requires an enormous amount of energy. The reason is simply the technology required to grow the crops. Specific energy uses include high-intensity lighting, dehumidification to remove water vapor and avoid mold formation, space heating or cooling during non-illuminated periods and drying, pre-heating of irrigation water, generation of carbon dioxide by burning fossil fuel, and ventilation and air-conditioning to remove waste heat. In fact, the \$3.5 billion marijuana industry is one of the nation's most energy intensive.

A 5,000 square foot indoor cannabis facility, for example, will use on average 29,000 kilowatt hours (kWh) of electricity monthly, while a local household consumes about 630kWh. In general, it's fair to say that electricity represents roughly 30% of the total cost of a cannabis operation.

Additionally, many growing facilities were either constructed without large capacity electric infrastructure or are housed in converted warehouses that do not have the necessary wiring for a traditional large scale electric solution.

For exactly this reason, the TECOCHILL is exceptionally useful. It consumes virtually no electricity thanks to its natural gas powered engine. Another advantage of the TECOCHILL running on natural gas is that it helps customers avoid expensive and generally time consuming electric service upgrades when they are retrofitting an older building into a growing facility. In most cases, dated buildings do not have the electrical infrastructure needed to support the immense electrical needs required by both the lighting as well as the HVAC (Heating, ventilation and air conditioning) system necessary to remove the heat generated by the lighting.



TECOCHILL units reduce operating costs for indoor growing facilities by up to 50%.

In addition, the chillers offer optional “waste” heat that is available whenever it is running. The free engine heat can be recovered and used to offset boiler gas that would have been needed to meet the dehumidification requirements.

Also, the units are equipped with Tecogen's patented Ultera system. Thanks to this cutting-edge emissions control technology, the carbon dioxide (CO₂) from the cleaned exhaust stream can be used as fertilizer to improve growing conditions. As a reminder, plants grow by converting CO₂ found in air to carbon through photosynthesis. Greenhouse plants absorb even more CO₂ because of the artificial lighting. Without the use of an Ultera, the exhaust stream would not be clean enough to recycle as CO₂ fertilizer, an important feature only TECOCHILL offers.

Finally, state-based incentives for natural gas-engine driven chillers are a boon for facilities across the Northeastern states. In Massachusetts, for example, an incentive of between \$0.25 and \$0.30 per kilowatt hour

that is removed from the grid, is provided. Other states, such as Connecticut, New Jersey and Pennsylvania also offer incentives for similar installations.

So it's no wonder that Tecogen continues to receive more orders for its equipment from places such as California, Colorado, Massachusetts, and Canada where the production and sale of cannabis has been legalized.

In June of this year, for example, Tecogen sold two TECOCHILL natural gas powered chillers for use in an indoor cannabis growing facility located in Massachusetts.

The units will provide 700 refrigeration tons of cooling (350 tons each), and will be used to cool the 50,000 square foot growing space to offset the concentrated heating effect of the lighting systems. In addition, the thermal energy from the TECOCHILL engines will be recovered in the form of hot water and utilized for dehumidification. The sale, including additional accessories and options, is valued at \$750,000.

Moreover, a month later, Tecogen sold six more TECOCHILLS to two separate indoor cannabis cultivation facilities.

Three units will be installed at a new 30,000 square foot (~2,800 square metre) growing facility in central Massachusetts. They will provide 450 refrigeration tons of year-round cooling. This is Tecogen's third sale into the nascent cannabis industry of Massachusetts.

The three other TECOCHILLS will be shipped to the Tampa, FL region where they will provide 450 refrigeration tons of cooling for a 40,000 square foot (~3,700 square metre) growing facility, which is being retrofitted out of an existing facility. This marks Tecogen's first sale into Florida's recently legalized medical marijuana business and the Company's sixth transactions with the indoor cannabis industry in total.

So far, the cannabis industry has gone through the typical pattern for new gigantic industries. It started in 2014 with the initial bubble where investors were wildly enthusiastic about marijuana being

decriminalized. Consequently, tens of millions of investment dollars flooded into the industry, driving valuations of companies sky high. Subsequently, the inevitable decline followed as investors realized everything was not yet rosy, from banking issues, to taxes and legal matters. Now with more States in the US and other nations worldwide decriminalizing marijuana it is set for its resurgence and definite breakthrough.

To date, a total of 29 states, the District of Columbia, Guam and Puerto Rico allow the use of cannabis for medical purposes.

Nearly twenty other countries have legalized cannabis possession and consumption to some degree (primarily for medical purposes), including Canada, Switzerland, Croatia, Czech Republic, Colombia, Jamaica, Italy, Spain and Uruguay, to name a few. Also Germany and Australia have recently passed legislation authorizing the use of cannabis for medical use.

Indoor farming, specifically of cannabis, holds enormous potential for Tecogen, as utility costs are the single biggest operating cost for these facilities. In general, electricity represents roughly 30% of the total cost of a cannabis operation.

Another advantage for Tecogen is that given the expected growth of the industry, it is going to get competitive for growers very quickly. To date, some 240 applications to grow and sell marijuana have been submitted in Massachusetts alone. Once the price per pound starts to decline as more growers enter the market, only those who truly have a handle on their energy cost and usage will be successful.

Consequently, it is fair to say that due to the exceptional cost savings that are generated with Tecogen chillers, the units are becoming a necessity in the competitive cannabis industry.

Importantly, this is not just the case for cannabis. Growing leafy greens, herbs, and tomatoes also holds substantial promise for Tecogen. According to a study done by indoor farming software company Agrilyst, the amount of physical

space dedicated to indoor farming globally is set to jump at least five-fold over the next five years with the potential to generate over \$6 billion in incremental annual indoor farming revenue.

FINANCIALS

Product sales revenue was higher in the second quarter of 2017, posting 29.4% growth over the prior year comparable quarter. Higher cogeneration product sales accounted for over three quarters of the increase, with chiller and heat pump sales accounting for the remainder.

Services revenue grew 12.9% year-on-year, benefiting from increasing penetration in service contracts and favorable operating metrics for the installed fleet as well as an active period for installations work. This was the 18th consecutive quarter of year-over-year quarterly contract service revenue growth. These long-term contracted maintenance and service agreements, account for a substantial piece of the Company's total revenue, providing an annuity like revenue stream.

Note that **Product Revenue** is derived from the sale of the various cogeneration and chiller units. Because the equipment is built to last 20 or more years, most of the product sales are to first time customers. The Company's **Service Revenue**, however, lends itself to recurring revenue from long-term maintenance contracts, which provide the Company with a somewhat predictable revenue stream.

Product sales revenue for the six months ended June 30, 2017 was \$5.92 million, an increase of 27% versus \$4.68 million in the comparable period in 2016. Also, Services revenue grew by 27% during the first six months of 2017 compared with the same period in 2016.

The Company's net loss declined from \$1.31 million in the first half of 2016 to \$249 thousand in this year's comparable period. Again, excluding the exceptional costs of the

second quarter, this loss would have been a nice profit.

Amounts in \$000's	06/30/17	06/30/16
Product Revenue	3,116	2,409
Service Revenue	3,700	3,278
Energy Revenue	774	-
Total Revenue	7,591	5,687
Cost of Product Sales	1,966	1,767
Cost of Services Sales	2,307	1,817
Cost of Energy Sales	331	-
Total Cost of Sales	4,604	3,584
Gross Profit	2,987	2,103
Operating Expenses	3,232	2,489
Income (Loss) from Operations	(246)	(386)
Total Other Expenses	(31)	(41)
Net Income (Loss)	(277)	(427)
Diluted EPS	(0.01)	(0.02)
Diluted Shares Outs.	23,120	19,089
Selected income statement data for the quarters ending June 30, 2017 and June 30, 2016. Source: Company Filing		

Product gross margin was 36.9% for second quarter 2017 compared to 26.6% in second quarter of 2016. Product gross margin was primarily helped by the materials and supplier arrangements put in place over the past several quarters as well as by the product mix shift toward the higher margin InVerde e+ CHP model.

Services gross margin declined to 37.6% in the period compared to the 44.6% in the prior year, as it was impacted by exceptional site-specific costing on certain installation projects.

Energy production gross margin was a strong 57.3% following the completion of the merger with American DG Energy. Energy production gross margin is expected to fluctuate materially though due to seasonality.

On a combined basis, operating expenses increased to \$3,232,479 for the second quarter 2017 from \$2,488,924 in the same quarter of 2016. An increase in selling expenses, which rose 81.3% to \$607,511, merger related expenses of \$99,773, and the consolidation of ADGE's core overhead, accounted for most of the increase. The increase in selling expenses was due to an

uptick in marketing related activity and higher sales commissions.

Depreciation and amortization jumped to \$178,595 from \$66,484 in the prior year. The increase is related to the depreciation of the equipment that American DG Energy owns to deliver energy to its customers and the amortization of the corresponding contracts.

Balance Sheet as of June 30, 2017

Amounts in \$000's	06/30/17	06/30/16
Cash and Cash Eq.	3,318	4,070
Accounts Receivable	8,868	6,241
Inventory	6,100	4,940
Total Current Assets	22,727	17,344
Property & equipment	15,725	561
Intangible Assets	2,098	1,047
Excess of Cost Over Fair Value of Net Assets Acquired	12,571	-
Total Assets	55,586	19,051
Accounts Payable	4,502	2,618
Accrued Expenses	1,900	1,037
Total Current Liabilities	8,461	4,464
Promissory Note	3,149	3,124
Unfavorable Contract Liability	10,304	-
Total Liabilities	22,364	7,884
Total Stockholder Equity	32,735	11,167
Selected balance sheet data for June 30, 2017 and June 30, 2016. Source: Company Filing		

Note that due to the American DG acquisition it is hard to compare the current balance sheet with the one a year ago.

For example, the favorable contract asset and unfavorable contract liability in the foregoing table represent the estimated fair value of American DG Energy's customer contracts (both positive for favorable contracts and negative for unfavorable contracts).

Pricing to the customer for electrical power produced and supplied by ADGE under the contracts is under a fixed formula which requires the customer to pay for the kilowatts of electrical power provided at a fixed percentage discount to the local utility's electric rate for that period. As a result, as

utility rates for electrical power change, the amount ADGE is able to charge the customer under the contract also changes.

There has been a sharp decrease in electric rates over the past several years, subsequent to the vast majority of customer contract dates, causing the billable value of the electrical power generated by ADGE's systems to decrease, resulting in a deterioration of expected profitability.

The cash balance declined at quarter-end to \$3,317,928, compared to \$4,069,660 at the end of the second quarter in 2016. At the same time, inventory increased by over \$1.1 million. This increase is primarily due to the purchase of used equipment from American DG. Although lowering inventory is a goal, management expects inventory to vary significantly based on production and customer delivery requirements.

Consolidated working capital at June 30, 2017 was \$14,266,039 compared to \$12,879,929 at June 30, 2016, an increase of \$1,386,110.

OUTLOOK & VALUATION

Tecogen's second quarter was another impressive one with double digit product and service revenue growth. In addition, it is clear that the Company is off to an outstanding start of its third quarter with an almost constant flow of new sales agreements being announced.

Thanks to the successful acquisition of American DG Energy, which added the onsite utility business to Tecogen, the Company is now completely vertically integrated, making it a clean technology company able of offering equipment design, manufacturing, installation, financing and long-term maintenance service.

Prior to the acquisition, ADGE produced around \$6 million of steady revenue annually. While Tecogen's service revenue is very predictable, its sales revenue fluctuates. With the addition of ADGE, about half of Tecogen's total sales will consist of steady, predictable revenue, softening the ebbs and flows of the sales cycle, which is a big advantage!

With the merger completed, maintenance of the ADGE fleet has been incorporated into Tecogen's operations. This integration has gone well and as a result, thermal and electricity production of the ADGE chillers and CHP systems, collectively increased 22% year-over-year in the second quarter.

Moreover, the Tecogen staff is beginning to identify and implement cost saving measures that are attainable as a consolidated Company. This will be an ongoing effort through the remainder of the year, with the aim to achieve significant cost reductions.

Despite ongoing cost saving measures, the Company is exploring advanced sales acceleration tools to help generate new leads and streamline lead qualification and project development. For example, Tecogen continues to build relationships with new and existing energy service companies (ESCOs) that provide comprehensive energy savings programs for customers. Traditionally, these companies provide savings via lighting, solar and other efficiency measures. But increasingly, CHP systems are incorporated because of their tremendous savings potential.

Another rapidly emerging opportunity for growth is indoor agriculture, particularly for the TECOCHILL line of natural gas powered chillers. These facilities have tremendous electrical needs because of the lighting, cooling and dehumidification requirements of the plants. Consequently, electricity is a major expense in running these facilities.

To date, Tecogen has inked six transactions in the cannabis space for a total of 12 chillers, and with a total sales value of over \$2.3 million. More chiller sales are expected during the coming weeks and months in the marijuana sector.

This is truly an exciting time for Tecogen and its shareholders. Its sales are growing substantially, the positive impact of the ADGE acquisition will improve quarter by quarter, and success with only one of the Ultera applications will take the Company into another category. If you don't own shares of Tecogen yet, now is the time.

Valuation

Given the emerging nature of Tecogen's earnings, and the uncertainty of American DG's exact contribution to earnings, a multiple-based valuation is challenging. Instead, we apply a Discounted Cash Flow (DCF) model.

Based on our estimate of 26.9 million diluted shares outstanding, the intrinsic value of Tecogen's shares derived from our model is \$8.97.

We reiterate our buy recommendation for Tecogen Inc. with a price target of \$8.97, which is 193% above today's stock price.

SHARE DATA & OWNERSHIP

As of July 31, 2017, Tecogen had 24,714,989 common shares outstanding. This is an increase with 4.67 million shares due to the American DG acquisition. Also, as of June 30, 2017 an aggregate of 1,303,778 shares of common stock are issuable upon exercise of outstanding warrants and options. And finally, Tecogen has \$3,148,898 convertible debt, which is convertible into 889,830 shares of common stock.

The principal owners of the Company's common stock are John Hatsopoulos (13.4%), Monovoukas Yiannis (10.5%), Tryfon Natsis (6.5%), George Hatsopoulos (5.7%), Wincrest Capital Ltd. (4.9%), and Michaelson Capital Partners (4.9%).

MANAGEMENT

▣ DR. JOHN N. HATSOPoulos - CO-CHIEF EXECUTIVE OFFICER

Dr. Hatsopoulos has been the Chief Executive Officer of the Company since the organization of Tecogen in 2000. He has also been the Chief Executive Officer of American DG Energy Inc. since 2000, and the Chairman of EuroSite Power Inc. since 2009. Mr. Hatsopoulos is a co-founder of Thermo Electron Corporation, which is now Thermo Fisher Scientific (NYSE: TMO), and the retired President and Vice Chairman of the Board of Directors of that company. Mr. Hatsopoulos graduated from

Athens College in Greece, and holds a bachelor's degree in history and mathematics from Northeastern University, as well as honorary doctorates in business administration from Boston College and Northeastern University.

▣ BEJAMIN LOCKE - CO-CHIEF EXECUTIVE OFFICER

Mr. Locke was named Co-Chief Executive Officer in October, 2014. He joined Tecogen in June, 2013 as the Director of Corporate Strategy and was promoted to General Manager prior to his appointment as Co-CEO. Previously Mr. Locke was the Director of Business Development and Government Affairs at Metabolix, responsible for developing and executing plans for partnerships, joint ventures, acquisitions, and other strategic arrangements for commercializing profitable clean energy technologies. Mr. Locke has a B.S. in Physics from the University of Massachusetts, an M.S. in Electrical Engineering from Tufts University, and an MBA in Corporate Finance from Boston University.

▣ ROBERT PANORA - CHIEF OPERATIONS OFFICER

Mr. Panora has served as President of Tecogen since 2000. He had been General Manager of Tecogen's Product Group since 1990 and Manager of Product Development, Engineering Manager, and Operations Manager of the Company since 1984. Over his 27-year tenure with Tecogen, he has been responsible for sales and marketing, engineering, service, and manufacturing. Mr. Panora contributed to the development of Tecogen's first product, the CM-60 cogeneration module, and was Program Manager for the cogeneration and chiller projects that followed. Mr. Panora has B.S. and M.S. degrees in Chemical Engineering from Tufts University.

▣ BONNIE BROWN - CHIEF ACCOUNTING OFFICER

Ms. Brown served as ADGE's Chief Financial Officer, Treasurer and Secretary since September 2015. From September 2015 to January 2017, Ms. Brown served as Chief Financial Officer, Treasurer, and Secretary of EuroSite Power Inc. Ms. Brown was a Financial Advisor at Barker Financial Group, a

strategic wealth management advisement company, from July 2014 to September 2015. From 2009 to December 2014, Ms. Brown served as the Chief Financial Officer of Ilios Inc. She joined Tecogen as its Controller in 2005 and became the Chief Financial Officer in 2007 and remained in that position until

December 2014. Prior to 2005, Ms. Brown was a partner at Sullivan Bille PC, a regional accounting firm, for 15 years where she provided financial, accounting, audit, tax, and business consulting services for mid-sized companies.

ANNUAL INCOME STATEMENT FY 2014 – 6M 2017

All numbers in thousands

PERIOD ENDING	FY 2014	FY 2015	FY 2016	6M 2017
Total Revenue	19,343	21,443	24,490	14,437
Cost of Revenue	12,944	13,809	15,190	8,536
Gross Profit or (Loss)	6,399	7,633	9,301	5,901
Operating Expenses				
General & Administrative	7,265	7,998	7,994	4,615
Selling	1,796	1,687	1,637	1,055
R&D	1,041	592	667	399
Total Operating Expenses	10,102	10,277	10,289	6,069
Operating Income or (Loss)	(3,703)	(2,643)	(997)	(168)
Other Income or (Expense)				
Interest & Other Income	10	14	12	6
Interest Expense	(177)	(172)	(176)	(70)
Income or (Loss) attributable to the non-controlling interest	125	74	65	(17)
Net (Loss) attributable to Tecogen Inc.	(3,746)	(2,727)	(1,096)	(249)

Annual Income Statement FY 2014 – 6M 2017. Source: Company Filings



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