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MIDSTREAM COMPANIES DEPLOY HUNDREDS OF MICROTURBINES IN THE MARCELLUS AND UTICA SHALE REGION

By: Jeff Beiter, Managing Partner, E-Finity Distributed Generation, LLC

If I were to tell you that there is a generator that requires zero oil, is designed to operate for 8,000 hours without maintenance, and burns any gaseous fuel including high BTU fuels, you might think it all sounds too good to be true – like some prototype of a futuristic invention.

But the truth is Capstone Turbine Corporation, headquartered in California with distribution worldwide, has been producing such a generator for over 20 years. Capstone is the world leader of microturbine technology. Their patented air bearing technology allows the turbine to spin up to 96,000 rpms without any oil or lubrication like those found in traditional reciprocating engines. The absence of these oils and lubricants increases uptime with Capstone and removes the need for any kind of spill containment around the generators, while drastically keeping the emissions very low.



2 C65s powering a dehydration location in WV

Capstone has evolved and grown its microturbine product line over the last 20 years. The original C30 microturbine was a small 30kW unit released in 1998. This unit was quickly followed by a C65 microturbine (65kW) generator with a similar footprint of 30”W x 58”L and 78”H. In 2009, the C200 microturbine (200kW) generator was introduced as a single unit and then evolved into a package, combining three, four, and five microturbines to create a 600kW, 800kW, and 1MW generator. Capstone customers have found significant value in the C1000 product line since the release of its ISO container packaging (measuring 30’L x 8’W and 10’H) fits nicely at most site locations. Most recently Capstone announced the C1000S Signature Series Microturbine, a product enhancement to the C1000 product line. These product enhancements were made with the customer and conditions solely in mind.

Much like the evolution of the Capstone microturbine itself, the rapid development of the Marcellus and Utica Shale throughout the Appalachian Basin has driven the need for more electrical infrastructure. Central gas gathering, gas processing and separation, and gas transmission facilities continue to be built or expanded throughout the region. Often, the availability of electric power in the region is a constraint that limits the size or timing of a facility expansion. Capstone microturbines have become a common



C600S Powering a Midstream Site in Ohio

solution that provides the incremental electric power required for new and expanded facilities in remote shale locations, as well as for many oil and gas companies throughout the world. Currently in the Utica and Marcellus shale

E-Finity Distributed Generation, the authorized Capstone distributor in the Mid-Atlantic and Southeastern United States, has over 450 Capstone microturbines operating for various gas companies at a variety of oil and gas sites. The combined output of these units is approximately 50MW. To support this fleet, E-Finity offers complete sales and service for these units, including 24/7 remote monitoring for customers who need it.

In addition to the large oil and gas companies and remote locations, E-Finity has seen a growth in the commercial and industrial market – a direct result of the low cost of fuel caused by the abundant supply of natural gas in the Marcellus and Utica Shale region. This abundant supply of natural gas is being used in combined heat and power (CHP) installations. These



Pittsburgh Energy Innovation Center CCHP system

Capstone systems not only produce electricity, they also recover otherwise-wasted thermal energy to produce useful thermal energy. The captured heat can be used to heat water or used in a heat recovery steam generator to generate steam. The heat is often used with an absorption chiller to produce chilled water for building or process cooling. This is called a combined cooling, heat, and power (CCHP) system. The recovery of thermal energy is what makes CHP and CCHP technology so efficient. CHP technology with Capstone microturbines eliminates transmission and distribution losses from the central power plant, resulting in reduced primary energy use and lower greenhouse gas emissions by as much as 40 percent or more. E-Finity currently supports the operation of almost 100 small scale CHP and CCHP systems at various manufacturing facilities, nursing homes, colleges, data centers, and many other applications throughout the Mid-Atlantic and Southeastern U.S.

CHP and CCHP with Capstone microturbines can further replace or supplement existing, and possibly outdated, inefficient, conventional technologies. Instead of purchasing electricity from the local utility and burning fuel in an onsite furnace or boiler to produce thermal heat, an industrial or commercial facility can utilize a CHP system to provide both electrical and thermal in one energy-efficient step.

Since the heat is used year round, the system lowers a site's overall energy cost while providing a resilient onsite power system and lowering the carbon footprint too. In addition to helping the end user, these new CHP and CCHP plants produce a stable gas load for the local gas distribution companies. The stable demand and environmental benefits are the main reasons why many local gas distribution companies are becoming supporters of the technology.

The growth of both the oil and gas and commercial market have resulted in E-Finity's fleet growing to approximately 600 Capstone microturbines capable of nearly 60MW total. All this growth wouldn't be possible without the shale gas revolution and it's full circle journey from the oil and gas areas to the city gates themselves.



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