

AUSTRALIAN SHALE
GAS DEVELOPMENT

VALVE ENGINEERING
FOR RECIP COMPRESSORS

ROOT CAUSE OF
PIPING FAILURES

MAY 2015

COMPRESSOR^{tech²}

Dedicated To Gas Compression Products & Applications

SHALE

Gas Technology



+ Skidded Microturbines Power Marcellus **And** Utica Gas Facilities



■ Cat Goes Electric



Skidded Microturbine Packages Power-Up Marcellus And Utica Gas Facilities

> E-Finity custom packages reduce installation time from weeks to hours

BY NORM SHADE

■ E-Finity's customizable skidded packages provide multiple Capstone microturbines in a factory-built and commissioned system that includes the E-Finity mTIM microturbine interface module shown at the left end of the package.

The rapid development of the Marcellus and Utica Shales throughout the Appalachian Basin has driven the need for more 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. Microturbines are a common solution that provides the incremental electric power required for new and expanded facilities in remote Marcellus Shale locations.

E-Finity Distributed Generation LLC, the exclusive distributor for Capstone

Turbine Corporation in the Mid-Atlantic and southeastern United States, has installed more than 400 Capstone microturbines since 2007, many of them in Appalachian Basin natural gas facilities.

Standard Capstone microturbines are available in 40, 87 and 268 hp (30, 65 and 200 kW) frame sizes. Products based on the 268 hp (200 kW) turbine frame are also available in 804, 1072 and 1340 hp (600, 800 and 1000 kW) configurations. Capstone microturbines produce ultralow emissions and can run on a variety of fuels including methane, rich natural gas with high heating values up to 1275 Btu/scf (47.5 MJ/m³) or diesel oil. The Capstone microturbine elec-

tric generator is a small modular design with just one moving part, patented air bearings that require no lubricating oil or coolant, and integrated utility synchronization and protection. In aggregate, Capstone units have accumulated tens of millions of operating hours.

The ability to listen to customer needs and respond in a way that meets the demand of the industry is key to a company's success. "As the top distributor of the Capstone product line, E-Finity's success in both the commercial industrial and oil and gas markets has given

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■ When E-Finity's skidded package of multiple Capstone microturbines arrives on-site, it is ready for a single fuel gas connection and electrical connection at a single marshalling cabinet, which can reduce installation time to just a few hours.

it the ability to fully understand what a customer needs," said Jeff Beiter, managing partner. This is seen in E-Finity's most recent new product offering.

In the Appalachian Basin, it has been common practice to install multiple C30 (30 kW) or C65 (65 kW) microturbine units in parallel to provide the required block of site power. Although the Capstone microturbines are self-contained modules, the on-site configuration and installation of multiple parallel units can be labor-intensive and time-consuming. E-Finity solved this problem in October 2014, when it began packaging Capstone's standard C30 and C65 microturbine units into one compact, customizable, skid-mounted package.

E-Finity's skid package offering was created in response to a request from a gas-gathering and production customer in southwest Pennsylvania. With sites in the heart of the wet gas region of the Marcellus Shale, the customer was faced with the issue of bringing their compressor stations online quickly to take advantage of market prices and demand. They also wanted to reduce construction and start-up costs, while increasing the reliability of their power systems.

To achieve these goals, E-Finity designed and assembled a system that incorporates gas piping and electrical components that were specified by the customer. To meet the urgent

need of the customer, the system was pre-commissioned to verify that the control system and the power system were properly connected. All construction and pre-commissioning was done in-house at E-Finity's production facility in Wayne, Pennsylvania, just outside of Philadelphia.

When the skidded package of four C65s arrived on-site, it was ready for final fuel gas and electric power connections. E-Finity said that this allowed the customer to quickly, safely, and cost efficiently generate power at a remote compressor site. The benefits of the skid include a single fuel gas connection and electrical terminations at a single marshalling cabinet. The skid also allowed all four C65s to be factory-tested and pre-commissioned. The customer reported that the on-site installation time was reduced from more than three weeks to a single day. In fact, once the multiple-unit skidded system arrives on-site, it can be powered up in a matter of hours.

Since each skid is customizable, weight and dimensions can differ depending on what each customer requires at their site. Each skid has a width of 8 ft. (2.4 m), a height of approximately 7.5 ft. (2.3 m) and length of up to 44 ft. (13.4 m), depending on the number of microturbines. Optional silencers, which help meet stricter noise requirements, can be added, increasing the height by 2 ft. (0.6 m).

Each E-Finity skid-mounted microturbine system includes a fuel header with a 10 μ m filter, regulation and individual disconnects at each microturbine. The header is welded and pressure-tested to meet the customer's specifications. The skid package also contains the full control system normally present in any microturbine array and an outdoor-rated programmable logic controller (PLC) control system mounted next to the power distribution panel with 480 V disconnects for each unit. Power disconnect devices and fuel isolation valves allow the lockout and tagout of individual microturbines without shutting down the array. If lower voltage systems or single-phase power is required, this can be added to the skid as well.

E-Finity plans to supply these customizable and scalable skids to many oil and gas sites within the Marcellus and Utica Shale regions and expand the product into the company's commercial and industrial CHP (combined heat and power) and CCHP (combined cooling, heating and power) product offerings. The CHP and CCHP systems will be assembled with combined heat and power or chilling and heat systems mounted on the skids with the microturbines. These systems will reduce the construction cost on commercial applications as well. "Regardless of the application, the E-Finity skid-mounted units are helping and will continue to help customers meet the increasing demands of their facilities," concluded Beiter.

The skidded packages are not E-Finity's first example of responding to customer needs. "Earlier, customer need resulted in E-Finity developing its microturbine interface module (mTIM)," said Jerry Todd, senior sales engineer for E-Finity's Oil & Gas Division. The mTIM is a PLC-based controller that performs turbine and system diagnostics, while allowing for remote connectivity for 24/7 off-site monitoring and maintenance by E-Finity. Developed and manufactured in-house, the mTIM controller is now a standard and integral part of every E-Finity microturbine installation. **CT2**