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MICROTURBINES GAINING WIDER Foothold AS DRIVERS FOR COMPRESSION

Capstone says micros are aptly suited for new shale plays

BY PATRICK CROW

■ Darren Jamison



The U.S. shale gas plays have been an unexpected boon for Capstone Turbine Corp., which has more than an 80% market share of the domestic microturbine market.

Many oil and gas operators face delays in hooking up electric power for compression in remote shale locations. Fuel costs for diesel engines have been relatively high. But natural gas driven microturbines have proven to be a viable and preferable option in many places.

Darren Jamison, Capstone president and CEO, said customer education has been the primary challenge for his Chatsworth, California-based company.

"Once customers try our technology they like it, but getting them to try it is another thing," Jamison said. "In this economy people don't like to take risks. And oil and gas operators tend to be very loyal. Getting to these customers is the hardest part. They've been buying the same engines for 50 years and they tend to continue to do that."

Jamison said Capstone broke into the shale gas market with orders from Pioneer Natural Resources. "Once we got them, it was a landslide," he said. "Pioneer got us Chesapeake, Anadarko, Talisman, Marathon, Shell, and we can just keep going down the line."

Jamison said Capstone's foothold has expanded from the Eagle Ford Shale of South Texas to the Marcellus

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Shale of Appalachia to the Bakken Shale of North Dakota and Montana.

Two years ago, Capstone had "close to zero penetration" in the shale gas market. Jamison said that segment now accounts for 60% of its revenue. The company's US\$140 million backlog also is about 60% oil and gas related.

The company's microturbines usually operate in arrays of multiple machines, providing both redundancy and reliability. Plus, he said emissions and life cycle costs are lower.

He said gas producers are buying Capstone products for their reliability. "With oil and gas that's what they care about," Jamison said. "The cost upfront is hard, but if you have to take a site down for three or four hours, you've made up that difference.

"They love the reliability and the technology of microturbines. But the operators need to understand it's a different animal; it's more of an electrical product than a mechanical one."

He said the education process be-

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comes important when customers weigh the higher front-end costs of microturbines against the maintenance costs and downtimes of engines and motors.

"Our initial cost is higher, than say a reciprocating engine, but our total cost of ownership is lower," Jamison said. "We actually guarantee that cost of ownership for nine years."

Jamison said scheduled maintenance costs should be far less important than the downtime costs that result in unscheduled and unpredictable lost production. "If you're getting 80 to 85% runtime (with another driver), what's that 15% down time costing you?"

"We have discovered that as Capstone gets into bigger applications, our story gets more compelling. The customers are more educated and look more at the long-term costs. The initial cost becomes less of an issue.

"As we get bigger into the 4000 to 5360 hp (3 to 4 MW) range, someone who has paid a million dollars for a piece of equipment is concerned about lifecycle costs, emissions, what's it going to do for production at their actual site."

Jamison said engines obviously become less reliable over time. "Everybody knows with a recip you have a concert of moving parts: pistons, valves, belts, hoses, and such," he said. "If you look at how many moving parts they have, their availability is actually pretty good.

"Typically, once they start to wear out, their runtime will be in the low- or mid-80 percentage range with all the scheduled maintenance and then the unscheduled maintenance. Unless you have an operator on site, that can take some time."

Jamison said microturbines are much more reliable equipment. "You have one moving part, running on air bearings, no oil and no coding system," he said. "You mostly have a bunch of power electronics and one spinning shaft."

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He said maintenance is relatively simple: air filters should be changed yearly, injectors every two and a half years, and the hot section reworked every five years.

"With remote monitoring, when a unit goes down, we can know if it's a fuel fault, clogged air cleaner, software issue, or something else," Jamison said. "We can remotely dial in for more diagnostics."

Jamison described Capstone's microturbines as "somewhat fuel ag-

nostic" because they can burn natural gas, compressed natural gas, liquefied natural gas, propane or diesel — whatever is economical and locally available. They can also be repowered to different fuels.

He said many of Capstone's oil and gas customers do just that during the process of completing and hooking up natural gas wells. "They will run their microturbines on diesel while they are building the pipeline, and once that pipeline is operational, they begin tak-

ing gas off the pipeline and running the (microturbine) machines with that," Jamison said.

The microturbines can operate on casing head gas with up to 7% sour content, providing electric power for the downhole pump, small compressors, motor loads, and other onsite needs of a remote oil or gas development site. They can be used for compressor stations and manned/unmanned offshore platforms, also running on unprocessed wellhead gas to generate continuous power.

Capstone's largest microturbines are 270 hp (200 kW) units, which often are bundled in groups of five for 1340 hp (1 MW) of power. The company is lab testing its 335 hp (250 kW) architecture, which is expected to be commercially released in about 18 months, and will be followed by a 500 hp (370 kW) version.

"These larger architectures, the new products in the 335 to 500 hp (250 and 370 kW) market, provide the lowest costs per kilowatt hour and higher efficiency," Jamison said. "It's the same thing you hear from the engine guys, about getting more output from the same architecture and making it more efficient. That's where we're going."

"We're working on some other technology, but right now we feel like we have the right suite of products to continue forward, from an efficiency and architecture standpoint."

Jamison said since 2007 Capstone has averaged growth of 20% yearly, "which is great considering that were right in the middle of the economic downturn in 2008 and 2009."

He is optimistic that the company's growth rate will continue, or even improve, judging from the enthusiasm of Capstone's customers.

"They love our technology," Jamison said. "We have a lot of champions out there. These are people who are thinking outside the box, and are putting themselves on the line, to try a new approach." **CT2**