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SERVING THE OIL AND GAS INDUSTRIES
—IN THE FIELDS AND AT REFINING PLANTS—
COMES WITH PLENTY OF UPS AND DOWNS.

BY DAN RAFTER



The manufacturers of onsite energy systems are used to change. The customers that they serve—whether they own massive industrial warehouses, sprawling supermarkets, or new multifamily apartment towers—are constantly evolving, reacting to the changes that the ups and downs of the economy bring to their businesses.

But few customers experience highs and lows as frequently as those working in oil and gas.

Oil and gas providers are often at the mercy of economic fluctuations across the globe. They must also deal with ever-stricter environmental regulations that can suddenly impact their bottom lines. And then there's the growth of new technology: just look at how the technology of fracking—controversial, yes, but unquestionably profitable, too—has caused a surge in activity among oil and gas companies across the United States.

The manufacturers providing onsite energy solutions to these companies, then, must be willing to adapt, too. There are times when oil and gas companies, which make up an impor-

tant and large customer segment for onsite energy providers, will dramatically increase their orders of gensets and waste-heat-to-power onsite systems.

But there are as many times when the demand for onsite power at oil rigs will drop. It just depends on what factors are buffeting the oil and gas industry at the time.

Jim Crouse, executive vice president of sales and marketing with Capstone Turbine Corporation, says that oil and gas companies account for 50–70% of Capstone's turbine orders each quarter. This percentage varies according to what is happening across the globe and how strong oil prices are, he says.

"The markets are diverse that we work in," says Crouse. "During the last two quarters, North America and South America were two of our biggest markets. But we do a lot of work in Asia. Russia is still a good market, but it's become more challenging with sanctions and trouble with their currency."

The companies that manufacture turbines and other onsite power solutions say that the volatile nature of the industry is a constant. But they also say that oil and gas providers remain

a core customer base, and that companies in this industry are, in general, turning more frequently to onsite power solutions to make up for an unreliable public power grid (or lack of grid access in remote locations), to lower their emissions and, in some cases, to lower their operating costs.

In Flux

To serve this market, manufacturers have to provide onsite power systems that are durable—many will have to operate in rugged conditions—and reliable. They also need a flexible and diverse business model to survive the ups and downs of the oil and gas industries.

Bill Nix—who is in charge of sales and service at the Gainesville, GA, office of Stateline Power Corp.—says oil and gas companies make up 35–40% of his company’s business. But like others who provide onsite power to these companies, he says the demand from oil and gas companies is often in flux.

“The business does come strong when the drilling is good and the oil prices are up. That situation isn’t good for the consumer, but it is for the companies drilling for oil,” explains Nix. “When the price of crude drops, though, they shut down pretty quickly. It is not a slow decline. One day the companies are up there drilling. The next, they shut down the platforms. All orders that you might have had are put on hold. It’s pretty abrupt.”

Capstone’s Crouse says that as of press time oil prices were exerting a downward push on business from oil and gas companies. That’s because oil prices have dropped from more than

\$100 a barrel, to \$50. “That does slow things down,” he says. “That has taken customers that were traditionally purchasers of our product and has them looking at financing options, at different ways to get our turbines. They still have a need for the product, but they are looking at other ways to get it besides putting it in their capital budgets and paying for it.”

Nix gives an example: An oil or gas client might steadily order five or six units from Stateline Power every month. Stateline Power might project that these orders will remain consistent for three or four months.

But then that order might suddenly change, or stop completely. Maybe the oil or gas provider’s business has dried up because the cost of oil has plummeted. Maybe the company has run into regulatory trouble because its emission of nitrogen oxide (NOx) is too high.

These scenarios can cause an oil and gas provider to suddenly dump a long-standing, and long counted-on, order. Those five or six units that a manufacturer counts on every month? That order might suddenly evaporate.

Manufacturers that aren’t prepared for this instability can see their bottom lines suffer, if they don’t serve a varied enough group of core customers, Nix says. “This is not an industry that you can count on to be a stable one. The fluctuations can be severe.”

Stateline Power, though, will continue to serve the oil and gas industries, despite this challenge. That’s because when the industry is going strong oil and gas companies are lucrative customers that will return again and again.

A Boost From Fracking

New technologies are a good example of an outside force that can boost or reduce the number of orders from oil and gas producers. Consider how the rise of fracking has changed the fortunes of companies in this industry.

The oil and gas industry has gotten a recent boost from fracking. The Bakken formation underneath a large swath of North Dakota is a good example. Oil companies are flocking to this region looking for the plentiful oil that can be found there.

As a result, the Bakken region is booming. Commercial real estate firms are building convenience stores, gas stations, apartment buildings, hotels, and single-family homes to serve the needs of a population that is soaring.

Many of the oil and gas companies doing business here—and many of them working across the US—are increasingly turning to onsite power systems to help them power their rigs.

Capstone Turbine Corporation recently received 1.4 MW of orders from E-Finity Distributed Generation for microturbines to be used for oil and gas operations in the Marcellus and Utica shale regions. E-Finity is Capstone's distributor for these shale plays.

The customer—one of Capstone's largest—is turning to onsite systems to power a pair of compressor station facilities in New York State. A Capstone C800 Series turbine will power one of the stations, while a C600 Series turbine will fuel the other. Both sites incorporate waste-heat-to-power systems.

Capstone says one of the reasons why the New York cus-

tomers chose Capstone's turbines was to reduce the amount of emissions it produced. Reducing emissions has become a key goal for many oil and gas companies as municipalities and local governments enact stricter requirements. Those oil and gas companies that can't meet these tougher emissions requirements might struggle to do business as green concerns become important to government bodies.

Jeff Beiter, managing partner for E-Finity, in a written statement, says that the two sites, thanks largely to the turbines, have the potential to be more than 75% efficient.

That's an important selling point today, says Darren Jamison, president and chief executive officer at Capstone Turbine. That's especially true as energy prices continue to drop, placing more of a burden on the bottom lines of oil and gas companies.

"Shale gas producers are focused on increasing efficiency and lowering operating costs in response to the drop in energy prices," said Jamison in a written statement.

Demand on the Rise

Nick Detor, power generation division sales manager at the Tulsa, OK, office of MIRATECH, says that oil and gas companies are a big part of his company's business.

MIRATECH doesn't manufacture entire gensets. Instead, the company produces engine silencers to make sure that gensets run quietly, and catalyst solutions that reduce the amount of emissions of nitrogen oxides, carbon monoxide,

and hydrocarbons that gensets produce.

Detor says that oil and gas companies account for about 40 to 50% of MIRATECH's business. And Detor says that he expects demand from this industry to only increase in the coming years.

That's because an increasing number of oil and gas companies are installing onsite power systems to support their drilling operations and production facilities. "I would say that over the last five years, that piece has gone up maybe 10 or 15% of what it was," says Detor. "There is definitely an increased demand from oil and gas producers to put in their own onsite power."

He says environmental factors are playing a role in this increase. Many oil and gas companies operate several different rigs at their sites, all powered by several diesel engines running at the same time. These engines can produce a lot of emissions, resulting in local air-quality issues. It can be costly for oil companies to purchase the equipment needed to reduce the emissions from each of these engines.

Many companies find that it's more cost-effective to operate a central onsite power station. They can then treat the emissions from a smaller number of large engines instead of purchasing the equipment needed to treat a higher number of smaller engines scattered about their sites.

Diesel fuel itself can also be costly. But companies can set up a central onsite power plant powered either solely by natural gas or by a combination of natural gas and diesel. That can result in a lower cost for operators.

"The cost of oil is down, though. So that pressure for reducing the amount of diesel that companies consume is not as important today," says Detor. "But the environmental factors are still there."

Oil and gas producers need to take a close look at their operations before deciding in what way to produce more power onsite. There are plenty of factors for them to consider, Detor says. "Does it make sense to have a drill rig that is all electric and build a power plant someplace on site?" he asks. "Or does it make more sense to rely on diesel engines and treat the emissions at the source? There is no one right answer for everyone."

The Grid

The state of the public electric grid is also having an impact on the demand that oil and gas providers have for onsite power systems. David Griffin, sales manager for Aksa Power Generation in West Monroe, LA, says that the public electric grid no longer inspires confidence in companies, including those working in oil and gas. Until municipalities—or the federal government—invest more money in repairing, updating and maintaining the public grid, he says, expect demand for onsite power to rise among all types of companies.

"The majority of our onsite power customers are in the emergency standby market," says Griffin. "With current US electrical grid designs becoming more and more outdated, and with the increasing demand on these facilities, the need for emergency standby power continues to grow."

This driver is one of the more important today. Griffin says that the oil and gas industry is a “huge” market for onsite power generation. But genset manufacturers can’t always count on this demand staying steady, Griffin says.

“When the price of oil and gas drops, so does the demand for the need of power generation equipment,” he says.

A Tough Job

Onsite power solutions don’t operate any differently when they are providing support for oil or gas production, than when they are providing power to a hospital or factory.

But that doesn’t mean that gensets don’t face unique challenges when supporting a drilling rig.

Detor, from MIRATECH, says that onsite power systems fueling oil and gas sites generally face harsher operating conditions. “The big thing that stands out is that the duty is generally a little more severe,” he explains. “Oil and gas companies rely on a lot of equipment that is installed outside, where it is exposed to the elements.” Gensets might experience extremes when it comes to hot or cold weather, he adds.

“The guy powering a more traditional site might be able to place his onsite systems in a more sheltered environment,” says Detor. “With a traditional plant, you can place the power-generation equipment inside the plant. It is then more sheltered from the elements than what you’d see with a typical oil and gas application.”

Oil and gas companies, then, must focus more heavily on

maintenance, and they must budget more money for possible repairs. Gensets exposed to harsh weather conditions will need service visits that are more frequent. Oil and gas providers must track how many hours their power generation equipment has been operating and schedule preventative maintenance visits unless they want an unexpected—and unpleasant—surprise when their onsite power systems suddenly shut down.

The gas and oil industry provides challenges even when the business is flowing. That’s because gensets and turbines powering rigs and excavation sites so often have to operate in difficult conditions. “We always have to ask about where the equipment is going to be used,” says Nix. “The conditions are sometimes difficult, so we have to make sure that we design equipment that will hold up.”

An oil company might need a generator in the heat of the Louisiana swamps. Others might need one to that can stay cool enough to function even during the hottest days of a Missouri summer.

“During the daytime, our machines are operating in temperatures that can get up to 110 and 120 degrees,” says Nix. “There are often other machines running around them. So there is a lack of cool air. You have to size the radiators correctly so that they do get cool air.”

Other times, a generator might have to operate in a valley or other form of low ground where air movement is limited. The sun might beat down on the generators at the same time, placing stress on the machines.

The intense heat can cause problems for even the hardest of machines. So not only does Stateline Power have to develop the most rugged of generators, it has to make sure that end users know how to take care of these machines in different environments.

“It gets warm on the deck of a drill rig,” says Nix. “Often, oil companies will have all of their power systems running in one area of the platform. The heat can get pretty intense. You have to build accordingly so that the units aren’t overloaded. You have to make sure that your end users are getting a unit that can handle the conditions it is going to be operating from.”

Energy Independence

Anthony Weidner, senior marketing engineer in Houston for the power generation group of Elliott Group, says oil and gas companies are pushing harder today for energy independence and more efficient operations. Both of these factors mean that demand for the steam turbines that Weidner’s group manufactures is on the rise.

Elliott Group’s steam turbines can save oil and gas companies money by acting as replacements for pressure-reducing valves. Oil refineries produce higher-pressure steam that the refineries often have no use for. Or, even if they can use steam for a downstream process, they need that steam to be at a lower pressure.

Refineries can drop the steam pressure through pressure-reducing valves. But Weidner says that this results in wasted energy, and that, by installing turbines as replacements for these valves, refineries can then generate new energy that would otherwise be wasted through a valve.

“Replacing these pressure-reducing valves can increase the efficiency of a refinery,” he says. “Pressure-reducing valve replacement is one way to increase efficiency that oil companies often don’t think of.”

The Elliott Group also provides clients—including oil and gas customers—with waste heat-to-power systems. These systems take waste heat and turn it into usable power, another way for refineries to become more energy efficient and improve their bottom lines each year.

The combination of turning waste heat to usable power and replacing pressure-reducing valves is a potent one. It’s little surprise, Weidner says, that oil and gas companies are turning to such solutions. Not only does generating power onsite save these clients money, it also provides them with more reliable power, he adds.

“There is a push among oil and gas companies to move away from central utility plants that send them power from long distances,” he says. “Especially in Gulf Coast areas, a lot of refineries are looking to generate their own power. If the public grid goes down during a storm, a refinery can stay online and continue production. If they don’t have their own onsite power, if the grid goes down, they have to shut down, too. That’s lost revenue for them.”

And while more oil and gas companies are embracing onsite power systems, many are still deciding whether the technology is right for them, Weidner says. This means that there is plenty of room

for growth in this industry for the companies that manufacture and sell onsite power.

Weidner explains that the best way to grow the onsite business in this industry is for companies like his to hammer home the message that by generating their own power, oil, and gas companies can save big dollars every year. Manufacturers need to show, too, that these annual savings will quickly cover the upfront capital costs needed to purchase and install onsite power systems, he says.

“I think the waste heat to power and pressure-reducing valve replacements are largely untapped resources right now,” says Weidner. “I think companies promoting the technologies and putting that bug in people’s ears will help. If you tell plant managers and operators that they can save X amount of dollars a year, a light bulb goes off in their heads. They might decide to bring it up at the next board meeting. They recognize that if they can make the investment in capital costs right now, in the long run they can save a lot of dollars every year in operational costs.”

Michael Minnerly, global technical leader for engineered solutions with the Bethlehem, PA, office of Elliott Group, says that hot gas expanders are another solution available to refineries that want to boost their energy efficiency.

Minnerly works in the hot gas expander section of Elliott Group. The division supplies onsite power recovery turbines to petroleum refineries that have fluid catalytic crackers. The systems take the waste heat generated by the fluid catalytic cracking process and recover that thermal energy to produce power.

“This makes the refineries more environmentally friendly,” says Minnerly. “Look at the other options you have for onsite power production. To fire a gas turbine you are actually burning something. You have the expense of the fuel and the higher emissions. We don’t use any fuel within our expander. We use the waste gas produced by the process. There is no carbon footprint to produce power with our expander.”

Minnerly says that demand for his company’s hot gas expanders has been on the rise. But this increasing demand isn’t coming from US refineries. Instead, Elliott Group is providing this technology to refineries in the Asian Pacific region, the Middle East and India. The company as of press time was bidding for its first hot gas expander project in Africa, Minnerly says.

Demand is lower in the US mostly because there are so few new refineries being built here, Minnerly says. “We are not building new refineries in the United States. And the ones that we are building are smaller in scale,” he explains. “To put these units in these smaller refineries is not economically feasible. You can simply use gas turbine technology with the glut of natural gas we now have from fracking. To put a gas turbine installation in that situation makes more economic sense. Many of the existing larger refineries are old ones in the United States. They were not built with expansion in mind.

To retrofit them at this point becomes almost like a puzzle. To put a big hot gas expander unit in an existing facility doesn’t make economic sense.” **BE**

Dan Rafter is a technical writer and frequent contributor.

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