

# Inside Energy

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## Small LNG plants could have big market impacts

Sometime next year, if all goes according to plan, an ordinary tractor-trailer rig will pull up to an oil and gas drilling pad in a US shale play that is flaring a lot of gas because it is not close to any pipelines or other gas-gathering infrastructure.

In the span of just a few hours or at most a few days, workers will set up a uniquely small liquefied natural gas plant on that drilling pad that fits entirely within the confines of that 53-foot-long rubber-tired trailer. This plant will allow the drilling company to convert the flared gas to LNG right on site, as well as separate out the even more valuable butane, propane and other natural gas liquids (NGLs).

The company can then truck both of those commodities to market, or even use some of the LNG to fuel drilling rigs in that same shale play that have been con-

verted to run on LNG instead of diesel.

At least that's the plan for Dresser-Rand, a Houston-based company that designs and builds compressors, turbines and a host of other heavy equipment and engineering solutions for the oil, gas and power sectors in the US and abroad.

Dresser-Rand recently signed a licensing agreement that allows it to manufacture and sell a newly developed type of LNG plant that is much smaller and more mobile than any other liquefaction technology on market.

Brad Dickson, Dresser-Rand's vice president and chief marketing officer, says the technology will allow exploration & development companies to capture and monetize gas and the more valuable NGLs that they are currently flaring off in remote locations that do not have

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## Prospect of 'fiscal cliff' worries energy markets

If Congress fails to reach a deal to avoid looming tax increases and spending cuts, crude oil prices will drop dramatically, an aggressive selloff of investments in utility companies will lead to an unprecedented loss of value in the electricity sector, and new financing for energy research and development will disappear overnight.

That's the view of some analysts anxiously watching President Barack Obama and Congress start to explore options for avoiding the so-called "fiscal cliff" facing the US at the end of the year if no deal is reached.

"There's no doubt that the market is deathly afraid of going over the fiscal cliff," said Phil Flynn, an analyst with Price Futures Group. "If we go over the fiscal cliff, the market's going to price in a recession, we're going to see the price of oil fall, and we're pricing in the varying degrees of

an economic slowdown right now."

While this is a far bleaker portrait of financial challenge than most analysts expect, many are bracing for energy commodity prices to continue to fluctuate as negotiations between congressional leaders and the Obama administration drag into December. Crude oil prices, for example, have rallied and fallen over the past two weeks on rumors of potential stalemates and breakthroughs in negotiations.

At the same time, energy lobbyists, anticipating a larger tax-policy debate next year, are ramping up their efforts to keep any changes from hurting the industries they represent.

The Edison Electric Institute, for example, is fighting to maintain Bush-era tax cuts for dividend and capital-gains income, out of fear that without

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## Technology for small-scale LNG plants could have big market impacts ... from page 1

access to gas pipelines or other gas-processing infrastructure.

The technology — dubbed the “VX Cycle” — can also be used to produce LNG fuel for truck fleets, as well as cleaner-burning and cost-competitive replacements for the oil-based bunker fuel that ships use and the diesel fuel that railroad locomotives burn, Dickson said.

“There’s a place for all of this technology,” Dickson said. “There’s a lot of thinking that’s evolving around this, to the benefit of industry, so we’re very excited about it.”

The VX Cycle LNG plant was developed and patented by Expansion Energy, an energy-technology company based in Tarrytown, New York. David Vandor, Expansion’s chief technology officer, agreed that there are a host of applications — both upstream and downstream — for an LNG plant that is as small and as mobile as the one that Dresser-Rand has now licensed.

On the upstream side, for example, Vandor said VX plants are an ideal solution to addressing the dearth of gas-gathering and processing infrastructure in shale plays such as the Bakken in North Dakota, where E&P firms are flaring off a significant amount of gas and the NGLs it contains. Vandor said that once a VX Cycle plant arrives at a well pad via a standard 18-wheel tractor-trailer rig, it could be up and running very shortly, transforming otherwise flared gas into marketable LNG and NGLs.

“Hours or days, not weeks or months,” he said. “All it needs is a valve with a gas stream that’s ready to flow. It doesn’t even need to be in a place with access to power, because it makes its own electricity.”

Jeremy Dockter, Expansion Energy’s business manager, said he and Vandor are contractually obligated not to discuss the terms of the licensing agreement with Dresser-Rand. Dickson, for his part, also declined to disclose the terms of the deal.

But Dickson said a number of oilfield-services companies and E&P firms have expressed interest in purchasing the small-scale VX Cycle LNG plants, which Dresser-Rand will manufacture and sell. Dickson declined to say how much Dresser-Rand intends to change for one of the units, which will come with an optional maintenance agreement. But Dickson said Dresser-Rand has been giving potential customers a “rough order of magnitude” on the cost, and that those companies “tell us that we’re in the ballpark.”

### No more flaring gas?

Dickson acknowledged that industry is currently scrambling to build pipelines, processing plants and other permanent infrastructure in an effort to reduce gas flaring in US shale plays such as the Bakken. But he said these infrastructure investments will not hurt Dresser-Rand’s efforts to sell small-scale LNG plants to oilfield-services firms such as Schlumberger and Halliburton, or E&P firms such as Continental Resources, which has extensive operations in the Bakken.

“Not at all, because a lot of that [infrastructure development] is in its infancy,” he said. “I think a lot of different

technologies will be applied to the Bakken, but it’s going to be over the next decade. We can go to the market very fast with the Dresser-Rand VX Cycle technology, and make it economical to take what otherwise is being flared and make a commercial product out of it.”

Dickson said “hundreds” of mobile LNG plants could be deployed at well sites in the Bakken in the next few years. And if those plants work as well as Dresser-Rand believes they will, they could reduce the footprint of the permanent gas-processing infrastructure that’s being built there, Dickson said.

“You can produce the LNG and then truck it out of locations where putting in the infrastructure — the pipelines and so forth — doesn’t make sense,” he said.

Expansion Energy’s Dockter voiced a similar view, saying the VX Cycle plants could be deployed on an “interim” basis until the permanent gas-gathering and processing infrastructure gets built out.

“In some cases that will happen, and in some cases that will take quite some time,” he said. “But the beauty of the VX plants is that they are mobile, so if the gathering systems arrive a year or two later, you simply take your VX plant onto the next well site that doesn’t have a gathering system, or send it to another play, or use it for a downstream application.”

### Bigger markets downstream?

Dockter said he expects that the downstream market for small-scale LNG plants — using them to fuel trucks, ships construction equipment or railroad locomotives — will eventually become even larger than the upstream market in the oil and gas patch. He noted that there are efforts underway to build a network of LNG fueling stations across the US for long-range trucks, an initiative dubbed the “LNG highway.”

He said the VX Cycle can be used at those fueling stations, as well as in ports to fuel the increasing number of ships and barges that run on LNG instead of bunker fuel. VX Cycle plants can also be deployed along railroad lines to fuel locomotives that run on LNG instead of diesel fuel, he said.

“You’re going to need hundreds or maybe thousands of LNG fueling stations eventually to build out that infrastructure,” he said. “We view the VX Cycle as the ideal solution for that model because we can take low-pressure gas from any local distribution system and produce LNG right at the fueling station; we do not need a high-pressure pipeline or even a high-capacity pipeline to produce LNG.”

### Facilitating water-free fracking

Expansion Energy says the VX Cycle can also be used in conjunction with another one of its technologies that could have major implications for the oil and gas industry. That technology, called Vandor’s Refrigerated Gas Extraction, or VRGE, is designed to fracture shale plays using no water or other liquids whatsoever.

In this technology, the VX Cycle is used to create something that Expansion calls “cold compressed natural gas,” which is pumped to very high pressures and combined with sand or other proppants to create fissures in shale formations, as is done

in conventional hydraulic fracturing (*IE*, 27 August, 1). But the VRGE technology would use no water at all, thus eliminating a host of environmental concerns that have long dogged fracking, while also reducing well costs.

Dresser-Rand's Dickson lauded the Expansion Energy's liquid-free fracking technology as a "game changer" for the E&P industry, but he said his company decided not to license it because Dresser-Rand is not an oilfield-services company like Halliburton or Schlumberger.

"We feel the down-hole people will be better suited to support that," he said.

Dockter said Expansion Energy is currently talking to a number of oilfield-services companies and "major" oil and gas producers about licensing the liquid-free fracking technology. He declined to identify any of these potential partners at this point, but said Expansion intends to demonstrate the technology as soon as 2013.

### Demonstration next year

That's also the plan for the small-scale LNG technology. Dickson said Dresser-Rand is currently building a demonstration unit that will produce 1,650 gallons of LNG per day, and that the company intends to field test it in the second quarter of next year.

"That demo unit is to really prove out the entire cycle and also to prove out the economics," he said. "Because if we can be economical at 1,650 gallons per day, then we know we'll be economical at 5,500 or 12,000 or 25,000 gallons per day."

To be sure, Dresser-Rand and Expansion Energy are not the only two companies that claim to make a "small scale" LNG plant. But the VX Cycle differs from those other plants because of its size — both physically and in terms of the amount of LNG it can produce. The other plants on the market typically churn out at least 100,000 gallons of LNG per day, and are not mobile. While larger versions of the VX Cycle can produce that much or more, smaller versions can also produce as little as 1,500 gallons a day — which would not be cost-effective for other LNG technologies that use multiple compressors, mixed refrigerants and other specialized equipment.

But Vantor says the VX Cycle is economical to operate at truly small scales because it uses only a single compressor and a single refrigerant. And because of that, he says the device is the only mobile LNG plant on the market, making it appropriate for many different upstream and downstream applications.

"A single compressor can process the product stream and the refrigerant stream, and that's the beauty part of the VX Cycle," he said. "And that's what makes it able to be truly small scale."

— Brian Hansen

## Risk of going over the 'fiscal cliff' rattles global energy markets ... from page 1

said, claiming that many of the top executives with EEI's member companies would be lobbying Congress over the next two weeks to extend the cuts.

In July, EEI released a study conducted by Ernst & Young that

analyzed the age, income level and investment goals of dividend stocks investors. According to the study, roughly 8.2 million, or 32%, of these investors have dividend incomes that would be taxed at the maximum rate of 39.6% if the Bush tax cuts expire.

Under the tax cuts, which were originally passed in 2003 in the Jobs and Growth Tax Reconciliation Act and later extended by Congress in 2006 and 2010, the maximum tax rate on dividend income was cut from nearly 40% to 15%, while the maximum tax rate on long-term capital gains was reduced from 20% to 15%.

The study points out that investment income also faces an additional 3.8% Medicare tax on many of these households under Obama's health-care law, effectively increasing dividend tax rates to as high as 43.4% and hiking long-term capital gains tax rates to 23.8%. The study suggests that an expiration of the tax cuts would likely cause investors to sell dividend stocks in order to avoid a steep tax rate increase.

McMahon said for investor-owned utilities, which are typically financed half with equity and half with debt, expiration of the tax cuts would likely impair their ability to raise capital and "ultimately drive up the cost of service and rates."

"When you raise the cost of capital, something's got to give," McMahon said. "You don't want to do anything to increase the cost of capital when you don't really need to."

Representative Ed Whitfield, a Kentucky Republican and chairman of the House Subcommittee on Energy and Power, said many companies are "sitting on capital" due to the uncertainty over the tax cuts.

"I've had a lot of discussions with executives of major companies, utilities frequently, and they're all very much concerned about this higher tax on dividends," Whitfield said.

In addition to expiration of the Bush tax cuts, automatic deep reductions in government spending would also take effect in the absence of a deal between Obama and Congress, thanks to a budget deal that the president and lawmakers struck in 2011

Those cuts include more than \$4.6 billion in funding for Energy Department research and development, according to an analysis from the American Association for the Advancement of Science (*IE*, 1 October, 3)

In a September report, the White House Office of Management and Budget said sequestration would result in an 8.2% cut in DOE's nondefense budget.

While up to \$4 billion in tax breaks for oil and gas producers are not directly subject to the fiscal-cliff negotiations, the industry wants to make sure they are not victims of any overall tax-reform deal between the White House and Capitol Hill.

Whitfield said some Republicans may consider eliminating the oil and gas tax breaks if similar concessions for other energy industries, particularly renewable energy are eliminated as well.

Rick Boucher, a former Democratic congressman from Virginia and now the head of government relations for the law firm Sidley Austin, said oil and gas tax breaks might be eliminated in tax-reform talks next year in exchange for lowering the current corporate tax rate of 35%.

— Brian Scheid