



The Competitive Landscape for ENERGY

By Greg Varhaug

CeraWeek Energy Discussions. At CERAWeek, IHS's Annual Executive Conference held in downtown Houston, top executives from the world's major energy companies speak with remarkable candor about the complex interrelationships between technology, markets, geopolitics, and the environment—and how these factors shape their decisions as industry leaders.

Panel discussions at CERAWeek cover a wide range of topics, from the general (like "Solar Power") to the highly specialized (like "Recalibration of Supply Costs: Accounting for Integration"). The following summaries are merely the tip of the iceberg.

Electricity-storage Breakthroughs

The world isn't waiting for a better way to make electricity; it's waiting for a better way to store it.

In that vein, discussions on advances in electric-storage devices at this year's conference were closed to the press. Secrecy prior to a major announcement is sometimes a reason for sensitivity to media light—and according to the technology press, a steady stream of breakthroughs has been occurring in capacitor technology. At least a couple of promising technologies appear to be moving from university research to company labs.

Low Natural Gas Prices

Two years ago, the conference was buzzing with enthusiasm over the “shale gale.” A recurring theme at this year’s conference was how the economics of the U.S. shale gale have backfired for gas producers and royalty holders since then. Natural gas has, for some producers, become too cheap to produce.

In today’s global markets, we see sizable differences between gas prices in North America, where prices are largely market-driven, and prices elsewhere in the world. In Russia, and much of Asia, gas prices have historically been indexed to oil.

Today, Europe’s gas market is a mix of both oil-indexed and spot-market gas. Spot pricing in Europe began when the UK established a hub in Belgium in 1998. The increasing availability of cheaper-than-indexed

gas in Europe since then has resulted in a plethora of producers with a lot of expensive gas on their hands, as well as wholesalers who committed long ago to buy it at that price. Natural-gas prices worldwide could also be affected by the closures of nuclear plants in Germany and Japan. The availability of cheap natural gas also affects the economics of ongoing green-energy initiatives around the world.

In 2010, the U.S. began exporting LNG to the UK, Spain, India, and Brazil. U.S. businesses, including the Union Pacific Railroad, are currently gearing up to export large amounts of natural gas from the base of the Mississippi River corridor. Cheniere Energy recently received DOE approval to convert a Louisiana LNG import facility to use for export. Increased demand abroad is expected to raise domestic prices to a level that

can sustain continued development.

Speaking at this year’s CERA-Week, Scott Angelle, Louisiana’s Secretary of State, discussed plans by Sasol, a South African company, to build a gas-to-liquids facility in Lake Charles. The facility is expected to cost \$8–10 billion and would create 850 new jobs. The plant will be capable of producing over 3 billion cubic feet of natural gas each year. That amount is estimated to be worth about \$1.3 billion a year at today’s price. Sasol is betting that they can get a good price for their products in foreign markets like Europe.

LNG as a Transportation Fuel

LNG is poised to take off as a transportation fuel worldwide. At present, natural gas may be the only ready, scalable alternative to gasoline and diesel as a transportation fuel.

In the U.S., heavy-equipment manufacturers and large-fleet operators are introducing natural-gas-powered vehicles. Volvo announced on May 18 that they intend to produce a 13-liter natural-gas engine for use in heavy trucks in 2014, in factories in Maryland and Virginia. Ryder Systems has committed to increasing the number of natural-gas-fueled trucks in their fleet, and to gradually replacing their aging diesel fleet with natural-gas-fueled vehicles.

In 2011, Apache Corporation donated a compressed-natural-gas (CNG) fuel station for use at Houston's Bush Intercontinental Airport, to fuel their shuttle buses. Apache has also announced that they are building five public CNG fueling stations in four cities, including Houston.

For now, fleet operators are among the only entities who can adopt this alternative fuel for light-duty vehicles, because practically no public service stations are in place to sell LNG or CNG. Texas, for instance, has 36 public stations for CNG and six for LNG. Of the 52 public LNG stations in the U.S., 36 are in California. We saw a similar situation with E85. For all of the flex-fuel vehicles manufactured and sold, according to DOE, at last count there were fewer than 2,500 E85 fueling stations in the U.S. combined.



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Keeping the Lights On in Texas

Low natural-gas prices create a disincentive for power producers to maintain or retrofit old plants at a time when not many new plants are under construction. This situation is complicating matters for the Electric Reliability Council of Texas (ERCOT), which controls 85 percent of the electricity generated in Texas, and whose main concern at the moment is meeting the projected demand for electricity this summer. Texas experienced rolling blackouts in 2011 during the extremes of cold and heat.

Texas deregulated its power industry in 2002. Some benefits and increases in efficiency in Texas have resulted from deregulation. For instance, some believe that Texas would not have adopted smart grid technology as quickly in a regulated environment.

But deregulation has been a mixed blessing for Texas ratepayers. Electric-power rates in Texas are tied to natural-gas prices. In May 2008, high natural-gas prices were cited as the reason for high electricity rates—at a time when natural gas

prices were up substantially from the previous year. Now, Texans are asking why electricity rates are still high while natural gas prices are low. And residential consumers are being urged to lock in their rates now, while prices are still "low."

Texans are also worried about a replay of the events from last August, when "hourly day-ahead" wholesale power rates in Texas climbed to \$2,500 per megawatt hour (an average price is around \$40 per MW/h). This occurred after a similar wholesale price spike during a cold snap in February 2011. For the rest of the country, wholesale electricity prices were down, on average, in 2011.

Another issue plaguing ERCOT is Texas' low reserve-power generating capacity. Rolling blackouts can begin when reserve capacity falls below 12 percent. ERCOT projects that it will have a 14.3 percent reserve capacity in the summer of 2013. Since deregulation, insufficient new generation has been brought online to cope with the increased demand. Power companies have to time the completion of new generation projects carefully. They have a financial incentive to wait until new generation is really needed before bringing it online.

To address this issue, the Texas PUC has tentatively approved raising the cap on wholesale power prices from \$3,000 to \$4,500 per megawatt hour. This is supposed to create an additional incentive for investors to bring more generation out of mothballs and back online.

Explaining this situation at CERAWeek, PUC Commissioner Kenneth Anderson said, "But I think that generation has to have the opportunity, and it really only happens in the summer months ... to earn a return on their investment." Anderson continued, "It's in the summer months that you're going to get your return if you're going to get it at all."

Investors also recoup faster the more times they hit the PUC-controlled price cap. As Dan Lonergan, Senior Managing Director of Tenaska Capital Management, explained at CERAWeek, "Certainly as we look back on last summer, the market prices that you were able to achieve..."

on average because of hitting the cap as often as we did made 2011 a very attractive year."

Chris Weston, president and CEO of Direct Energy, also spoke to this point. "Ensuring that we get the right market structure that continues to be successful and to incent the new build of generation is very important."

The Texas power market is based on an "energy only" structure, meaning that no rules exist requiring generators to maintain an excess capacity. Maintaining sufficient capacity is now a function of the market. "Energy only" is one feature of ERCOT's Texas Nodal program, which replaced a few "congestion management zones"

with more than 4,000 interconnect-ed nodes, largely in order to create a better system of pricing signals.

Some markets, like those in the Northeast, employ a separate capacity market, to ensure that the grid doesn't run out of power. Under their rules, each individual retail supplier bears part of the burden of ensuring enough reserve generating capacity to prevent power shortages. Retail suppliers can then trade this generating capacity, in the form of "entitlements," in local spot markets. Still, maintaining this capacity represents a cost to the individual companies. It's one that power generators in Texas are eager to avoid.

Texas' "energy only" structure makes separate capacity markets unnecessary because, theoretically, consumers' response to market signals is enough to ensure that no critical supply shortages occur during periods of peak demand.

One mitigating step ERCOT took after a major problem they experienced in April 2006 was to start a Voluntary Load Response program in which large power consumers can voluntarily opt to reduce their power consumption during supply emergencies. These businesses are in turn paid for

their inconvenience. When a customer voluntarily cuts power under this program, they must wait until ERCOT gives them the green light to resume normal operations. A PUC program allows businesses with sizable diesel generators to supply additional electricity to the grid during peak demand.

The steps already taken, together with optimistic weather forecasts

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and the addition of more wind power in the last year, have led ERCOT to predict that we will be able to avert any critical shortages during the summer, if only barely.

The Future For Nuclear Power
Low natural-gas prices also

mean that nuclear power in the U.S. is less financially attractive—not that this dynamic has any noticeable effect, because so many other issues are already delaying the construction of additional nuclear plants in the U.S. For a variety of reasons, building a gas-powered plant is faster and cheaper than building either a coal or nuclear plant with the same generating capacity.

In the U.S., Southern Nuclear Operating Co. was recently awarded the first license in 30 years to build a new nuclear power plant. The two Westinghouse AP1000 reactors will be built in Georgia. These "Generation III+" reactors' design includes passive cooling features, reducing the likelihood of a meltdown in the event of a catastrophe such as an earthquake.

After the Fukushima disaster in Japan, here in the U.S., the NRC and the nuclear industry conducted reviews and issued statements that consolidated their findings. The Nuclear Energy Institute released a report they called "A Way Forward." It outlined steps the industry has taken, or plans to take, in response to Fukushima.

The French are committed to nuclear power. They are satisfied

with their current level of safety but say they want to take immediate steps to increase safety margins over those they have at present. Nuclear is such a large part of their power mix that their nuclear fleet is divided into base-load and peak-load plants.

At the time of the Fukushima disaster, Germany had just given lifecycle extensions to its fleet of nuclear plants. After Fukushima, the Germans announced, without consulting with their European neighbors, their intention to shut down all of their nuclear plants by 2022. They've also promised to reduce their overall power use and implement green technologies more aggressively. At last count, Germany had shut down eight reactors. Emphasizing renewables means that some conventional operators are running their plants below capacity. Operators threatened to shut down, in turn threatening the viability of the power grid. So the government is planning to create a capacity market, like those used elsewhere.

China is going ahead with its nuclear projects, building a number of AP1000 reactors, along with Chinese-made CPR1000 (Generation II+) and ACPR1000 (Generation III) reactors. Some of the CPR1000s, under construction since 2007, will come online later this year. China currently has 14 reactors, with 25 more under construction. The Chinese plan to begin exporting their ACPR1000 reactors to Europe.

Japan itself is in nuclear limbo. Public confidence in the industry and the government is deeply shaken. On May 6, Japan became nuclear-power free after it shut down the last of its reactors as part of the government's response to the March 2011 disaster. The government has also begun aggressive conservation measures. The plan now is to restart most or all of the reactors after "maintenance," but popular support exists for a plan to phase out nuclear power gradually. A group of Japanese cabinet ministers is scheduled to announce its decision regarding the future of the nation's nuclear plants this August, during the heat of summer.

In Conclusion

It remains to be seen what the 2012 game changer will be in the energy sector. As global energy leaders steer their companies to invest in innovation, deep-water operations, transportation, environment, clean electric power generation, and so on, the real promise of these new developments will begin

to unfold. The landscape is competitive, and all of the factors discussed in this article will shape energy leaders' decisions—and success—in the coming months and years. **N**

Greg Varhaug has written software instruction manuals and procedural manuals for many Houston companies. He operates HoustonGuitar.com, a commercial music-instruction website.
