Chapter | 15

Evolving Energy: Big Business in Texas

❖ Can Texas remain the world's energy capital in the age of new energy?

Introduction

Energy will likely be the next big thing in the worldwide economy — and Texas may well be one of the biggest beneficiaries. Texas companies produce more energy than any other state, and Texans consume more energy than other Americans. This gives Texans unparalleled insight into the history and possible future of energy production and delivery. This also means that Texas companies could be positioned to dominate the era of new energy that is just beginning.

What's Happening

The Texas energy industry is changing for many reasons, including the following:

- **Technological advances** that make alternative energy sources, such as wind, solar, hydrogen and even algae fuels, more financially viable
- **New, more restrictive pollution laws** that are stimulating demand for renewable energy
- **An aging workforce** and the onset of Baby Boomer retirements that will create a dearth of workers for Texas energy companies, which have some of the state's oldest employees
- **Wild swings in the commodity prices** of oil, natural gas and coal that are driving interest in alternative fuels and alternative forms of energy

These changes have Texas investors, consumers and existing energy companies discussing alternative energy sources, such as wind and solar, along with more unique forms, such as burning trash and using the energy in hydrokinetic water waves.

For example, in the past, NRG Energy Inc. relied primarily on coal-fueled electricity plants. Now the utility is diversifying its fuel sources with a third wind-powered project, a

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new solar project, a new modern coal plant and a planned expansion to its two nuclear plants, said Kevin Howell, Texas president of NRG. At a fall 2009 meeting in Austin to discuss proposed federal emissions regulations, he and other utility executives told state officials that their utilities are adjusting to a society that wants less local pollution from energy providers.

This shift of energy options in Texas will soon affect workers. Both existing nuclear power plants in Texas applied for federal permits to double their capacity. An oil refinery in Port Arthur and another in Houston are set to expand. And a string of enormous power lines will be strung from West Texas to San Antonio and Fort Worth to link growing wind and solar projects in rural areas to Texas population centers.

The Data

Though Texas lost jobs in the traditional oil and gas sectors in the past few years, employment has held steady for most of the 2000–2010 decade. Consider this abbreviated time line and Texas statistics:

- **August 2000** — Texas oil and gas industry employs 66,500 workers, 374 oil and gas rigs operate in Texas, and the price per barrel of oil is $31.22.
- **August 2008** — Texas oil and gas industry employs 84,300 workers, 934 oil and gas rigs operate in Texas, and the price per barrel of oil is $116.70.
- **August 2009** — Texas oil and gas industry employs 75,200 workers, 366 oil and gas rigs operate in Texas, and the price per barrel of oil is $71.06.

The correlation between these three economic indicators is limited, but the numbers point out the dramatic swings in Texas oil and gas industries — swings that show up in paychecks.

Workers in the oil and gas industries are some of the highest paid in Texas. According to data compiled by the Texas Workforce Commission, the average pay for oil and gas workers in the Lone Star State grew from $2,749 a week (or $142,948 a year) in the first quarter of 2005 to $3,384 a week (or $175,968) five years later, in the first quarter of 2009.

Texas dominates the American energy industry in many ways. Consider the following rankings for Texas from the U.S. Energy Information Administration:

- **First in energy consumption** (using about 12% of all energy in the United States)
- **First in gasoline consumption** (consuming about 45% more than second place California and more than 2.5 times as much as third place Florida)
- **First in oil production** (providing a fifth of the oil pumped in the United States, thanks to production offshore in the Gulf of Mexico)
- **First in oil-to-gasoline refining** (creating more than a quarter of the gasoline in the nation, a result of having 9 of the 20 largest refineries in the United States)
- **First in electricity generation**
- **First in electricity consumption** (Texans consume so much electricity that the Lone Star State still has to import electricity)
- **First in natural gas production** (supplying almost 23% of the national market)
- **First in natural gas consumption**
- **First in wind energy production**
- **Sixth in both solar energy production and coal production**
- **Seventh for nuclear energy capacity** (yet was fifth in production in 2009)
- **First state on record to have a traffic accident** involving a hydrogen-powered vehicle

So What?

The Fortune 500 list in 2009 included 64 companies based in Texas — with 4 in the top 10 — including the following companies:

- **Thirteen oil companies** (led by ExxonMobil, Conoco Phillips and Valero Energy, all in the top 10)
- **Nine pipeline companies** (led by Enterprise GP Holdings and Plains All American Pipeline)
- **Eight companies that make and supply equipment to the oil and gas industries** (including Fluor and National Oilwell Varco)
- **Five utilities** (including Reliant Energy, Energy Future Holdings and CenterPoint Energy)

But the oil and gas industries are currently facing three key structural changes that will affect the economies of Texas, said Michelle Michot Foss, chief energy economist at the Center for Energy Economics in Houston.

First, the oil and gas industries have become so specialized that they are splitting apart. Natural gas is growing, whereas crude oil is a shrinking business in Texas. Most of the Texas oil left in the ground is either of low quality or difficult to extract — or both. The days of pumping oil from the ground in Texas will end in 10 to 20 years, according to various industry experts.

Second, the natural gas industry is growing. New natural gas findings in recent years mean that Texas will be the leading U.S. supplier of natural gas for possibly the next 50 years. The natural gas industry expects to grow as electric utilities shift their power plants from coal to natural gas due to proposed air pollution regulations. The additional supply of natural gas, coupled with expected future demand, has attracted more companies to the natural gas market, causing the price of natural gas to drop and thus making it a more competitive fuel source.

Third, oil and gas industries have matured and implemented advanced technology, resulting in a need for fewer workers.

Though the push for alternative energies exists, the U.S. credit crunch and global recession has created a tough financing environment, slowing the progress of energy companies. Private investors, venture capitalists, private equity investors and banks are not putting as much money into energy ventures.

“Everybody in the alternative energy industry whom we have talked to is really

gloomy because nothing is happening fast enough for anybody," said energy economist Foss. "We're not going to be able to rely on alternative energy alone: the wind doesn't blow all the time, and the sun isn't out all the time." And her energy concerns are broad. "The oil refineries are just trying to figure out how to survive," Foss said. "We've had some increases in oil price, which has kept the bottom from falling out of the oil industry. This was heading to another 1986 meltdown."

The energy industry in Texas is under continued pressure to change. Some of the pressure arises from environmental concerns. Scientists worldwide point out that the earth's atmosphere has risen two degrees in recent decades, resulting in melting ice caps at the North Pole, rising water levels along coastal areas, intensified storms and long-lasting droughts. The U.S. Supreme Court ruled in April 2007 that the federal Environmental Protection Agency (EPA) has the authority to regulate greenhouse gas emissions. Under new leadership at the White House, Congress and the EPA moved to uphold existing pollution-control regulations and created new regulations in late 2009. These regulations will directly affect oil refineries and electric plants — and eventually consumers' wallets.

Texas invests millions of dollars in tax credits and related financial supports of renewable energy start-up companies, with particular emphasis on wind and biofuel firms. Some universities, such as the University of Texas at Austin and many of Texas State Technical College's institutions, also have added alternative energy curricula that focus on wind, solar and biofuel markets.

Another example of energy innovation comes from Jim Burke, CEO of TXU Energy in Dallas. He said that consumption could be reduced if consumers constantly view their energy usage. He expects that within a few years consumers will begin receiving daily updates to their e-mail or cell phones regarding their energy consumption at home and at the office. Consumers will subsequently be able to regulate their consumption, and their energy bills, via cell phone or the Internet.

In 2005, a team of energy industry insiders produced a report regarding the "energy cluster" of Texas. These experts recommended that a Texas consortium of private companies, state agencies and regional government organizations be formed to push new technology in the energy sector. In 2009, they started to get their wish.

Petroleum extraction and equipment makers Baker Hughes, ConocoPhillips, Halliburton, Marathon Oil, British Petroleum, Schlumberger and others formed the Advanced Energy Consortium. The consortium members pooled $30 million to fund research at several Texas universities, including Rice University and the University of Texas at Austin and, along with engineers from the consortium companies, worked with the universities' faculty on new technology ideas. In 2009, these engineers and Rice University researchers completed blueprints for "nanobots" — tiny sensors, about 70,000 times smaller than a human hair, that are placed in the ground and signal companies regarding the location of oil. While an actual product is still a few years away, such collaborative efforts are demonstrating Texans' forward-thinking capabilities.

Michael Economides, a University of Houston petroleum engineering professor, is making two key predictions that have the attention of energy companies in Texas. He expects the price of oil to return to $100-plus a barrel (or more than $4 a gallon for gasoline to consumers) due to worldwide demand and foreign political instability. He also expects natural gas prices to remain low due to excess new supplies caused by technological advances in drilling and to crowd out alternative energy sources.

Chapter 15 | Suggested Strategies

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– Michelle Michot Foss, University of Texas at Austin

Think Globally, Plan Regionally

Texas creates — and consumes — a lot of energy. But energy-minded innovations can direct and drive the new energy economy, and such innovations can happen in Texas. "Texas is a great state for material sciences. If we're going to move beyond fossil fuels, you have to make things lighter, and we can do that in Texas," said economist Foss, expounding on one aspect of Texas energy innovation potential.

Texas has a variety of programs to bolster the energy forms in the state's energy cluster industries. Major utilities and even the major oil companies are diversifying their holdings by moving into alternative energies, ranging from natural gas and nuclear to wind and solar to algae and hydrogen.

Interviews with energy executives, insiders and consultants in Texas indicate that the state can continue to dominate the energy market by implementing changes in a few key areas:

- **Make more engineers.** Texas wants to double its nuclear reactors but isn't producing more nuclear engineers. Texas also wants to create new methods to transfer energy but isn't producing more mechanical and electrical engineers.
- **Modernize the electric grid.** Texas is divided into four separate regional power grids that still need smart grid technology to improve the efficiency of distributing electricity.
- **Create more transmission lines.** Texas companies are expanding their production of electricity from sources such as wind and solar, but this is happening away from the population centers. If Texas wants these forms of energy to grow, Texans need to install the lines needed to transmit electricity to the consumers who need it.
- **Invest in new energy technology companies.** As private equity, venture capital and even angel investing shrink, the state's Emerging Technology Fund has focused on biotechnology start-up companies. Yet Texas is already the dominant energy state and not the dominant biotech state. Texas energy startups could leverage the energy expertise that already exists in the state if capital and credit were made more available.
- **Review the governor's Energy Cluster Assessment.** Industry insiders gathered in 2005 to consider the greater energy industry in Texas. Those insiders recommended that Texas bolster efforts to develop products and companies involved in wind energy, hydrogen energy and computerized electromechanical equipment to direct energy distribution. Those recommendations are even more valuable now.
- **Train more technicians.** Big oil companies and tiny wind energy companies alike say they no longer need roughnecks with strong backs to work in the field. Instead, they need people with specialized community college degrees or engineering degrees who understand how to manage the convergence of electricity, computers and mechanics. These are the rank-and-file workers for the new energy era. If Texas can train these multidiscipline energy workers then Texas can secure future energy companies.
- **Push for diversity of energy sources.** Developing more energy sources will result in more workers focused on innovating and capitalizing on converging energy sources. And that means Texans would lead the world's energy industry for another century.