



For More Information contact:

Oklahoma Wind Power Initiative
The Environmental Verification
and Analysis Center
University of Oklahoma
3200 Marshall Ave, Suite 150
Norman, OK 73072-8032
Phone: (405) 447-8412

FUELING OKLAHOMA'S ECONOMY New Opportunities for Renewable Energy Development

Oklahoma's economy has historically been dominated by the oil and gas industry. In 1999, petroleum and natural gas production contributed \$4.6 billion to the Oklahoma economy [1]. Even as opportunities for oil and gas continue to grow, national trends highlight a rapidly growing demand for other energy sources. Examples from just across the Red River show that renewable energy sources can co-exist with oil and gas to produce a vibrant, healthy economy.

There is no denying the importance of oil and gas to Oklahoma. The industry provides 30,000 jobs and an estimated \$400 million in production taxes. Oklahoma ranks third in natural gas production and fifth in oil production. It is second only to Texas in the number of active drilling rigs on land [2]. Yet despite the tremendous energy supplies produced in Oklahoma, our principal energy source is coal, mostly imported from other states.

Energy production in Oklahoma has increased steadily over the last decade, from 47 million Megawatt-hours (MWh) in 1990 to 55 million MWh in 1999 [3]. During this time, Oklahoma has remained a net exporter of electricity, exporting between 5 and 10 million MWh annually to consumers in other states. With electricity shortages existing elsewhere, it is reasonable to expect this trend to continue.

Most of Oklahoma's energy comes from coal. In 1999, coal power plants produced 60% of the 50 million MWh generated by utilities [3]. Natural gas supplied 33% of the energy, and nearly all the remainder came from hydroelectric sources. Gas is increasing its share of the market, with nearly all applications for new facilities being natural-gas sources. While this is good news for Oklahoma gas producers, it may not be the best news for consumers who may have to pay higher prices as a result.

Oklahomans enjoy some of the lowest energy prices in the country. In 1999, the average electricity price was 5.37 cents per kWh, ranking Oklahoma as the 10th lowest nationally [3]. A major contributor to the low energy costs is a steady decline in the price of coal, about 6.7% annually from 1990-1999. However, as natural gas obtains a larger market share, Oklahoma's low-cost electricity may be in danger. The price of natural gas rose from less than twenty cents per thousand cubic feet in the early 1970s to nearly three dollars just a decade later [4]. Prices during the 1990s averaged \$1.79, but by the year 2000 the price had doubled to \$3.61. Although demand and supply will fluctuate, the increase number of gas turbine power plants will likely keep gas prices higher than the 1990s-average.

Debate in the U.S. Congress has created uncertainty in the fossil fuel markets, as proposed restrictions on carbon dioxide and other emissions are considered. For the year 1999, the electric power industry (utility and non-utility) contributed 2500 million tons of carbon dioxide (37% of total U.S. emissions), 13.2 million tons of sulphur dioxide (67% of emissions), and 7.9 million tons of nitrogen oxides (23% of emissions) into the earth's atmosphere [5]. Nitrogen oxide emissions in Oklahoma has shown a 2.3% annual increase between 1990 and 1999, while carbon dioxide emissions are increasing at an annual rate of 3.0% [3]. Even the cleanest fossil fuel, natural gas, threatens air quality in Oklahoma. During 1999, gas turbine power plants produced 16% of all nitrogen oxides emitted from electric power plants and 25% of carbon dioxides.

Renewable energy sources offer an ability to balance growth in demand for electricity with wise management of resources, maintenance of air quality, and economic development. Rather than viewing these resources as competitors, renewable energy sources can complement development in natural gas facilities. Wind power, the most viable renewable energy source for large-scale production, is comparable in cost to the mid-1990s natural gas costs. Yet costs are not the only issue. One chief criticism of wind energy is that the source cannot be controlled. If the winds are light, the turbines simply do not spin. By coupling wind resources with natural gas facilities, wind can be used when conditions are favorable, and natural gas can be employed when wind generation is not available. This reduces overall fuel costs, extends the life of gas turbines, and reduces nitrogen oxide and carbon dioxide emissions.

To illustrate how renewable energy can effectively blend with oil and gas resources, one needs only to look south of the Red River. Texas has taken steps to develop renewable energy sources, especially wind energy, over the last several years. In 1998, Texas' energy production profile looked similar to Oklahoma's, dominated by coal and gas, although nuclear power accounted for nearly 10% of their electricity generation. By the end of 2001, Texas had over 1,000 MW of generating capacity from wind energy facilities, surpassing hydroelectric capacities in the state [6].

Texas achieved this rapid growth in the wind energy industry by implementing a renewable portfolio standards coupled with green energy credits that could be traded on a market basis. In their deregulation legislation, Texas set a target for 2,000 MW of renewable energy capacity by 2009. For each megawatt-hour generated, the producer receives a credit, which can then be sold to other energy producers in the state. This creates a new market, and the early results have been promising. By some estimates, nearly \$2 billion in new business investment will come to Texas as a result of renewable energy resources development [7]. With Oklahoma ranking among the top 10 states in potential wind energy, there is no reason a similar success story cannot occur here.

NOTES:

1. For an overview of the petroleum and natural gas industry to the Oklahoma economy, see the 2001-2002 Oklahoma Almanac, (Oklahoma Department of Libraries), pages 981-998.
2. Estimates of economic impacts on the Oklahoma economy obtained from the Oklahoma Energy Resources Board, available on the Web at: <http://www.oerb.com/OGIndustry/industryHistory.asp>.
3. Energy production and emissions data obtained from U.S. Department of Energy. State and national profiles are available on the Web (through 1999) at: http://www.eia.doe.gov/cneaf/electricity/st_profiles/toc.html.
4. Annual average gas prices obtained from the Oklahoma Corporation Commission, Oil and Gas annual report (see http://www.occ.state.ok.us/TEXT_FILES/annual9.HTM).
5. "Emissions From Electricity Generation, 1989-1999." *Annual Energy Review – Environmental Indicators*. Energy Information Administration, Washington, DC. <http://www.eia.doe.gov/emeu/aer/envir.html>. "National Pollutant Emission Estimates for 1999." Environmental Protection Agency, Washington, DC. http://www.epa.gov/ttnchie1/trends/trends99/tier3_1999emis.pdf.
6. See American Wind Energy Association, <http://www.awea.org/projects/index.html>.
7. Source: American Wind Energy Association, "Texas Utilities Power Ahead on Meeting Renewable Energy Goal", August 31, 2000, available on the Web at: <http://www.awea.org/news/index.html>.