

North Carolina Energy Policy Council 2013 Report

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Receiving Entities:

Governor

Speaker of the House of Representatives

President Pro Tempore of the Senate

Environmental Review Commission

The Joint Legislative Commission on Energy Policy

Chairman of the Utilities Commission

Submitting Entity:

Energy Program;

Division of Energy, Mineral and Land Resources; North Carolina Department of Environment and Natural Resources

NORTH CAROLINA STATE ENERGY REPORT

2013

**Submitted on behalf of the NORTH CAROLINA Energy Policy Council
Prepared by: Energy Program; Division of Energy, Mineral and Land Resources;
NORTH CAROLINA Dept. of Environment & Natural Resources,**

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BACKGROUND

The Energy Policy Council is required by statute (G.S. 113B-12(a)), as amended by Session Law 2013-365, Section 8. (a) [*Senate Bill 76*]), to submit a comprehensive report providing a general overview of energy conditions in the state to the governor, legislative leaders, the Joint Legislative Commission on Energy Policy, the Environmental Review Commission and the chair of the Utilities Commission.

During the 2013 legislative session, Senate Bill 76 (the Domestic Energy Jobs Act) was passed. It was signed into law by Gov. Pat McCrory on July 29, 2013. It modified the composition, leadership and duties of the Energy Policy Council.

This report, drafted by the Energy Program in the Division of Energy, Mineral and Land Resources of the Department of Environment and Natural Resources, will provide an update on the status of energy resources and issues in North Carolina in order to comply with state statutes.

OVERVIEW

North Carolina is poised to become one of the United States' emerging energy producers. In addition to demonstrating the success of a new clean coal energy through the construction and operation of Duke Energy's new 800 MW coal-fired power plant at the James E. Rogers Energy Complex, North Carolina has almost 300 MW of solar energy capacity in service. North Carolina has significant potential for natural gas production, and the development of offshore energy resources. Currently, North Carolina's energy demand is met through a combination of nuclear, coal, natural gas, and renewable resources.

ENERGY & POWER GENERATION IN NORTH CAROLINA

Electric power is supplied to North Carolinians from three major sources:

- Investor-owned utilities
 - Duke Energy Carolinas/Progress (3,730,000 customers throughout North Carolina);
 - Dominion NORTH CAROLINA Power (119,000 customers in Northeastern North Carolina)
- 31 Electric membership corporations/cooperatives (1,047,000 customers)
- 75 Municipal owned electric distribution systems (570,000 customers)

Net generation was 116 million megawatts in 2012 and is expected to be up 5 percent in 2013. Coal and nuclear power plants continue to generate most of the state's power. However, lower natural gas prices have contributed to a shift in generation away from coal and towards natural gas combustion.

Generation Source	North Carolina		United States	
	2011	2012	2011	2012
Coal	50.5%	44.0%	42.3%	37.4%
Nuclear	34.2%	33.9%	19.3%	19.0%
Natural Gas	9.4%	16.7%	24.7%	30.4%
Other fossil fuels/gas	0.6%	0.3%	1.3%	1.1%
Hydroelectric	3.3%	3.0%	7.7%	6.7%
Wood/Biomass	2.0%	2.0%	%	%
Solar	0.01%	0.03%	1.4%	1.4%
Wind	0%	0%	2.9%	3.5%
Geothermal	0%	0%	%	%
<i>Total non-hydroelectric Renewable Energy</i>	2%	2%	4.7%	5.1%

Source: U.S. Dept. of Energy, Energy Information Administration, "Electric Power Monthly with Data For December, 2012, February 2013"

The retail energy price across all sectors in North Carolina has risen 33.8 percent in the past ten years during which time the consumer price index rose 24.8 percent. While only one metric, average retail energy price data maintained by the U.S. Energy Information Administration shows that during the first nine months of 2013, the price of energy for all sectors was 25 percent more in states with renewable energy portfolio standards (REPS) mandates (11.5 cents per kilowatt-hour) as compared to states without mandates (9.2 cents per kilowatt-hour). North Carolina is the only southeastern state with a REPS mandate. The table below summarizes average retail prices and the states with REPS mandates are shaded.

AVERAGE RETAIL PRICE (January through September 2013)

State	All Sectors* (cents/KWh)	Rank	Residential (cents/KWh)	Industrial (cents/KWh)
Washington	7.01	1	8.67	4.19
Kentucky	7.51	2	9.75	5.40
Wyoming	7.54	3	10.18	6.40

State	All Sectors* (cents/KWh)	Rank	Residential (cents/KWh)	Industrial (cents/KWh)
Idaho	7.57	4	9.35	6.20
Arkansas	7.87	5	9.56	5.93
Oklahoma	7.92	6	9.80	5.38
West Virginia	7.94	7	9.59	6.24
Illinois	8.04	8	10.35	5.77
Louisiana	8.07	9	9.47	5.94
Iowa	8.20	10	11.27	5.75
North Dakota	8.24	11	9.22	7.20
Utah	8.28	12	10.49	5.99
Oregon	8.34	13	9.93	5.84
Montana	8.58	14	10.44	5.37
Indiana	8.63	15	10.88	6.59
Texas	8.80	16	11.36	5.95
Nebraska	8.81	17	10.49	7.34
South Dakota	8.88	18	10.36	6.97
Virginia	9.02	19	10.98	6.65
Nevada	9.12	20	11.79	6.76
South Carolina	9.13	21	11.85	5.88
Alabama	9.13	22	11.40	6.08
Missouri	9.15	23	10.76	6.28
Mississippi	9.17	24	10.80	6.49
Ohio	9.18	25	12.00	6.11
North Carolina	9.19	26	10.95	6.37
Tennessee	9.27	27	10.07	6.57
New Mexico	9.32	28	11.82	6.37
Minnesota	9.58	29	12.04	7.08
Georgia	9.62	30	11.42	6.16
Kansas	9.64	31	11.65	7.11
Colorado	9.83	32	11.93	7.23
Pennsylvania	9.83	33	12.81	7.02
Arizona	10.29	34	11.84	6.79
Florida	10.30	35	11.34	7.70
Wisconsin	10.69	36	13.80	7.60
Delaware	10.95	37	13.01	8.5
Michigan	11.30	38	14.64	7.85
Maryland	11.63	39	13.23	8.38
Maine	11.79	40	14.35	8.27
Rhode Island	13.43	41	14.88	11.62
New Jersey	13.79	42	15.8	10.77

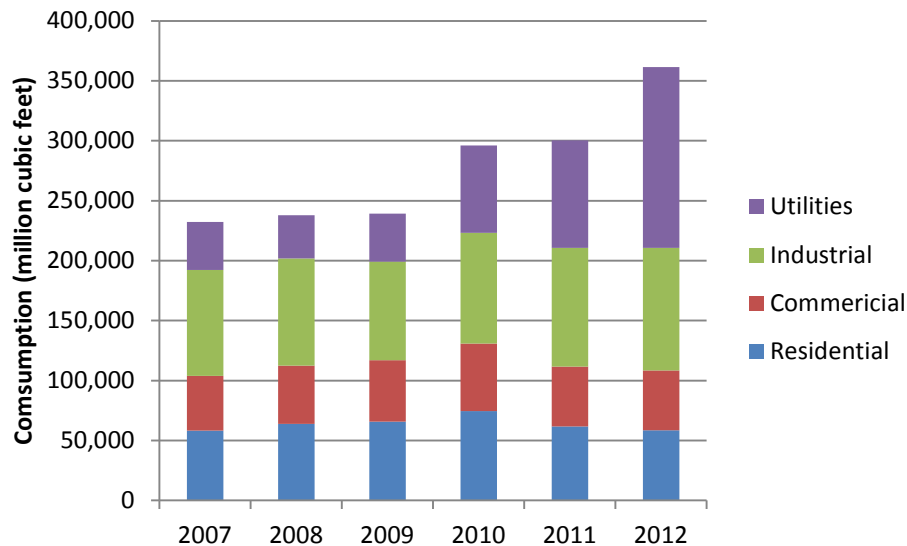
State	All Sectors* (cents/KWh)	Rank	Residential (cents/KWh)	Industrial (cents/KWh)
Massachusetts	14.25	43	15.22	13.13
New Hampshire	14.28	44	16.37	11.37
Vermont	14.42	45	17.13	10.14
California	14.66	46	16.35	11.28
Connecticut	15.64	47	17.53	12.66
New York	15.83	48	18.92	6.50
Alaska	16.40	49	18.18	15.66
Hawaii	33.23	50	12.16	29.81

* Includes residential, commercial, industrial and transportation sectors.

SOURCE: U.S. Energy Department, Energy Information Administration, November 2013 Report, Table 5.6.B. Average Retail Price of Electricity to Ultimate Customers by End-Use Sector

In recent years, North Carolina has experienced a significant increase in natural gas use by utilities while use of natural gas in other sectors (residential, commercial, and industrial) has remained relatively unchanged. In 2012 the utility sector became North Carolina's top consumer of natural gas. As of September 2013, electric power produced from natural gas combustion accounted for 22.4 percent of all electric power produced in North Carolina.

Natural Gas Consumption Growth

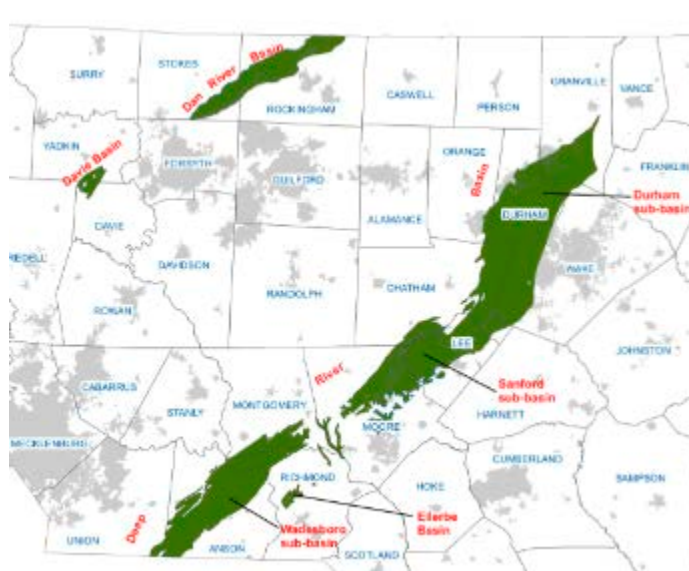


Source: U.S. Energy Department, Energy Information Administration, Table 1.10.B. "Net Generation from Natural Gas" http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_10_b

NATURAL GAS EXPLORATION AND DEVELOPMENT

A 59,000 acre area in the Sanford sub-basin of the Triassic Basins in North Carolina appears to be a promising location for organic rich shale and coal from which natural gas can be extracted. A N.C. Department of Environment and Natural Resources study completed in April 2012 concluded that hydraulic fracturing to extract natural gas can be performed safely provided the right protections are in place. The N.C. Department of Commerce estimates drilling activities in

the Sanford sub-basin would add an average of 387 jobs each year over a seven year period and positively affect the state's GDP by \$292 million.



The North Carolina Mining and Energy Commission is working to establish a regulatory program for the management of oil and gas exploration and development. The full Commission has met 12 times from January through December 2013. The Commission's committees and study groups have met more frequently.

During the past year, the Commission and the Division of Energy, Mineral, and Land Resources in the Department of Environment and Natural Resources, have developed draft rules (to be implemented in 2015) related to oil and gas exploration and development in the following areas:

- Chemical disclosure requirements;
- Prohibited chemicals and constituents;
- Water acquisition and management;
- Well construction requirements;
- Wellhead standards;
- Waste management;
- Baseline testing; and
- Setbacks.

Additionally, in October 2013, reports were presented to the Joint Legislative Commission on Energy Policy from three state Mining and Energy Commission study groups:

- Local Government Regulation Study Group;
- Compulsory Pooling Study Group; and
- Funding Levels and Potential Funding Sources Study Group.

RENEWABLE ENERGY

Renewable energy, with the assistance of state and federal tax incentives, adds diversity to North Carolina's energy resource. Realizing the need to provide financial assistance to support renewable energy development, the North Carolina General Assembly passed Senate Bill 3

(Session Law 2007-397) in 2007 that established a state Renewable and Energy Efficiency Portfolio Standard (REPS). The REPS mandate made previously economically unviable projects including landfill gas-to-energy projects, solar, and wind possible. The REPS requirement is a phased approach requiring electricity generated from new renewable energy sources to be 3 percent of retail sales by 2012, 6 percent of sales by 2015, 10 percent of sales by 2018 and by 2021 and thereafter 12.5 percent of sales.

Consistent with a study commissioned by the N.C. Utilities Commission, average retail electricity prices are expected to increase as the renewable requirement increases. *See* LaCapra Associates, Analysis of a Renewable Portfolio Standard for the State of North Carolina (December, 2006) <http://www.ncuc.commerce.state.nc.us/rep/NCRPSReport12-06.pdf>. To date, there are a number of areas where REPS has supported the development of renewable energy projects. Some of those are described below.

Landfill Gas Projects

Landfills appear to be one of the more cost effective REPS-eligible resources. Many landfill owners throughout the state have implemented measures to capture methane and transform it into a fuel and energy-producing resource. Through 2013, there are at least 24 landfill projects throughout the state.

North Carolina Landfill Gas Projects

Watauga County Landfill	Boone
Charlotte Motor Speedway	Concord
Jackson County Green Energy Park	Dillsboro
Cargill NORTH CAROLINA Energy Project	Fayetteville
Gaston County	Gaston
Cone Mills Boiler Project	Greensboro
Pitt County Memorial Hospital	Greenville
Henderson City Boiler Project	Hendersonville
Caldwell County/Google	Lenoir
Rockingham County	Madison
Wilkes County	Moravian Falls
Coastal Env. Partnership	New Bern

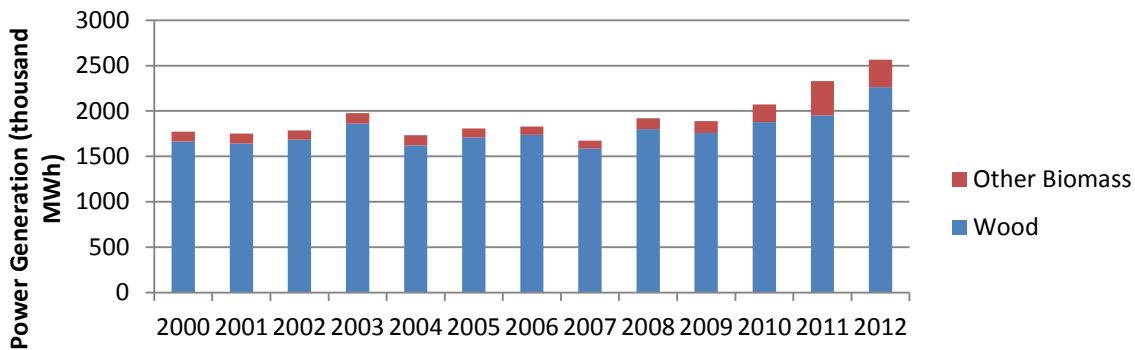
SOURCE: U.S. Environmental Protection Agency

Columbus County	New Hope
Blackburn (Catawba County)	Newton
Ajinomoto USA LFG	Raleigh
Mallinckrodt, Inc./Covidien	Raleigh
Robeson County	St. Pauls
Iredell Transmission	Statesville
EnergyXchange Renewable Energy Center	Sugar Grove
Edgecombe County	Tarboro
Uwharrie Landfill Facility	Troy
East Carolina Environmental	Windsor
Salem Energy Systems	Winston-Salem
Buncombe County Landfill	Woodfin

Biomass

A significant source of renewable energy is biomass (e.g. wood). Biomass use has steadily risen since 2007 and now represents 2 percent of all energy generated in North Carolina.

Biomass Generated Energy



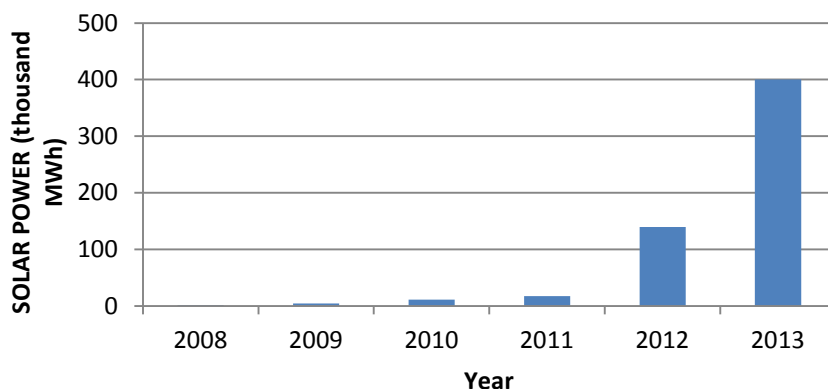
SOURCE: US. Dept of Energy, Energy Information Administration State Historical Table through 2012

Wood-burning power plants emit, on a per unit of electricity generated, more air pollution than coal plants and significantly more than natural gas combustion facilities. The U.S. Environmental Protection Agency promulgated a rule that exempts from regulation all carbon dioxide emitted from biomass combustion.¹ As a result of this exemption, many biomass projects are not required to install state of the art air pollution controls and are not required to perform otherwise required environmental impact assessments. Some public interest groups have expressed concerns about the use of forest resources and the possible impact on wetland forest habitats and effects on forest regeneration.

Solar

North Carolina has almost 300 megawatts of solar capacity and numerous solar ventures in development or under construction making the state the third largest solar energy generator in the nation.

NORTH CAROLINA Solar Energy



SOURCE: U.S. Dept. of Energy, Energy Information Administration; State Historical Table

*2013 is estimated based on year to date data available through September (310,000 MWh).

¹ The Center for Biological Diversity successfully challenged EPA's rule exempting CO₂ from biomass combustion. The D.C. Circuit Court found that EPA's rulemaking was flawed and vacated EPA's exemption. That ruling has been stayed and therefore the EPA's CO₂ exemption for biomass combustion remains effective.

Thirteen projects greater than 5MW and dozens between 1 and 5 MWs are now underway. Major solar installations throughout the state include:

- **Davidson County Solar Farm:** Completed in 2011 by developer SunEdison. The photovoltaic project has a capacity of 16 MW.
- **Strata Solar:** Recently constructed five solar projects in North Carolina, with a combined capacity of 31 MW.
- **Washington White Post Solar Project:** Completed last summer by Duke Energy and SunEnergy1, the 13MW project near Bath in Beaufort County, is among the largest solar installations in North Carolina.

North Carolina has achieved the REPS set-aside quota for solar energy (0.2 percent of total energy) well ahead of the 2018 deadline. Assuming a 20 percent utilization rate, solar capacity now represents about 0.5 percent of the state's total energy needs. Future solar expansion may be constrained by sustainable land resources. Solar photovoltaic projects require approximately 8 acres of land per megawatt capacity. Much of the suitable land which must be clear of trees, flat or southern sloping, with nearby electrical grids has been utilized. Use of marginal land may increase cost, lower utilization, or pose environmental concerns.

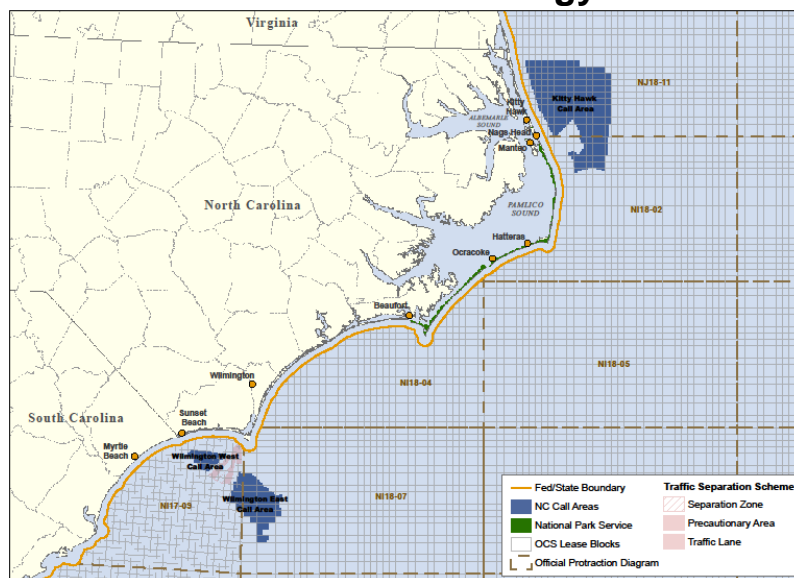
Wind

The National Renewable Energy Laboratory estimates that only 0.13 percent of the available land in North Carolina has a gross wind energy capacity factor (without losses) of at least 30 percent at 80 meters height above ground. The two areas in the state with sufficient wind energy are the western mountains and offshore the northeast coast. Development of the potential wind resources in western North Carolina is limited by the Mountain Ridge Protection Act of 1983 (Session law 1983-676), otherwise known as the "Ridge Law," which restricts development of tall structures along ridgelines.

While offshore wind energy costs are relatively high as compared to other renewable sources, several companies have expressed interest in the development of potential offshore wind resources. The North Carolina Utilities Commission has issued permits for two potential locations. The Department of Environment and Natural Resources is in the process of developing appropriate siting guidelines in accordance with Session Law 2013-51 (House Bill 484). The law establishes the wind energy permitting process to preserve military interests in North Carolina and protect the environment of nearby residents.

In December 2012, after a series of meetings with state and local officials, community and business leaders as well as federal and military interests in the state's coastal region, the federal Bureau of Ocean Energy Management (BOEM) announced the release of the Call for Information and Nominations for potential offshore wind leasing areas offshore from North Carolina. The call covered areas 1, 2, and 5: "Call Area Kitty Hawk", "Call Area Wilmington East" and "Call Area Wilmington West"

NORTH CAROLINA Wind Energy Call Areas



SOURCE: U.S. Bureau of Ocean Energy Management

The federal Migratory Bird Treaty Act (MBTA) remains a concern for wind energy projects. In 2013, Duke Energy paid a \$1 million fine to the U.S. Department of Justice for their wind projects in Wyoming and admitted to violating the MBTA.

Utility Savings Initiative

The Utility Savings Initiative's primary responsibility is to coordinate and support activities of state agencies and University of North Carolina system institutions to manage and reduce utility consumption and costs. Initiative services are now available to all public sector institutions: state agencies; UNC institutions, community colleges, public schools, county governments and municipal governments. Services include communication and training, preliminary energy audits, data collection and analysis, assistance to participants with energy plan development and implementation, and overseeing the energy performance contracting process.

The Utilities Savings Initiative's goal is to reduce energy use per square foot by 30 percent by 2015 based on the 2002/2003 fiscal year for the state agencies, universities, and community colleges. Energy use on a square footage basis has declined 26 percent, saving North Carolina approximately \$102 million in FY2012/ 2013.

Developing Areas

In the two and a half years since the Energy Policy Council last met, the North Carolina energy landscape has evolved and changed significantly:

- Potentially significant and extractable reserves of natural gas have been identified, primarily in the Deep River Basin in the central Piedmont that "extends across about 59,000 acres, at depths of less than 3,000 feet in the Sanford sub-basin, Lee and Chatham counties." (as described in N.C. Geological Survey Open File Report 2013-01 and the U.S. Geological Survey's "Assessment of Undiscovered Oil and Gas Resources of the East Coast Mesozoic Basin of the Piedmont, Blue Ridge, Thrust Belt, Atlantic Coastal Plain and New England Provinces, 2001," released June 5, 2012) The N.C. Mining and

Energy Commission was created and is working toward developing a regulatory program and administrative rules for natural gas exploration and development;

- The state is engaged in developing offshore energy resources in the areas of wind, oil and natural gas;
- Three major natural gas pipelines cross the state. In December 2015, Transco is expected to add a pipeline for transporting gas from the Marcellus shale formation in the northeast to the south. The additional supply is expected to keep natural gas prices relatively low.
- The state has achieved and exceeded the solar energy set aside under the REPS;
- Non-hydroelectric renewable resources in North Carolina supply only about 2 percent of the state's net generation. Hydroelectric and other renewable sources together supply slightly more than 5 percent of the state's total generation which represents about a 20 percent increase since 2008.
- The Appalachian Energy Summit is developing a comprehensive energy use and conservation plan for the state's university system and its campuses;
- The state's Utility Savings Initiative continues to offer state and local agencies innovative opportunities for cutting utility bills;
- New action plans have been developed for energy assurance and emergency preparedness; and
- Development of biofuels and other renewable/sustainable fuel sources is underway.

Emerging Challenges

As quickly as the energy and resources landscape is changing in the state, so are other major energy and utilities-related issues. Some now appearing on the horizon include:

- Continued uncertainty over fuel and fuel-related costs;
- Growing environmental concerns over the use of biomass as a renewable energy source coming from some public interest groups;
- Volatility of price and supply of natural gas prices concomitant with a growing and changing market;
- The increasing role of natural gas throughout the United States;
- New federal greenhouse gas emissions regulations;
- Grid integration and distributed power generation;
- Power transmission planning, expansion and construction;
- Energy efficiency and demand response;
- The potential re-emergence of nuclear power
- Third-party sales and net-metering; and
- Long term questions with reimbursement mechanisms and the Public Utilities Regulatory Policies Act (PURPA) avoided cost calculation.

End notes

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