
Financial Issues and the Future of Coal

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Economic vs. Financial Analyses

- **Economic analyses look at the impact of existing plants or proposed projects from the perspective of ratepayers or the local, state or regional economies.**
- **Financial analyses look at the impact from the perspective of the owners and their shareholders.**
- **Economic and financial analyses are interrelated.**
 - **For example, cost of borrowing money depends on financial health of company and affects the cost of building a new power plant.**
 - **Results of Integrated Resource Planning analyses are presented in Net Present Value (NPV) or Net Present Revenue Requirements (NPVRR). Utilities then take these results and analyze them in financial models that show the impact of different resource decisions on the company and its shareholders.**
- **Both consider many of the same factors (natural gas prices, construction costs, cost of borrowing money, etc.) and some of the same basic analytic methodologies (discounted cash flow analysis). However, resource planning and financial analyses use different models.**

- **Coal plants are owned by a number of different types of entities:**
 - **Investor Owned Utilities (IOU or Regulated)**
 - **Merchant Generating Companies (IPP or Merchant)**
 - **Public Power Utilities (PPU)**
 - **Electric Member Cooperatives (EMC)**
 - **Regional Power Agencies or TVA**
- **Some large holding companies (e.g., Ameren, Southern) have both regulated and merchant affiliates.**
- **We will be focusing on regulated investor owned utilities and merchant generators (that also are owned by investors) although much of what we say also will be applicable to other types of plant/project owners.**

Industry Organization: Merchant vs. Regulated

Regulated

- Recovery of operations and capital costs through regulated rates set by independent regulatory body.
- Significant market protection.
- Serves specific customer base.
- Geographic footprint.
- Consumers obligated to pay.
- Right to a reasonable rate of return.
- Usually bound by least cost options.

Merchant

- Recovery of costs through competitive sale of electricity.
- “Spread” between the Price of Power in market versus cost of generating electricity from plant determines profitability.
- No specific consumer base.
- Sale of electricity into wholesale markets or to utilities.
- Speculative, no guarantee of return.
- Highest possible price.

Financial Risks for Coal Plant Owners (1)

- **Coal owner revenues and sales are under significant threat from:**
 - **Very low natural gas prices**
 - **An aging coal fleet, much of which is uncontrolled for SO₂, NO_x or Hg**
 - **Uncertainty about coal plant operating lives and whether their operating performance will degrade as they age and/or their operating costs or capital requirements will increase significantly**
 - **The potential for more stringent EPA regulation of criteria air pollutants, GHG emissions, water use and coal ash disposal**
 - **Greater availability of renewable resources**
 - **Reduced demands due to energy efficiency and the economic downturn**
 - **Coal price and supply uncertainty**

Financial Risks for Coal Plant Owners (2)

- **However, risks are different for regulated vs. merchant owners.**
 - **Regulated owners will make a profit because expensive investments in upgrades and environmental controls are put into rate base and they have guaranteed customers for plant output.**
 - **But expensive investments make merchant generators less competitive in deregulated markets and they don't have guaranteed customers for plant output unless there is a contract with a utility or some other party.**

Some Companies Extremely Dependent on Coal

Some examples:

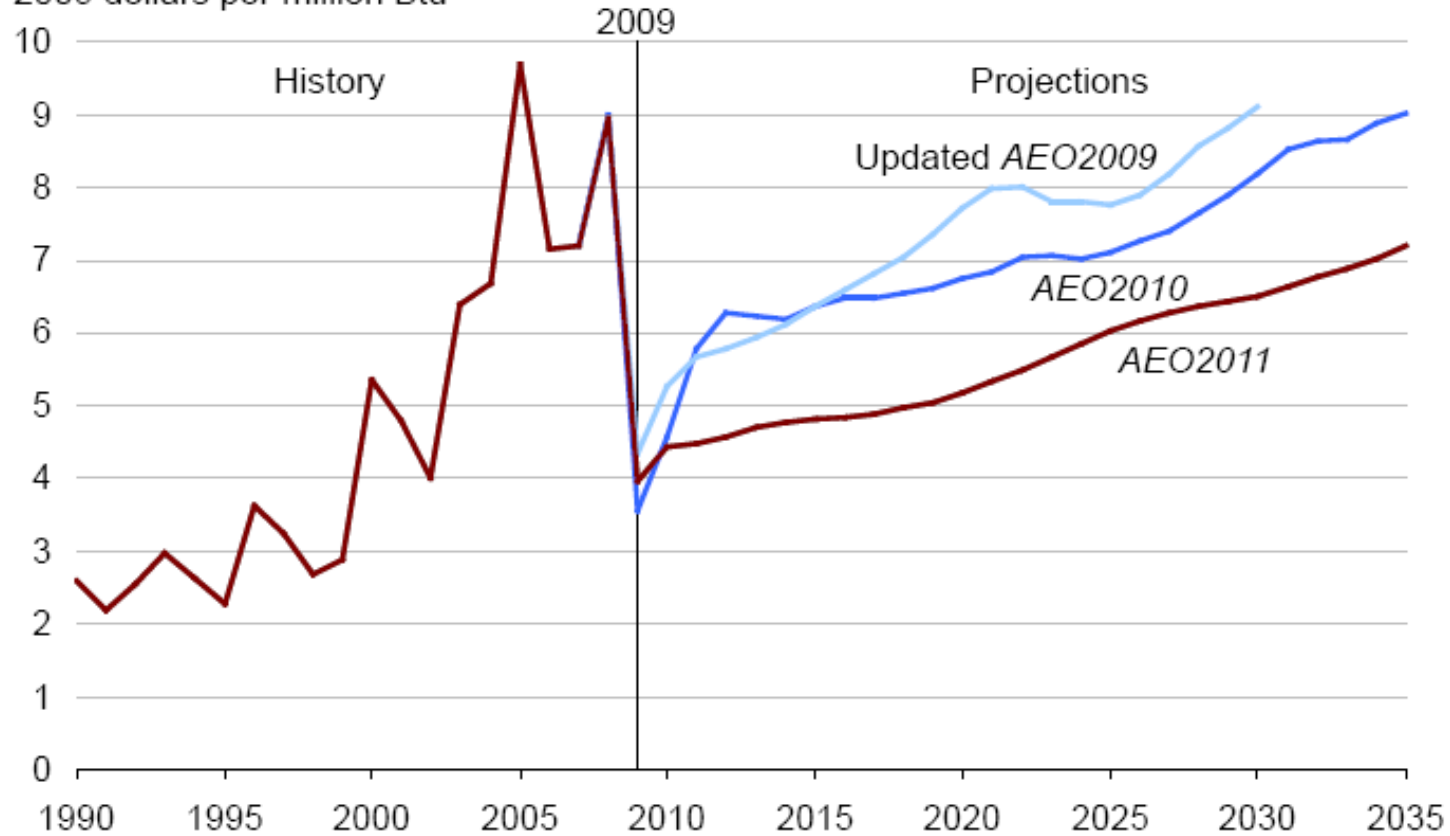
- **In 2010, coal and lignite represented 82% of AEP's fuel supply, down from 88% in 2009 and 86% in 2008.**
- **85% of Ameren's generation in 2010 was produced at coal-fired plants. 98% of the generation from Ameren's 6,263 MW of merchant generation in 2010 was produced at coal-fired facilities.**
- **88% of Otter Tail Power Company's internally generated MWhs in 2010 came from coal or lignite fueled sources. The company also purchase a significant amount of off-system power that was most likely also generated at coal or lignite-fired facilities.**
- **Almost 80% of the power generated by public power utilities in the upper Midwest in 2008 came from coal-fired sources.**

Coal Generation “At-Risk” of Being Displaced by Natural Gas

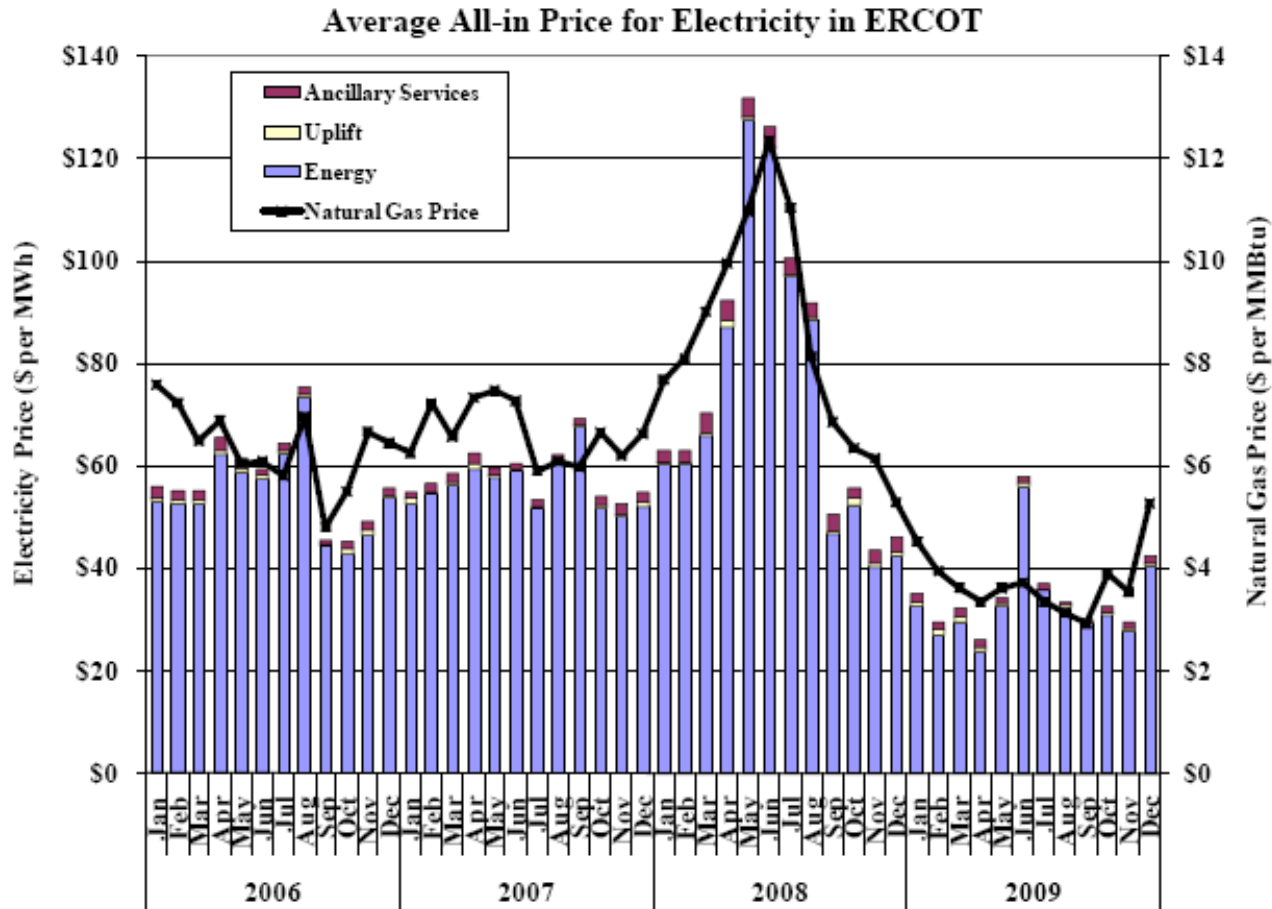
- **Natural gas prices collapsed in 2008 and are expected to stay low for foreseeable future.**
- **Coal generation being displaced by dispatching of natural gas units – especially in Southeast and PJM.**
- **Existing gas-fired units have significant untapped power production potential – NGCC can run at 60%-70% capacity factors but actually operate far less.**

Gas Prices Collapsed in 2008

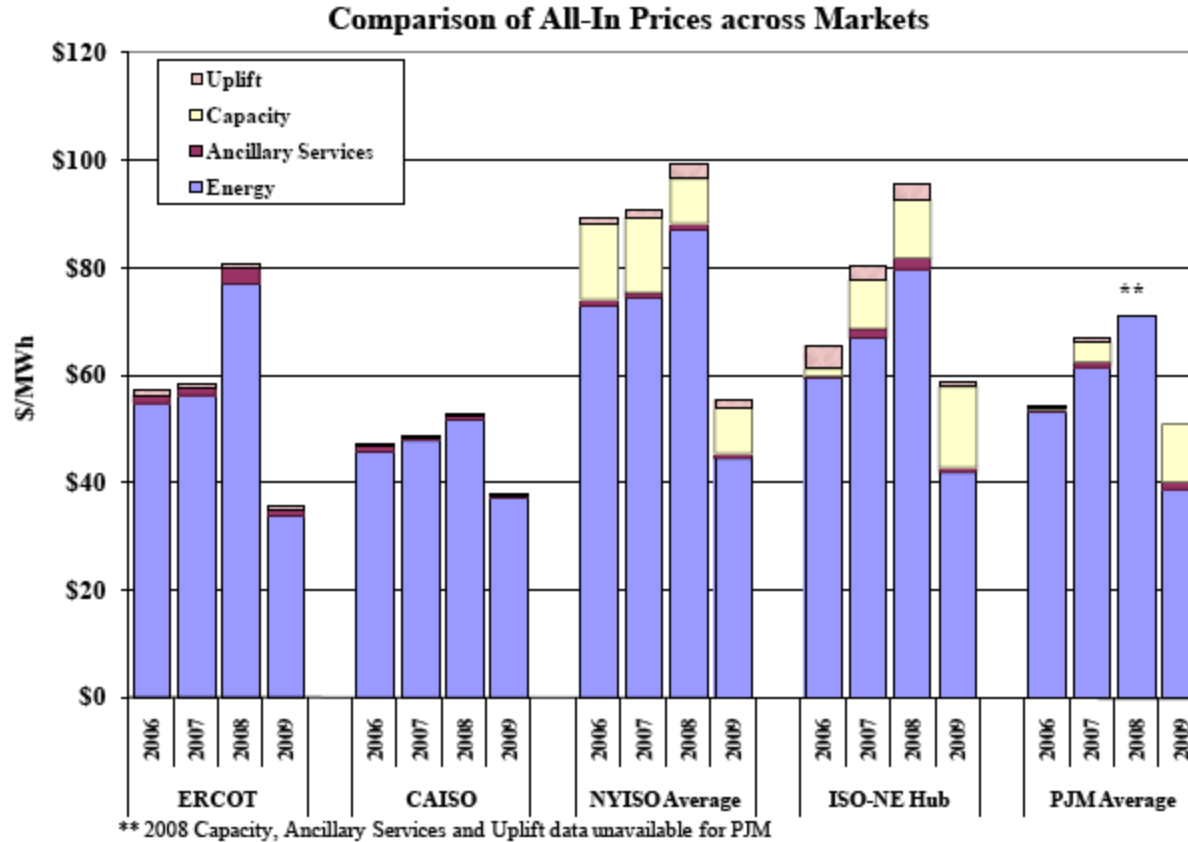
natural gas spot price (Henry Hub)
2009 dollars per million Btu



Impact of Lower Natural Gas Prices on Power Market Prices (1)

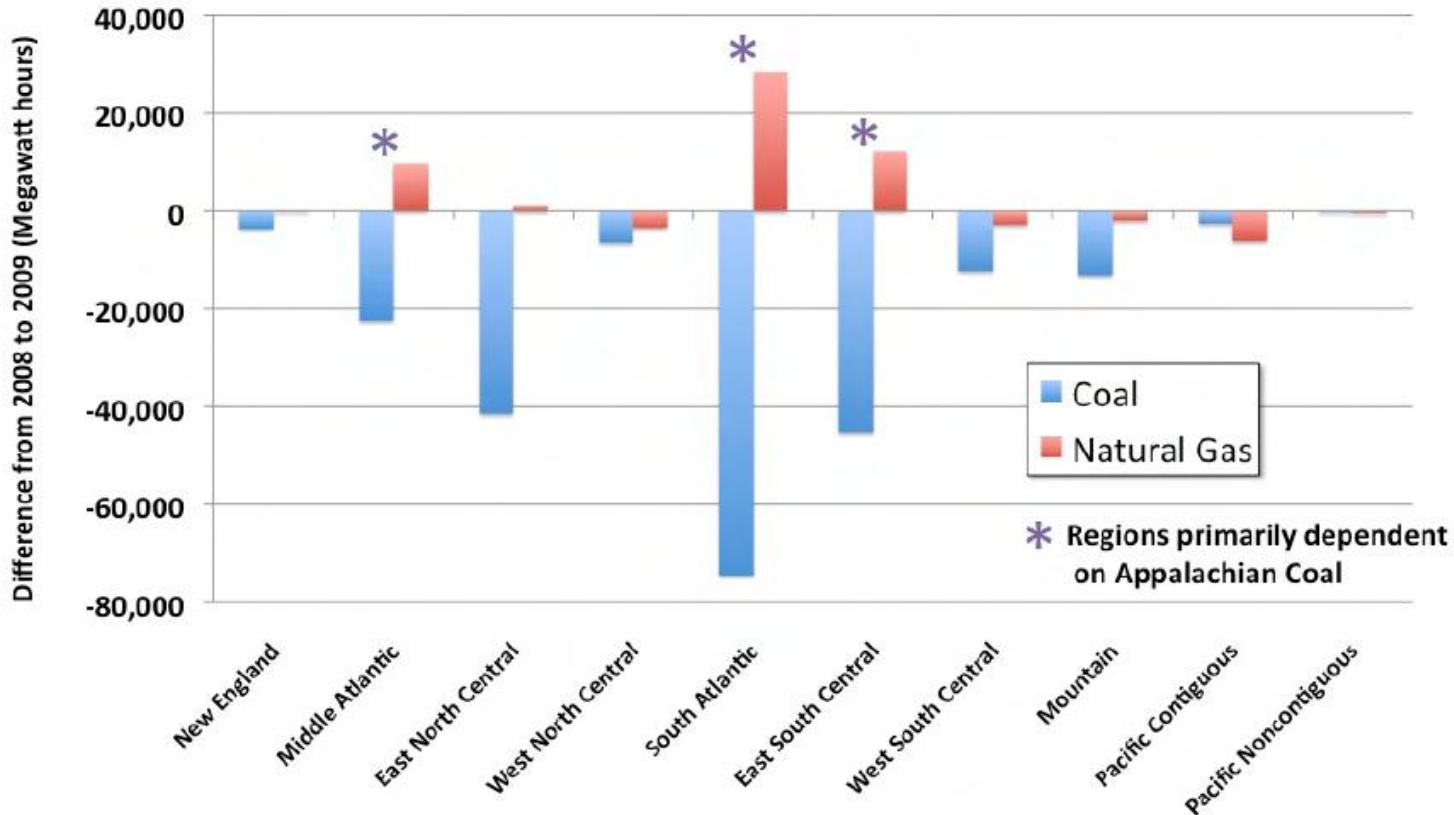


Impact of Lower Natural Gas Prices on Power Market Prices (2)



Coal Generation Displaced by Gas

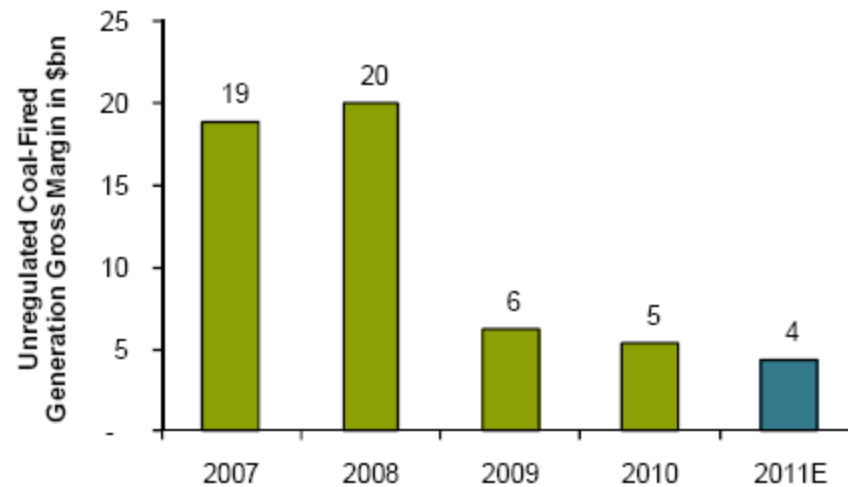
Changes in Coal and Natural Gas Generation Between 2008 and 2009 by Census Region



Sources: EIA Electric Power Monthly for March, 2010 (EIA/DOE-0226). Produced by Appalachian Voices, August, 2010

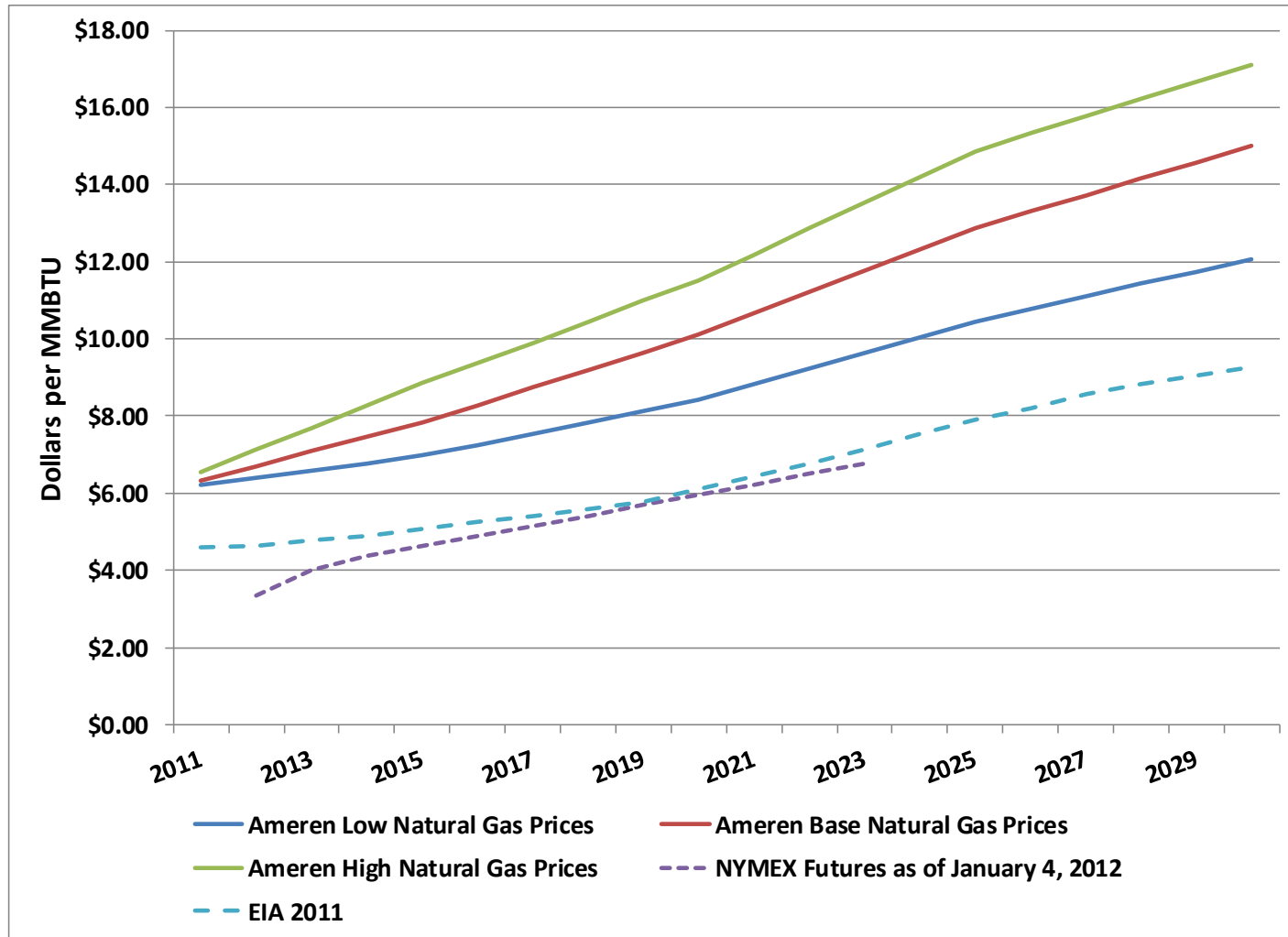
Merchant Coal Plant Profits Have Dropped Significantly

Unregulated U.S. Coal-Fired Generators – Yearly Gross Margins



Source: Bloomberg LP, SNL, Ventyx and Bernstein analysis

Natural Gas Prices Expected to Stay Low for Foreseeable Future



Under-utilized Natural Gas Capacity in the U.S.

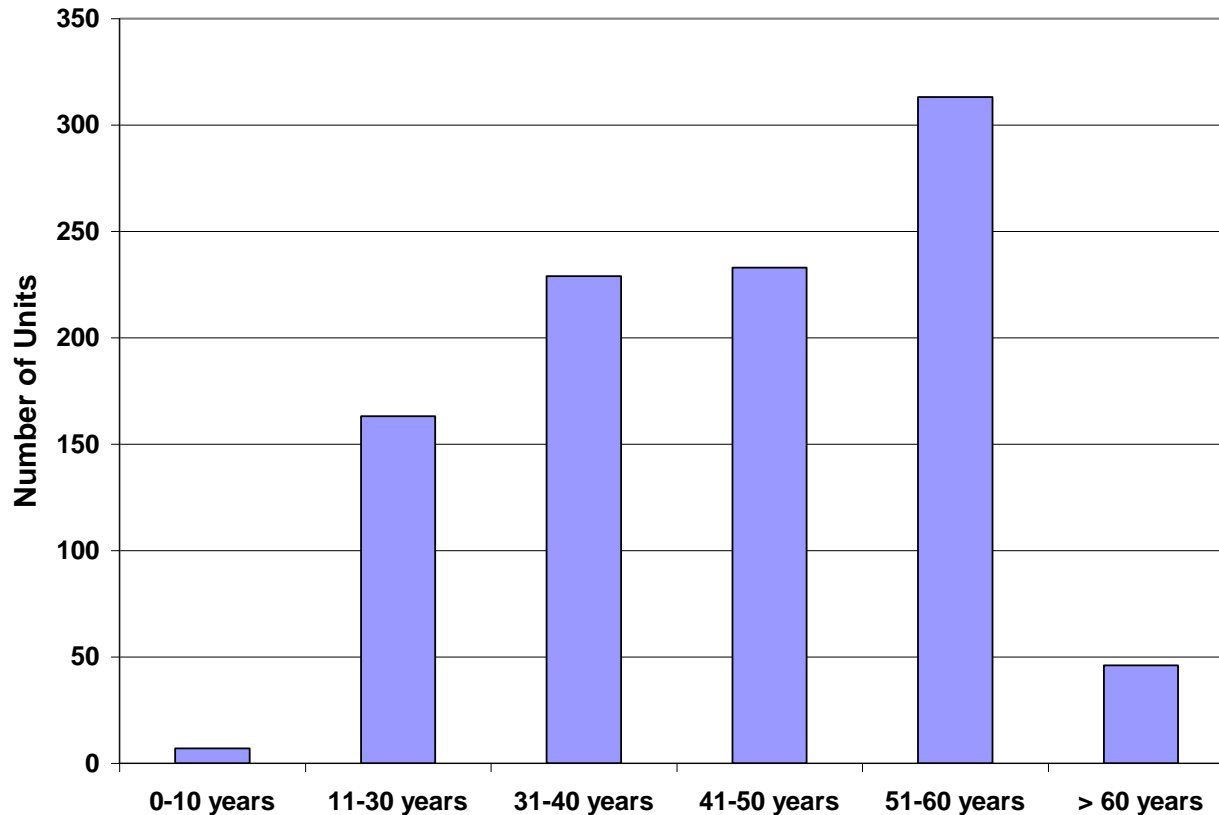
Exhibit A-5. Performance Characteristics Of Natural Gas Combined Cycle Units By Region

Capacity Factor %

Census Region	Weighted Average Capacity Factor									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
New England	40.6%	44.2%	45.5%	46.4%	47.0%	49.1%	51.2%	52.2%	49.4%	48.6%
Middle Atlantic	57.0%	52.9%	39.3%	26.6%	24.1%	23.8%	27.0%	33.1%	33.8%	39.8%
East North Central	47.9%	24.7%	22.4%	14.2%	15.3%	17.0%	15.7%	19.9%	14.1%	14.8%
West North Central	18.0%	16.2%	18.1%	13.1%	13.9%	21.7%	18.9%	26.4%	24.7%	14.8%
Florida	57.5%	50.9%	50.7%	48.7%	55.7%	51.7%	56.7%	51.6%	53.9%	55.8%
South Atlantic w/o Florida	20.4%	18.0%	13.9%	13.7%	16.2%	22.0%	23.3%	28.9%	26.4%	37.7%
East South Central	21.4%	34.6%	31.3%	14.8%	17.7%	20.8%	24.0%	30.5%	28.3%	36.9%
ERCOT	43.8%	46.0%	45.9%	41.7%	47.1%	51.2%	50.8%	52.1%	49.8%	47.6%
West South Central w/o ERCOT	39.5%	32.5%	22.7%	28.8%	26.8%	30.2%	35.6%	34.1%	35.4%	37.8%
Mountain	59.2%	44.2%	46.9%	39.0%	33.9%	40.0%	42.5%	48.0%	50.2%	45.8%
California	44.4%	44.2%	52.1%	52.6%	56.7%	49.5%	54.1%	60.8%	61.3%	42.1%
Pacific Contiguous w/o CA	73.3%	67.6%	39.7%	44.9%	51.0%	50.6%	43.5%	44.6%	51.2%	50.8%
Pacific Noncontiguous	68.0%	70.7%	72.5%	58.7%	74.9%	77.9%	83.1%	85.2%	80.9%	80.9%
TOTAL U.S.	45.5%	41.8%	37.7%	33.5%	35.0%	36.9%	38.9%	42.1%	41.5%	41.2%

Source – Outlook for Natural Gas Demand for 2010-2011 Energy Ventures Analysis, Inc.

Existing U.S. Coal Fleet is Aging



- **83 percent of units already 30 years or older.**
- **60 percent of units already 40 years or older.**
- **Short remaining lives adversely impact the relative economics of adding environmental controls or other upgrades.**

Significant Uncertainty About Future Coal Plant Operating Performance and Costs

- **In resource planning studies, companies assume that their existing coal-fired units will operate at 70-85% capacity factors until they are 70, 80 or even 90 years old and that**
 - **Their operating costs and/or capital requirements will not increase dramatically as they age**
 - **Their operating performance (e.g., heat rate, forced outage rate, equivalent availability) will not degrade significantly.**
- **However, no coal unit of 100 MW or larger has operated for more than 62 years. Only a relatively small number of smaller units have operated longer.**
 - **Median age of retired coal units is 57 years**
- **Therefore, there is great uncertainty about (a) coal unit operating lives, (b) what capital investments will be required as they age, (c) their operating performance as they age, and (d) their operating costs as they age.**

Many Existing U.S. Coal Units Don't Have SO₂ and/or NO_x Controls

- Only 41% of existing units (representing 48% of coal-fired capacity) have scrubbers.
- Only 36% of existing units (representing 43% of coal-fired capacity) have SCR or SNCR NO_x controls.
- 48% of existing units uncontrolled for either SO₂ or NO_x.
 - Approximately 30% of units under 40 years old uncontrolled and 60% of units over 40 years old.

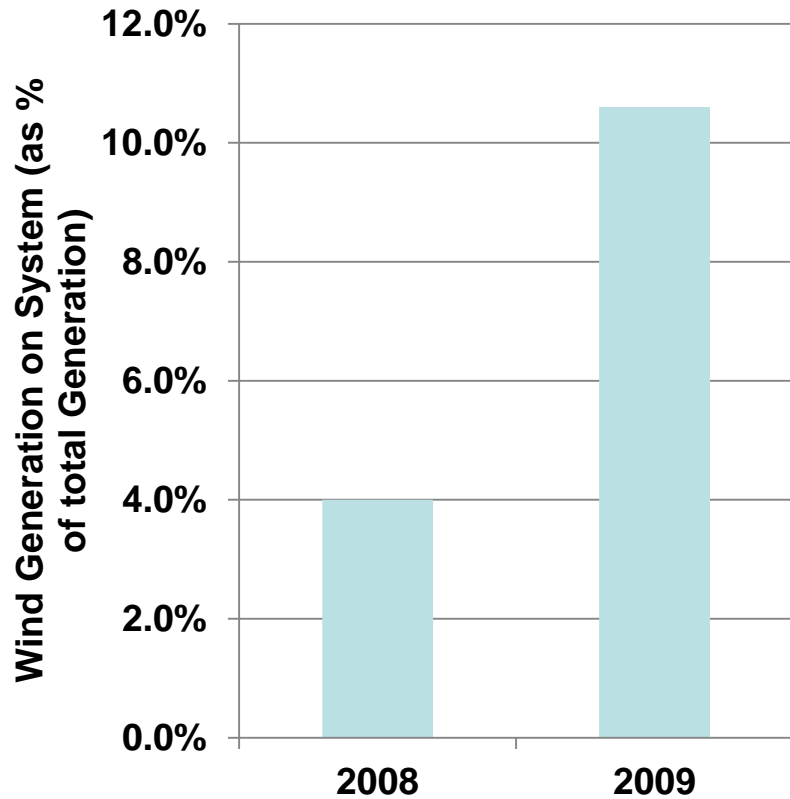
Source: M.J. Bradley/Analysis Group, *Ensuring a Clean, Modern Electric Generating Fleet While Maintaining Electric System Reliability*, August 2010

Regulatory Uncertainty

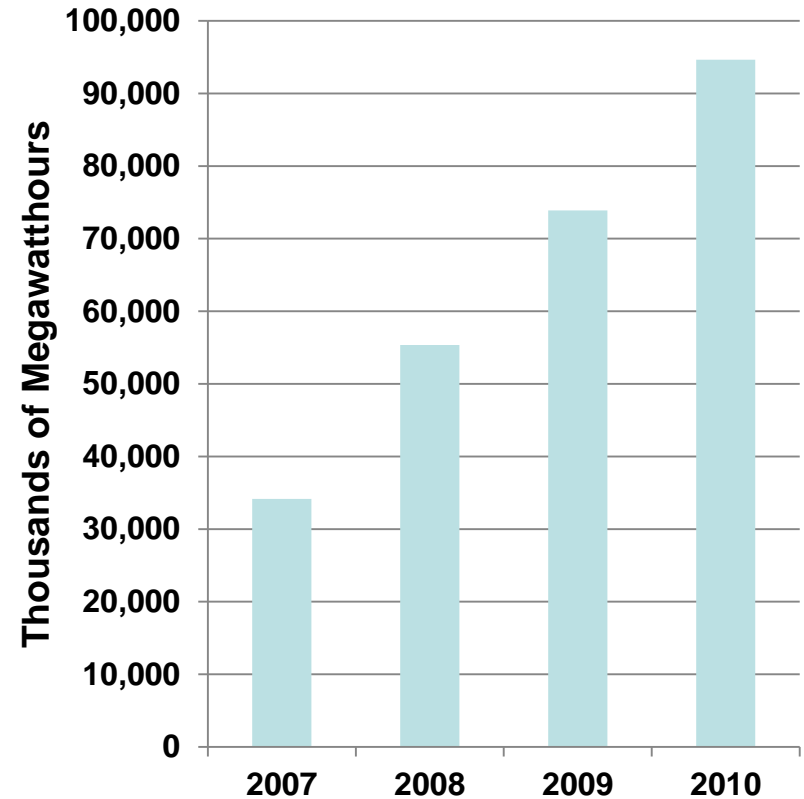
- **Cross-State Air Pollution Rule**
- **Mercury and Hazardous Air Pollutants MACT Rule**
- **New NAAQS standards for NO_x, SO₂, ozone and PM**
- **Coal Combustion Waste Disposal Rule**
- **Cooling Water Intakes under Section 316(b) of the Clean Water Act**
- **Climate Change Legislation or Regulation**
- **Will mean expensive investments in aging coal units**
 - Merrimack (NH) – scrubber- \$430-457 million
 - Big Stone 1 (SD) – scrubber, baghouse and SCR - \$490 million
 - La Cygne (KS) – scrubber, baghouses, chimney - \$1.23 billion
- **For some owners coal plant upgrades will be required at same time as other substantial capital investments in transmission & distribution**

Increased Wind Generation

One Utility – Otter Tail Power



Nationwide



State Renewable Portfolio Standards

May 2009



- **In resource planning studies, utilities assume very low coal price escalation with little to no volatility.**
 - Testify that coal export strategies will be temporary and have no price impact.
 - However, coal producers estimating sharp increases in prices due to exports.
- **Utilities also ignore rising costs of production from depleted resources in areas of intensified mining.**
 - CAPP coal all but priced out of utility market. Red-flag warnings from USGS on Powder River Basin.
 - How do you plan a 20-30 year new coal investment with price and supply uncertainty?
- **Utilities say coal prices cannot rise if natural gas prices remain low and environmental regulations are aggressively enforced – demand will drop they say**
 - Not at all true – price increases are occurring, particularly in the PRB, under precisely these conditions.

PJM 2011 Assessment of Coal Capacity at Risk for Retirement

- **Reduced natural gas/coal price spreads from \$5-\$7/mmBtu in 2006-2008 to \$2-\$3/mmBtu in 2009 are forecast by the EIA to continue until 2016. This reduces the net energy market revenues available to cover the costs of environmental retrofits.**
- **Lower forecast average hourly energy demands lead to lower cost resources being on the margin setting price and lower net energy market revenues available to cover the costs of environmental retrofits. Moreover, less efficient units will not run as often, further eroding net energy market revenues available to cover retrofit costs.**
- **Over the past 4 years, the combination of reduced natural gas/coal price spreads and lower demand have already resulted in lower capacity factors that have fallen from 65 percent in 2007 to about 40 percent in 2010 for coal-fired units less than 400 MW and more than 40 years old.**
- **Overall, the decline in the gas/coal spread and average hourly demand resulted in declining net energy market revenues for all coal capacity, but net revenues remain lowest for coal-fired units less than 400 MW and more than 40 years old.**
- **As a result, approximately 11,000 MW of coal capacity is “at high risk” for retirement. An additional 14,000 MW is “at some risk.”**

PJM Coal Capacity at Risk for Retirement, August 2011

Merchant Coal Plant Owners at Special Financial Risk

Moody's March 2011:

- **“Merchant power plants in many parts of the country are facing a dire financial future, depending on whether they have strong deals in place for selling their output.”**
- **Moody's base case for natural gas in next 12 to 18 months assumes that Henry Hub natural gas prices will be about \$4.50/MMBtu in 2011 and coal prices will rise significantly.**
- **“[R]ising coal prices relative to natural gas could result in greater displacement of coal fired generation in the eastern U.S. since efficient gas fired plants could become more competitive than coal fired power projects.”**

US Power Project Outlook 2011: Offtake Contracts Provide Stability While Merchant Generators Face Severe Challenges, Moody's March 2011