



Marcellus Shale Infrastructure: *A PUC Perspective*

Chairman Robert F. Powelson
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About the PUC



Mission Statement - The Pennsylvania Public Utility Commission *balances* the needs of consumers and utilities to ensure safe and reliable utility service at reasonable rates; protect the public interest; educate consumers to make independent and informed utility choices; further economic development; and foster new technologies and competitive markets in an environmentally sound manner.



Gas Safety



- PUC wants to expand its gas safety jurisdiction
- Current Jurisdiction:
 - U.S. Department of Transportation’s Pipeline and Hazardous Materials Safety Administration (PHMSA)
 - Has primary pipeline safety inspection responsibility BUT delegates this responsibility to the states
 - PUC Gas Safety Division:
 - Assists PHMSA with inspections of intrastate gas pipelines
 - Jurisdiction limited only to those entities classified as “public utilities” by the Public Utility Code

The PA PUC is not looking to expand its reach into economic regulation of the Marcellus Shale. The PA PUC is focused solely on gas safety measures.



Gas Pipeline Safety



- Marcellus Shale natural gas commenced a construction boom of gathering pipelines and intra-state transmission pipelines to transport the natural gas to the interstate transmission system.
- Unlike most other state commissions, the PaPUC does not have jurisdiction over all gathering and intrastate transmission pipelines.
- USDoT currently pays PaPUC to inspect pipelines and is ready to extend payments if PaPUC is authorized to do the inspections.



Gas Pipeline Safety, cont.



- PUC natural gas safety jurisdiction is needed over otherwise non-jurisdictional entities such as cooperatives and non-public gas utilities distributing propane and natural gas to residential and commercial/industrial consumers.
 - SB 325 and HB 344 – both of these bills have passed in their respective Houses within the last two weeks.



Gas Pipeline Safety, cont.



- Increase fines for gas pipeline safety violations to those now permitted by federal law
 - From \$10,000/day to \$100,000/day up to a gross maximum of \$1 million
 - House Bill 102 (Preston). This bill is currently in the House Consumer Affairs Committee



Benefits of Natural Gas

- Clean
 - The cleanest fossil fuel
 - No SO₂
 - No Mercury
 - Negligible Particulates
 - 80 percent less NO_x than coal
- Carbon Light
 - 50% less carbon dioxide than coal, 30% less than oil.
- Large transportation potential
 - 8 million NG vehicles worldwide. Only 150,000 in US.
- Tremendous electric generation potential, supplanting coal in future
- Excellent “partner” fuel as renewable production grows.



Abundant /Affordable/ American

- **Abundant Domestic Supply**

- Barnett Shale: 44 Tcf*
- Fayetteville Shale: 42 Tcf*
- Haynesville Shale: 250 Tcf*
- **Marcellus Shale: 490 Tcf****

Total equates to
nearly 40 years of
national supply

- **Affordable**

- Natural gas price of \$5.50 per MMBtu equivalent to \$33 Bbl oil
- Current oil price around \$80 Bbl

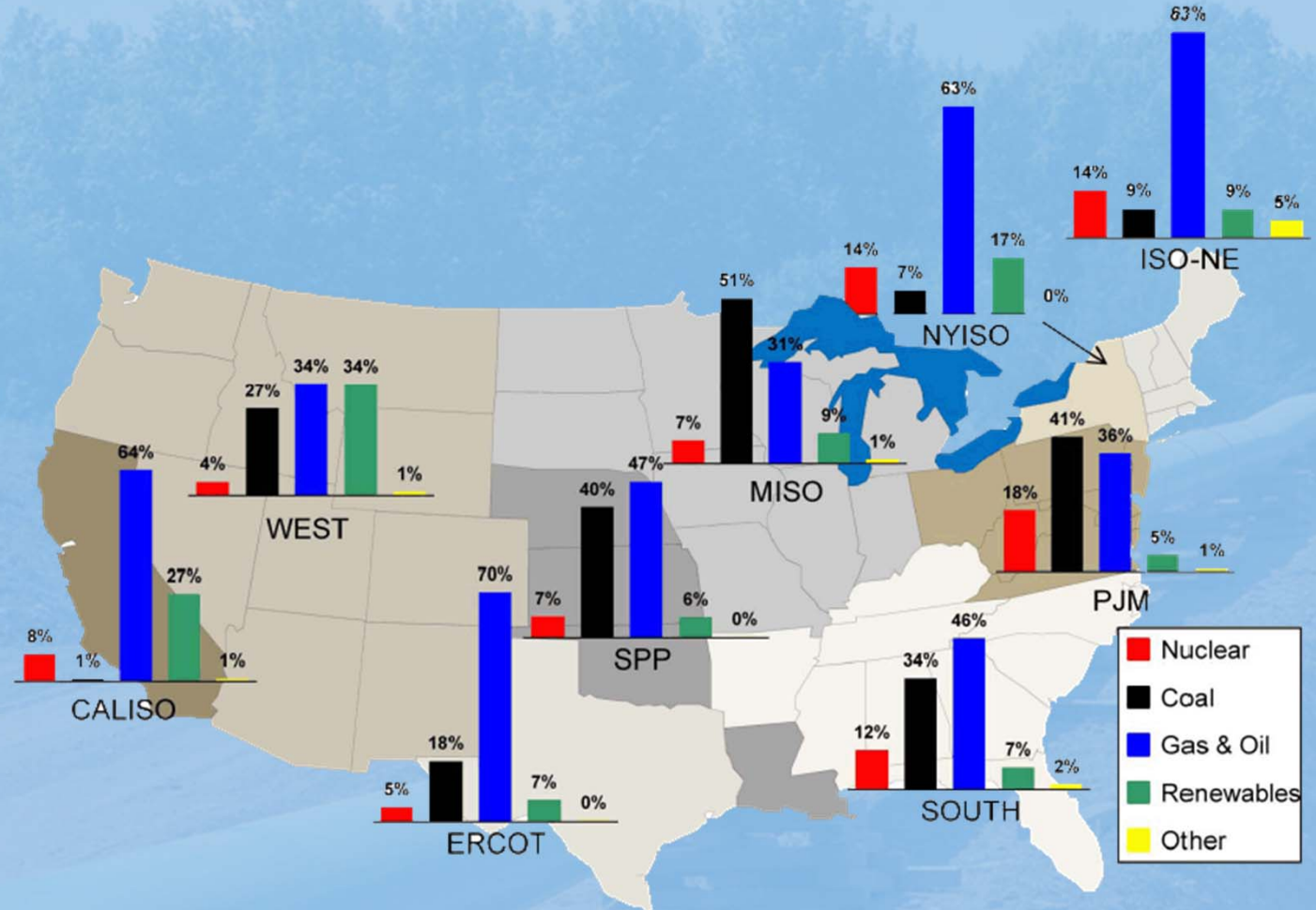
- **Versatile –Most Widely Used Fuel**

- Clean burning power plants
- Residential use
- Industrial and manufacturing
- Commercial space heating
- Transportation fuel (CNG)

Sources: *US Department of Energy (April 2009): *Modern Shale Gas Development in the United States: A Primer*, p. 17), **Dr. Terry Engelder, Penn State University) and Chesapeake Energy.
Tcf = trillion cubic feet



Generation Portfolios Vary Greatly by Region Reflecting the Natural Resources of the Region

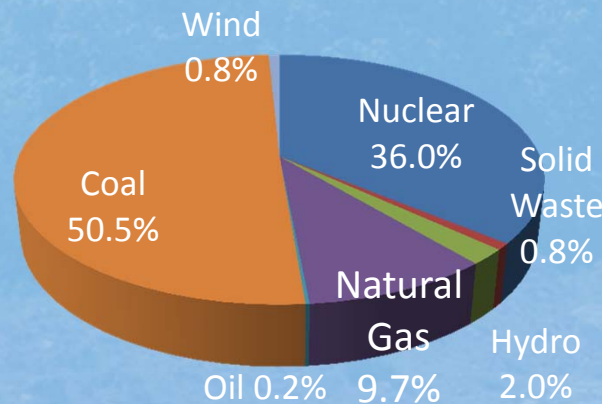


Source: U.S. Energy Information Administration and RTO data

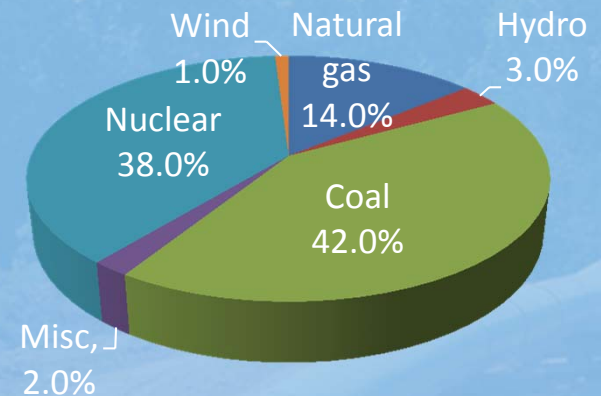
By the Numbers



PJM 2009 Generation by Fuel Type



PA 2009 Generation by Fuel Type

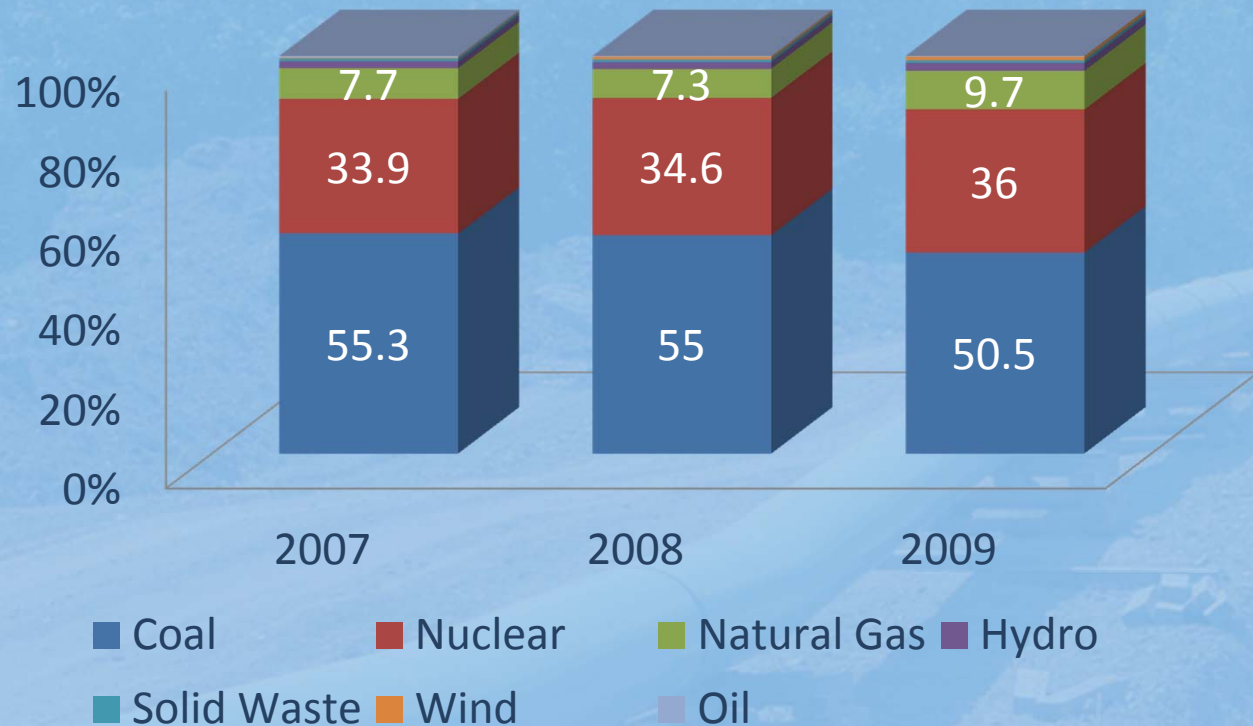


Pennsylvania:

- 2nd largest nuclear production state = 75 million MWh of electricity
- 4th largest coal production state = 66 million tons
- A net exporter of power in PJM
- Has installed capacity of 47,000 MW

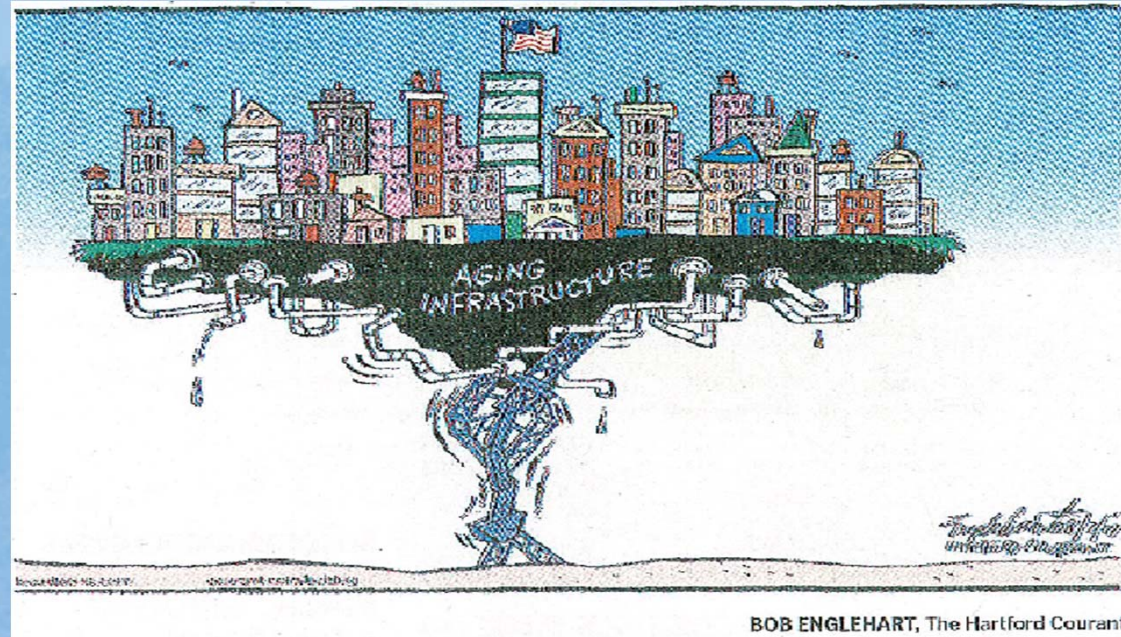


Energy Generated in PJM by Fuel Type





Aging Infrastructure



- Much of PA's utility infrastructure is 70+ years old (gas pipelines, wastewater treatment systems, electric transmission and distribution systems)
- Safety issue as well as an economic issue:
WE MUST GET IT RIGHT!



National Pipeline Development Statistics



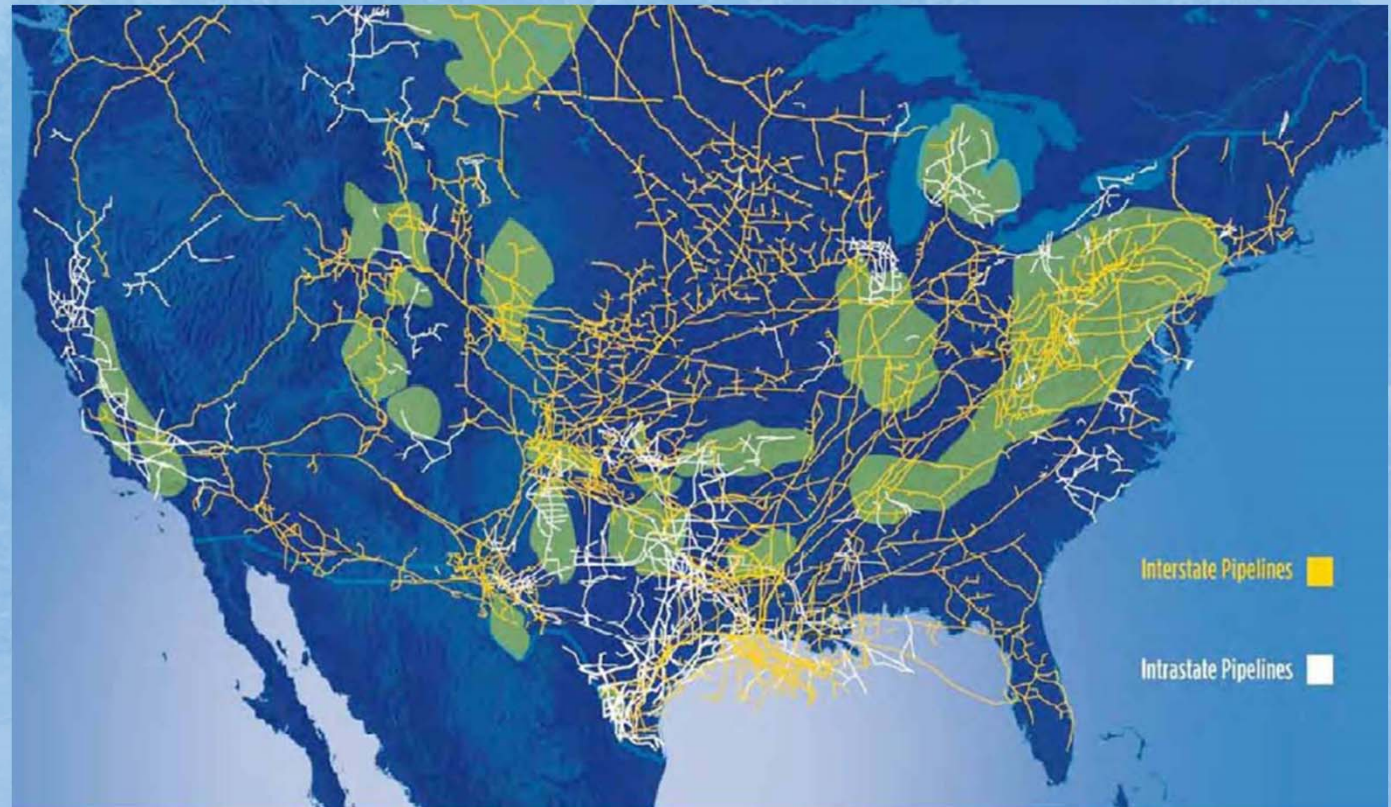
Number of Pipeline Projects Approved by
Federal Energy Regulatory Commission:

- 2 – 2011
- 18 – 2010
- 23 – 2009

Source: <http://www.ferc.gov/industries/gas/indus-act/pipelines/approved-projects.asp>



Shale Basins and the U.S. Pipeline Grid



Source: American Clean Skies Foundation



Water Usage

EXHIBIT 37: ESTIMATED WATER NEEDS FOR DRILLING AND FRACTURING WELLS IN SELECT SHALE GAS PLAYS

Shale Gas Play	Volume of Drilling Water per well (gal)	Volume of Fracturing Water per well (gal)	Total Volumes of Water per well (gal)
Barnett Shale	400,000	2,300,000	2,700,000
Fayetteville Shale	60,000*	2,900,000	3,060,000
Haynesville Shale	1,000,000	2,700,000	3,700,000
Marcellus Shale	80,000*	3,800,000	3,880,000

* Drilling performed with an air “mist” and/or water-based or oil-based muds for deep horizontal well completions.

Note: These volumes are approximate and may vary substantially between wells.

Source: “Modern Shale Gas, A Primer”, p. 64

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Game Changer



1. Based upon the projected upswing in Marcellus well activity, reaching a projected equilibrium of 2500 to 3000 wells per year, Pennsylvania will become a net exporter of natural gas by 2014.
2. Natural gas production volumes can be a game changer for Pennsylvania utility customers by saving customers a portion of the \$1 to \$2 in demand charges they currently pay to move gas through interstate systems to their burner tip.
3. Marcellus production will soon be sufficient to offset much of the long-haul pipeline requirements and can save Pennsylvania consumers millions! In fact, some wells are producing in excess of 6 MMDF/day, enough gas from a single well to fuel 24,000 homes annually.



What are some of the infrastructure hurdles facing PA?



- 1. How aggressive are we going to be encouraging the use of CNG vehicle fleets? Can we build the fueling stations to support it?
- 2. On the pipeline development front: how do we harness the power of PA-based tubular steel production?
- 3. Electric generation: we have nuclear, we have coal--what is the equation for gas going forward in a post-EPA "train wreck" scenario?
- 4. Finally, are we prepared to require our local gas distribution companies to become more aggressive with the procurement of Marcellus Shale gas?