

# A Sustainable Future for Natural Gas

GasMart 2011 Session

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# Percentage of Power Production

	Gas	Coal	Nuclear	Wind	Solar
2000	16%	52%	20%	0	0
2010	24%	45%	20%	2.3%	0.2%

# Power Production Numbers

- Since 1996 U.S. Electricity Consumption up 20%
- Coal up 2%
- Gas up 115%
- Nuclear up 20%
- Non-hydro renewables up 123%
- Hydro down 27%

# Natural Gas Usage

- 24% of Electricity comes from natural gas plants
- 51% of homes use natural gas
- 0.2% of natural gas used in vehicles

# Natural Gas Supplies

- EIA doubled shale gas supplies in 2010 increasing it from 400 tcf to 847 tcf
- U.S. Shale gas supplies equal to 35 years of U.S. current consumption
- U.S. Shale and conventional gas supplies equal to 100 years consumption
- International Energy Agency estimates gas reserves equal to 300 times current global demand

# Natural Gas Production

- 2010 U.S. produced more natural gas than any other country
- 2010 U.S. production highest since 1973
- China completed in 2011 first horizontal, service gas well
- China plans to get 10% of electricity from gas in about 10 years

# Natural Gas Prices

- \$13/mcf in July 2008
- \$3 to \$5/mcf from December 2008 to May 2011
- Oil & natural gas prices delinked

# Shale Gas Development

- Pennsylvania's Strategic Objective:
  - Produce The Gas and Protect The Environment

# PA Goals in Shale Development

- ❑ Economic Development/Jobs
- ❑ 2010 PA Ranked Third in New Job Creation; Lower Unemployment Rate than Nation & Texas
- ❑ Strong State Regulation To Encourage a World Class Industry
- ❑ Tax Revenues to Pay For Local Impacts, Environmental Programs and Vital State Services Like Schools
- ❑ Use More Gas and Less Coal and Oil to Reduce Pollution
- ❑ Energy Security

# Producing Gas

- First Marcellus Well Drilled in 2005
- By 2008 Marcellus Industry Booming
  - Gas at \$13/mcf
- By January 2011, 6,000 Marcellus Permits Issued
- 2,500 Marcellus Wells Drilled
  - Gas at \$4.50/mcf

# Producing Gas cont'd

- PA Marcellus Profitable at About \$2.50/mcf and Up
- PA on the Way to 2 Trillion Cubic Feet/Year Production

# Protecting the Environment – Issues for the Public

1. Impact on water from drilling /wastewater
  - Streams
  - Private water wells
  - Withdrawals
  
2. Operational Problems/Accidents
  - Spills
  - Leaks
  - Fires – Response time
  - Blow outs – Response time
  - 50 plus emergencies responses

# Protecting the Environment – Issues for the Public

## 3. Truck Traffic Impact & Safety

- Congestion
- Road damage
- Unsafe trucks

## 4. Gas Migration

## 5. Public Lands: State Forests & Parks

# Protecting the Environment – Issues for the Public

## 6. Taxation

- 70% support for drilling tax as of 1/1/2011

## 7. Staffing of Oil and Gas Program

- Number of employees
- Location

## 8. Air Impacts

- Nox
- HAPs

# Protecting the Environment – Issues for the Public

## 9. No Clear Benefit for Public Health In Minds of Public from Gas Production

- 100,000 megawatts nationally of 40 year old, poorly controlled gas
- Just 110,000 natural gas vehicles in USA

## 10. Credibility of Regulation/Regulators

# Regulatory Response

- Review & Strengthen All Rules
  - 4 Regulatory Packages Enacted
    1. Water Withdrawal Plan: August 2008
    2. Waste Water Disposal/TDS Rule: August 2010
    3. New, Strong Drilling Standards: January 2011
    4. 150 Feet Mandatory Buffer from All Development for 22,000 Miles of High Quality Steams: November 2010

# Regulatory Response

## □ Staffing

- 88 Positions in Oil Gas Program as of September 2008
- Raised Fee When Applying For a Permit from \$100 to as much as \$10,000 for Deep Wells
- Doubled Staff to 202 by January 2011

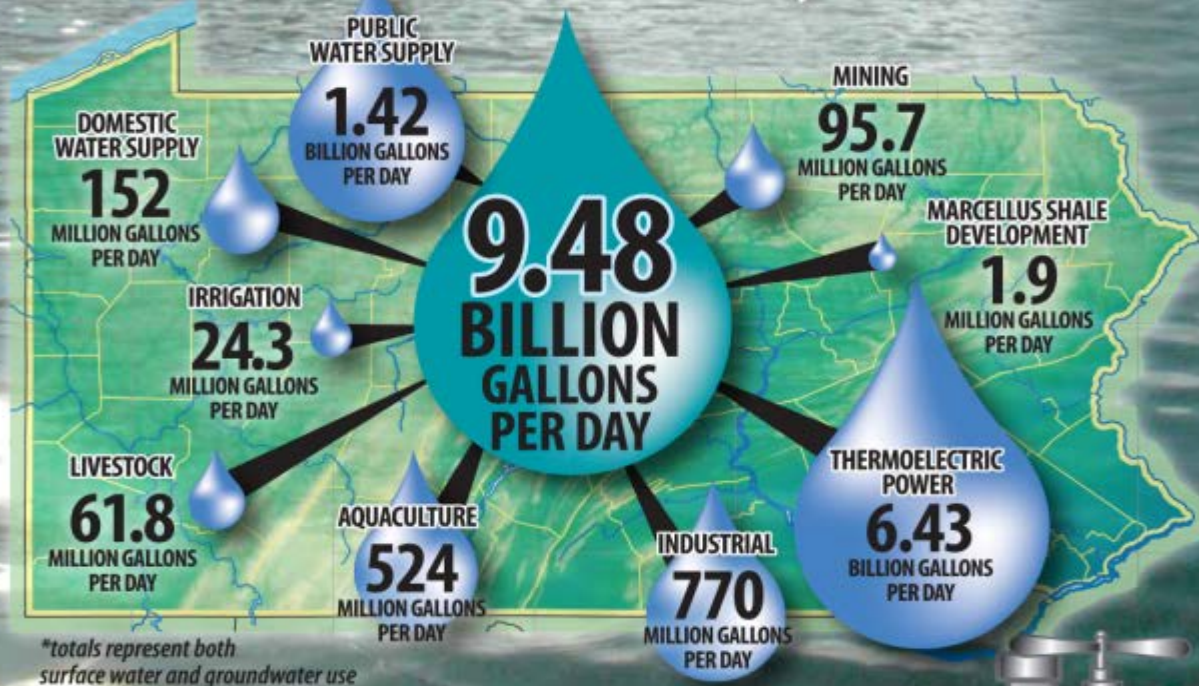
# Regulatory Response

- Enforcement of Rules
  - 1,200 Violations Issued During 2010
  - Companies Pay for Clean Up of Spills, Leaks, Gas Migration

# Industry Response

- At Least 70% of Water Recycled
- Moving to Eliminate or Reduce Pits
- Air
  - Concern about aggregation
  - Moving to cleaner engines
- Support of New Strong Gas Drilling Standards
- Greater, Increasing Focus on Safety and Best Practices

# PA Water Withdrawals by Water Use\*



Sources: J. F. Kenny, N. L. Barber, S. S. Hutson, K. S. Linsey, J. K. Lovelace and M. A. Maupin. 2009. *Estimated use of water in the United States in 2005*. U. S. Geological Survey Circular 1344. 52 p.

Marcellus Shale Gas Development Water Use: June 1, 2008 - May 21, 2010 Susquehanna River Basin Commission basin-wide reported daily use of 0.99 MGD expanded to statewide estimate. Water sources: 29% Public water supplies/71% Surface water withdrawals  
 1 MGD daily use in Susq. Basin ÷ wells drilled in Susq. Basin/wells drilled statewide=1 MGD ÷ (765/1428)