Building a Powerful Future
West Virginia Energy Summit

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Four Take-Aways

• Economics make new coal highly unlikely.

• Existing coal plants can compete.

• The country must pursue a rational greenhouse gas mitigation strategy.

• Availability of future capacity is a major concern.
Cost to Build or Acquire

Installation Cost Per kW

- Natural Gas Peaker
- Natural Gas Combined Cycle
- Wind
- Amos and Mitchell
- Coal Ultra-Supercritical
- Coal IGCC with CCS (Kemper)
- Nuclear
Coal vs. Natural Gas

MMBTU


$0  $2  $4  $6  $8  $10  $12

APCo Coal

APCo Natural Gas
Comparing Coal to Gas
Based on Appalachian’s baseload plant costs

- $46 coal = $2.50 gas
- $70 coal = $3.80 gas
US EIA Natural Gas Storage Report

• NYMEX forward prices
  - Balance 2013: $3.80
  - 2014: $3.99
  - 2015: $4.14
  - 2016: $4.23
Proposed CO$_2$ Regulations

• 1,100 lbs. per MWh for new coal plants.
  — CCS would be required to meet goal.
• 1,000 lbs. per MWh for new natural gas plants.
• New Turk plant is 1,800 lbs. per MWh.
Global CO$_2$ Emissions
Global CO$_2$ Emissions

- 2012 global CO2 emissions totaled 32.2 billion metric tons
  - Of that, China accounted for 28 percent
  - The US accounted for 17 percent
- Global emissions have increased 15 percent since 2005
  - 80 percent of the increase is due to growth in China
- By 2040, emissions from developing countries will rise by more than 70 percent
US Greenhouse Emissions

- In 2011, EGU CO2 emissions were 10 percent below 2005 levels
- Preliminary 2012 EIA data indicates EGU emissions were 15 percent below 2005 levels
Market
Considerations for 2016-2017 PJM Auction

• Potential Reliability Effects
  — 14 percent or 24,200 MWs of total capacity market is planned capacity resources
  — Planned resources may
    • Buy out their commitment
    • Cut by external balancing authority
    • Not show up in an emergency
Electricity Generation Mix

**Appalachian Power**
- **2012**
  - Coal: 74%
  - Natural Gas: 11%
  - Hydro-Wind: 15%

**American Electric Power**
- **2013**
  - Coal: 60%
  - Natural Gas: 23%
  - Hydro-Wind: 8%
  - Energy Efficiency: 4%
  - Demand Response: 5%
  - Nuclear: 4%
Electricity Generation Mix

Appalachian Power 2016
- Coal: 19%
- Natural Gas: 12%
- Hydro-Wind: 69%

American Electric Power 2016
- Coal: 60%
- Natural Gas: 33%
- Hydro-Wind: 8%
- Solar: 6%
- Pumped Storage: 6%
- Energy Efficiency-Demand Response: 6%
- Nuclear: 6%
Conclusion

• Economics make new coal highly unlikely.

• Existing coal plants can compete.

• The country must pursue a rational greenhouse gas mitigation strategy

• Availability of future capacity is a major concern.
Questions?

www.appalachianpower.com