

Recap of the Advanced Coal Technology Work Group  
Meetings from January through March 2007

May 8, 2007



# Purpose and Overview

To review for each Work Group Meeting:

- What we heard
- What we accomplished
- Where we go next

## January 7 & 8th Meeting - What We Heard

- Overview of Advanced Coal Technology (ACT), Stu Dalton, EPRI
- Overview of Carbon Capture and Storage, Julio Friedman, Lawrence Livermore National Lab
- Federal & State Incentives re: ACT, David Berg, DOE and Kate Burke, National Conference of State Legislatures
- Public Utility Commission's Perspective on ACT and CCS, Talina Matthews, Governor's Office of Energy Policy, KY
- Financial Community's Perspective on ACT and CCS, Jeff Miller, Tremont Group, LLC

# Key Points from the January Meeting

- Technology to improve efficiency and capture and store CO<sub>2</sub> is available
- Large CO<sub>2</sub> storage potential exists in the U.S.
- Scientific and technical scale-up questions exist for CCS and for IGCC
- Commercial scale use of advanced coal technology with CCS is needed
- Regulatory, legal, liability concerns for CCS exist

# Key Points from January Meeting [2]

- Multiple Federal and State incentives exist – coordination opportunity?
- PUCs- tension between encouraging the environmentally sustainable use of coal vs. maintaining low electricity rates
- The price gap between coal, natural gas and other renewable energy sources is wide enough to cover efficiency and environmental costs associated with sustainable coal use to generate electricity, as a result, investments in coal-fired electricity generation will continue

# What We Accomplished at the January Meeting

- Agreed to organizing concept for the Six-Month Interim and One Year Reports:

Development of a set of recommendations and actions to be undertaken by different stakeholders will provide the greatest potential to accelerate the use of ACT

- Agreed it is important to say something useful

# What We Accomplished at the January Meeting [2]

## **Identified Six Areas of Focus for the Work Group:**

- Advanced Coal Technology
- Carbon Capture and Storage
- Statutory and Regulatory Considerations
- Barriers and Incentives
- Education and Outreach
- Work Group Process

# Other?

- EPA authority on GhG regulation now decided – needs discussion
- May mean regulation as well as voluntary recommendations
- Clarity about Jeff Miller's summary comment on costs for controls, etc.on the price gap.
- Simplistic statement of the technologies/availability & time frame for wide scale deployment.
- State actions can move plant construction across borders



## Other (2)

- State leadership can move the process forward.
- Need to consider policy and practical implications of Mass v. EPA for State and Federal GhG initiatives
- What did the Court say? What policy and process will EPA take? Hear from OGC, too. What did Congress hear?
- What is the legal floor?

## February 8th Meeting - What We Heard

- Geologic Storage of Carbon Dioxide, James Dooley, Battelle's Joint Global Change Research Institute
- Carbon Capture and Compression Technology, Professor Ed Rubin, Carnegie Mellon
- Work Group Member Panel Discussion on IGCC and ACT (AEP, Southern Company, and Clean Air Task Force)

# Key Points from February Meeting

- Each advanced coal technology has limits and challenges-there is no silver bullet, there needs to be a portfolio of solutions
- CO2 abatement is a systems issue, focusing solely on the capture technology may not be the best place to gain the most leverage
- Siting a plant for CCS is as important as the technology used in the power plant
- In the absence of a climate policy, there are not any strong incentives to deploy ACT
- Market based policies broadly aimed at reducing CO2 emissions are not likely to stimulate CCS, until carbon prices increase

## What We Accomplished at the February Meeting

- Identified Priority Agenda Topics for future Work Group meetings
- Identified Key Barriers
- Identified Key Opportunities

# Other?

- A suite of incentives may exist to get the first mover projects started.
- Technology improvements (learning curve) may make more possible.
- Market based incentives could include rate basing that would happen at a less than national level.
- Fuels (liquids) are different than electricity production, and incentives should be different.

## March 6th Meeting - What We Heard

- ACT for pulverized Coal Plants, Carl Bozutto, Consultant
- Business Case Study and Risks Related to ACT, David Berg, DOE
- Overview of the Clean Air Act, Bob Wayland, EPA and Steve Jenkins CH2M Hill
- Legal, Liability and Public Perception Concerns Associated with Carbon Capture and Storage, Jeff Logan, WRI

## Key Points from the March 6th Meeting

- Efficiency improvements and low-cost technology to capture CO<sub>2</sub> should be the goal
- Retrofitting of the existing plant fleet will not happen until there is a price signal to make it economical
- Highly rated risks for ACT include high capital costs, limitations in construction sector (EPC capacity), price increases, permitting delays and CCS
- Experts believe that CCS risks are manageable with proper site selection and monitoring

## Key Points from the March 6th Meeting [2]

- There is no national or state regulatory framework to address CCS; there is significant variability among states and how they regulate CCS
- The legal, state-specific issues of eminent domain and unitization to enable large scale storage are critical
- To address long term liability issues for CCS, a financial responsibility framework, indemnification and/or insurance instruments to manage the risk are needed
- Building public acceptance for CCS is critical, inclusive and transparent approaches are needed



## What We Accomplished at the March 6th Meeting

### **Identified key characteristics of ACT**

- Reduces or eliminates the environmental impact of emissions, including CO<sub>2</sub>, from coal-based production processes
- Reduces CO<sub>2</sub> through efficiency improvements
- Reduces CO<sub>2</sub> through capture and sequestration
- Meets dynamic, technology forcing parameters

## What We Accomplished at the March 6th Meeting [2]

### **Prioritized Barriers and Opportunities**

- Regulatory drivers for CO2
- Liability and NUMBY
- Education and outreach for public and regulators
- Streamline /accelerate permitting for ACT
- Financial incentives to encourage ACT
- Mechanisms to advance R & D in needed areas

# Other?

- Efficiency improvement needs to be clear as far as DSM and within the plant.
- DSM is on the table.
- Have lumped together CC and Storage, legal liability issues apply to Storage
- Generation and CC and Storage technologies will develop on different paths, and timing of combinations important.
- Need to take into account air emissions, waste, toxics, water, and the total 'footprint'.

## March 29th Meeting - What We Heard

- Principles and Recommendations from the U.S. Climate Action Partnership (USCAP), Nikki Roy, Pew Center on Global Climate Change, Larry Boggs, GE
- Recent Events Related to ACT, Work Group Member discussion
- Lessons Learned from Demonstration /First Mover Projects, Doug Topping , EPCOR
- Efforts of the Coal Utilization Research Council (CURC), Doug Carter

## Key Points from the March 29th Meeting

- A sustained market signal is necessary to drive technological transformation
- An efficient federal floor, as opposed to a patchwork of different state programs to address CCS, will free states so they can focus resources and go further if needed
- Work Group members' companies are demonstrating ACT for chilled ammonia and oxy-coal to address CO<sub>2</sub>

## Key Points from the March 29th Meeting [2]

- Offsets, energy efficiency improvements and demand side management are tools that can mitigate the impact of CO<sub>2</sub> for power plants today
- With successful R & D, by 2025 new sequestered coal-based generation may cost about the same then as new unsequestered coal-based generation does now.
- R & D funding is inadequate, especially for demonstration projects

# What We Accomplished at the March 29th Meeting

- Agreed to framework and components of Six-Month Interim Report
- Identified a list of priority areas and preliminary recommended actions
- Cataloged potential recommendations in a matrix

## Other?

- Substantial uncertainty about forecasts of costs in 2025
- What is the implication for price signals and their longevity?
- Embedded utility costs are substantially lower than new coal plant costs now, or in future, has implications.



## Framework for the Six-Month Interim Report

- Less than 10 pages
- Address background related to Work Group, including Charge and Work Group's actions to date
- Work Group's observations re: ACT, including barriers and opportunities
- Recommendations

# List of Priority Areas and Potential Recommended Actions

- Create price signals to encourage ACT
- Create incentives to encourage ACT
- Education and outreach re: ACT
- Liability and public perception concerns re: CCS
- Streamline/accelerate permitting for ACT
- Create mechanisms to advance technology and needed R & D

# What We Heard on the Conference Calls

- Electricity Technology in a Carbon Constrained Future, Revis James, EPRI
- DOE Regional Sequestration Partnerships and other CCS Legislative Initiatives, Larry Myer, Lawrence Berkley National Lab
- EPA's Efforts to Address CCS, Anhar Karimjee and Bruce Kobelski, US EPA