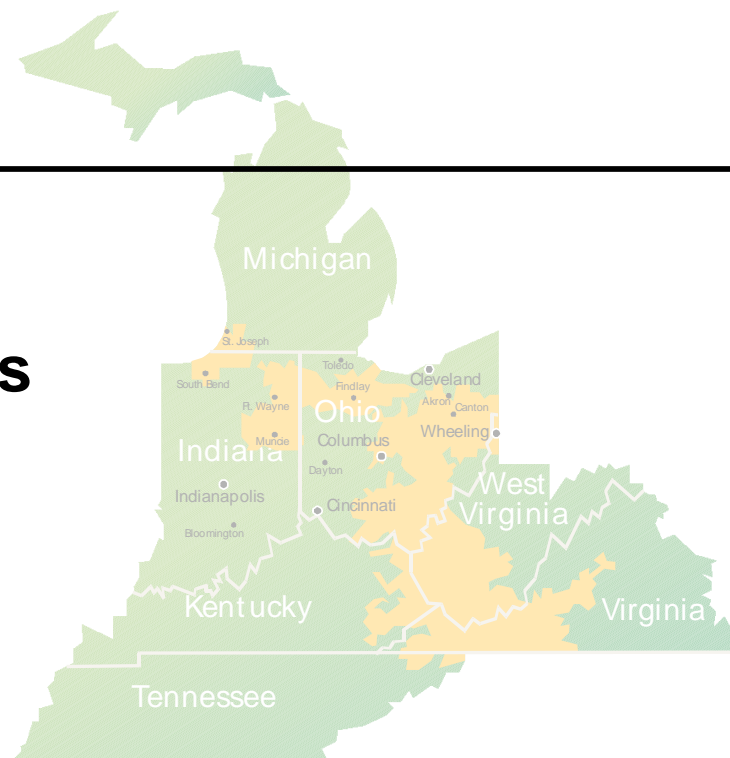
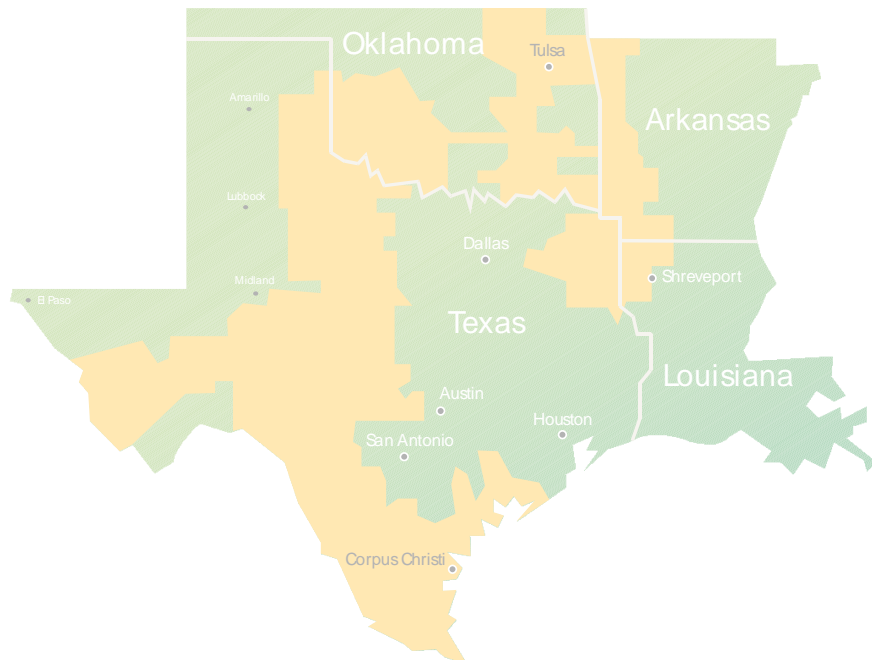




The Carbon Economy: Opportunities & Challenges

The Industry Perspective from AEP's View



G8-IEA-CSLF Workshop on Near Term Opportunities for Carbon Capture and Storage

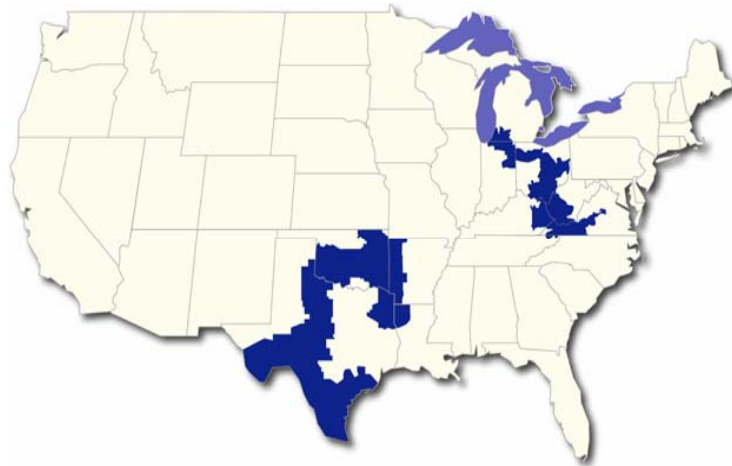
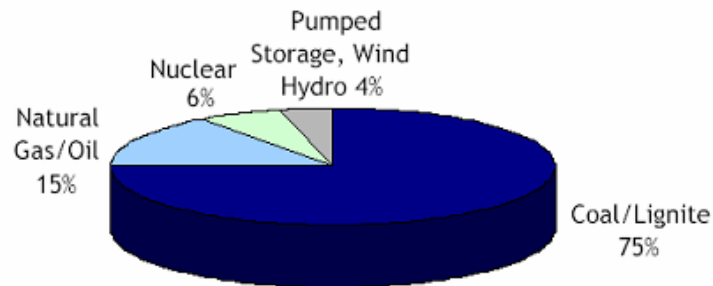
Michael J. Mudd
Manager New Generation Development
American Electric Power

**Chief Executive Officer
FutureGen Alliance**



AEP Background

Capacity by Fuel Mix



 AEP Service Territory

- Among the largest U.S. electricity generators (36,000 MW)
- One of the largest consumers of coal in the Western Hemisphere
- A leading consumer of natural gas
- 39,000 miles of transmission
- 206,000 miles of distribution
- 5 million customers in 11 states



“No authority is higher than reality”

-- Peter Nivio Zarlenga (Businessman-Author)

Many strategic reasons for using coal –

- ✓ Abundant and available
- ✓ Critical to our service area's economy
- ✓ Critical to national security (economical source of energy)

But in a carbon-constrained world the reality of our situation is compelling. In 2005 AEP...

- ✓ Burned 75 million tons of coal
- ✓ Generated 1.0 ton CO₂/MWh
- ✓ Generated 2.1 tons CO₂/ton Coal Burned

The bottom line..... AEP produced **162 million tons CO₂**





CO₂ Emission Reduction Strategies – An AEP Perspective

Multi-faceted Approach

- Accelerate IGCC deployment
- Improve efficiency of existing plants; incorporate high efficiency design for new plants
- Renewable generation investment (wind, biomass testing)
- Research & Development (e.g., FutureGen)





Making an impact on CO₂

- **Renewables**

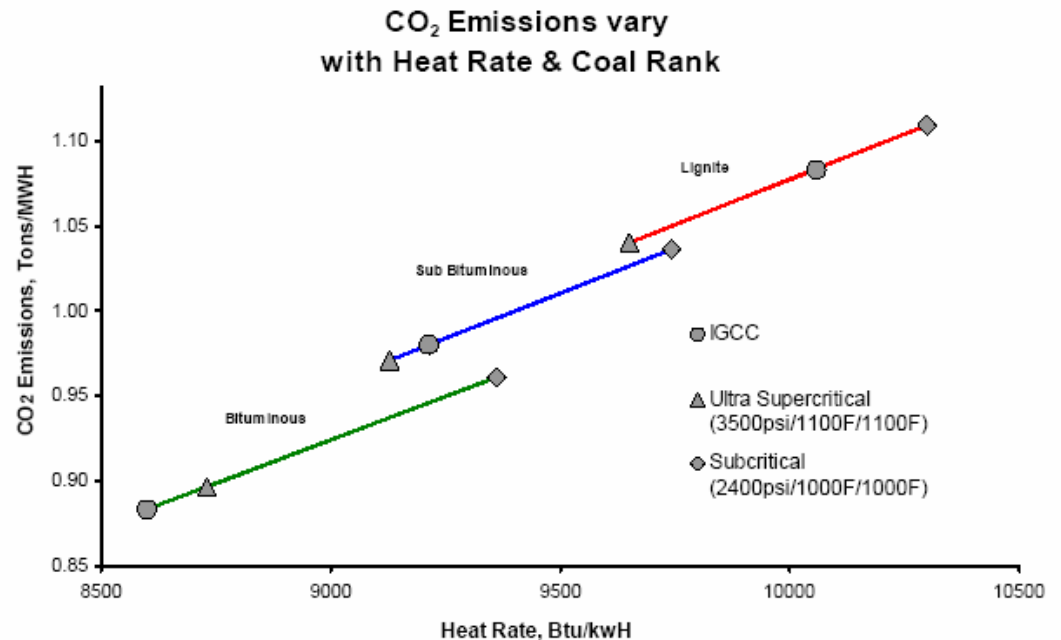
- One of the largest owners of wind generation capacity in the U.S. with 310 MW of owned capacity in TX, and agreements to purchase 373 MW of capacity in OK and TX

- **Off-system reductions**

- Invested in world's largest avoided forest deforestation project in Bolivia; facilitated similar projects in Brazil and Louisiana; reforested more than 23,000 acres of company-owned land.
- Founding member of Chicago Climate Exchange; committed to reducing or offsetting 46 million metric tons of CO₂ equivalent emissions between 2003 and the end of the decade.

- **Efficiency**

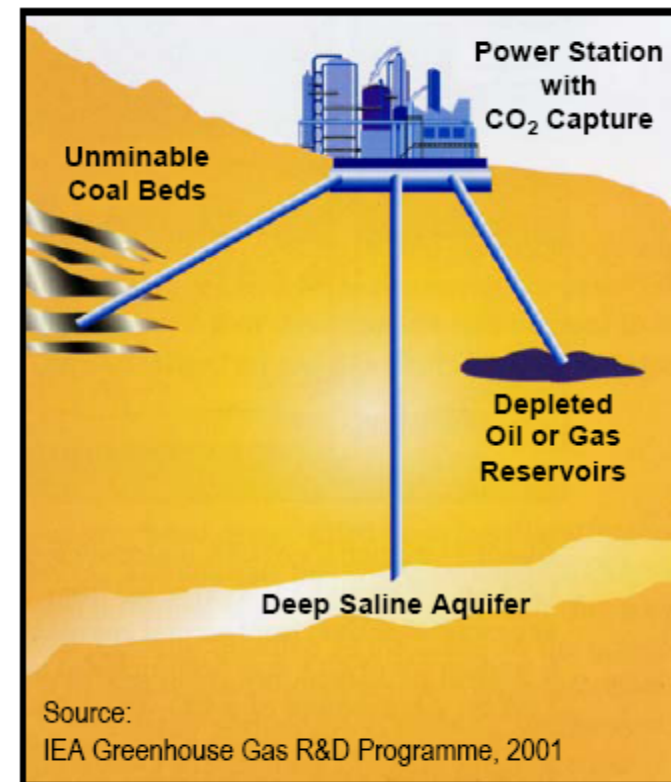
- Replacing turbines and throttle valves with more efficient designs; pursuing heat rate improvements in new plant designs (IGCC/USC-PC)
- Heat Rate Improvement Potential:
 - A 1% (100 Btu/kWh) heat rate improvement across the fleet will reduce CO₂ by 1.62 million tons/year





Related Research & Development

- CO₂ capture & disposal research for existing coal-fired power plants
 - Mountaineer Plant (advanced amine separation)
 - Industry Collaborations
 - FutureGen
 - EPRI
 - DOE Regional Carbon Partnerships
- R&D Drivers
 - Reduce capital cost penalty
 - Reduce efficiency penalty
 - Prove efficacy of permanent/safe geological sequestration





Delivering IGCC's Promise – Phase II FutureGen

- Advances Phase 1 technology
 - Natural evolution of IGCC technology
 - Greater fuel flexibility
 - Demonstrates CO₂ separation/capture/sequestration
 - Demonstrates H₂ production turbine / fuel cells
 - Enable Technology Breakthroughs
- We see a future for IGCC
 - “0” emissions
 - 7,500 Btu/kWh target heat rate using domestic coal

FutureGen is the research platform that will make these performance improvements possible





FutureGen Project Features

- Commercial-scale
- 275-MWe Plant
- 1 million tons/year CO₂ captured and sequestered
- Co-production of H₂ and electricity
- “Living laboratory” to test and validate cutting-edge technologies
- Public-private partnership
- Stakeholder involvement
- International participation
- On-line 2012





FutureGen Alliance, Inc

- Non-profit, 501(c)3 formed to manage the project
- DOE Cooperative Agreement Signed Dec. 2, 2005
- 10 Members and still growing
- World leading utilities and coal producers

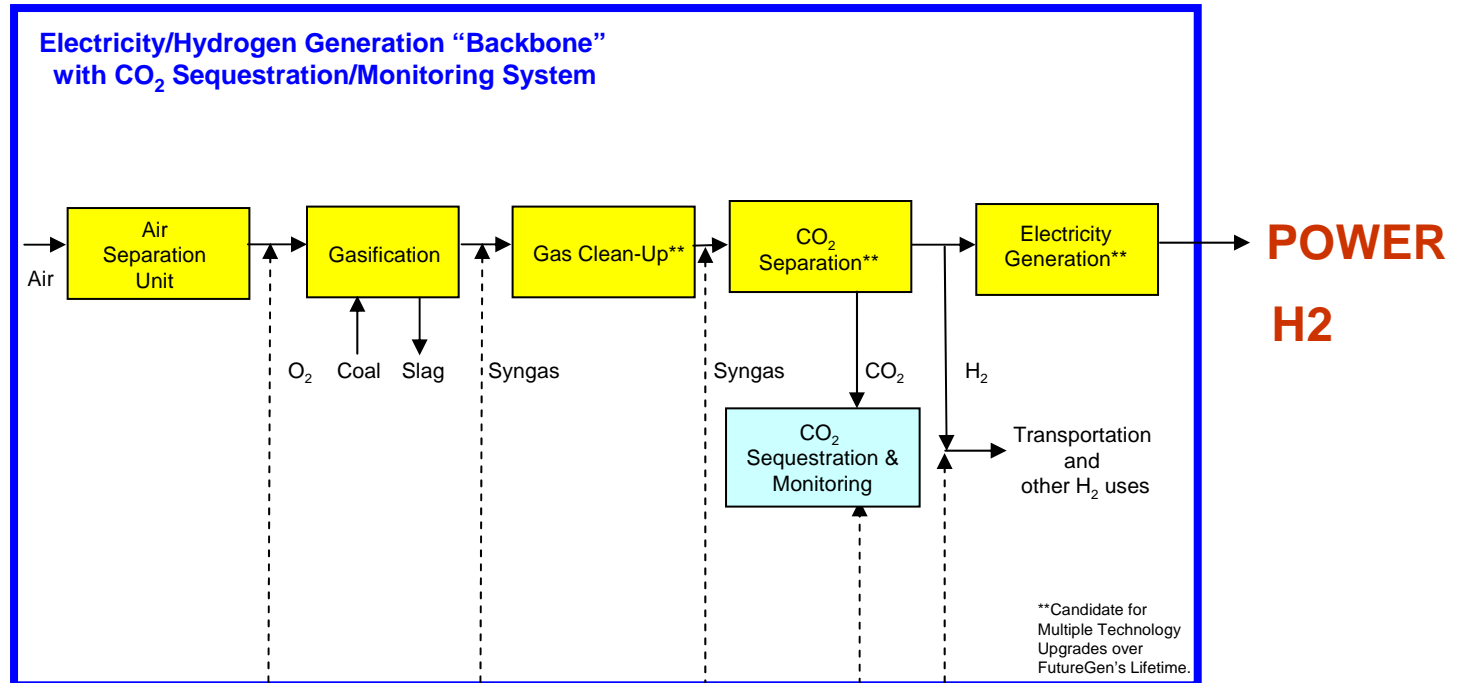




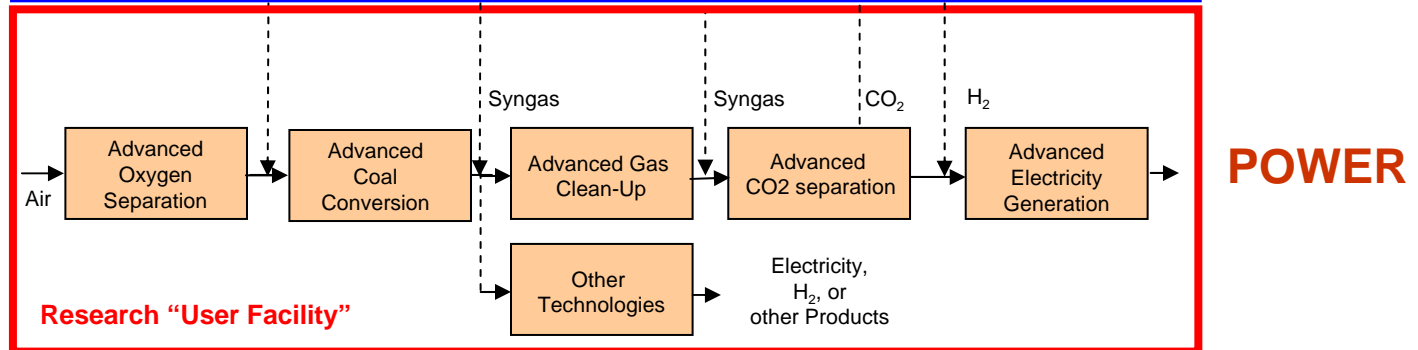
FutureGen Multi-Facet Features

“State-of-the-Art
Gasification
Technology”

“Sequestration”

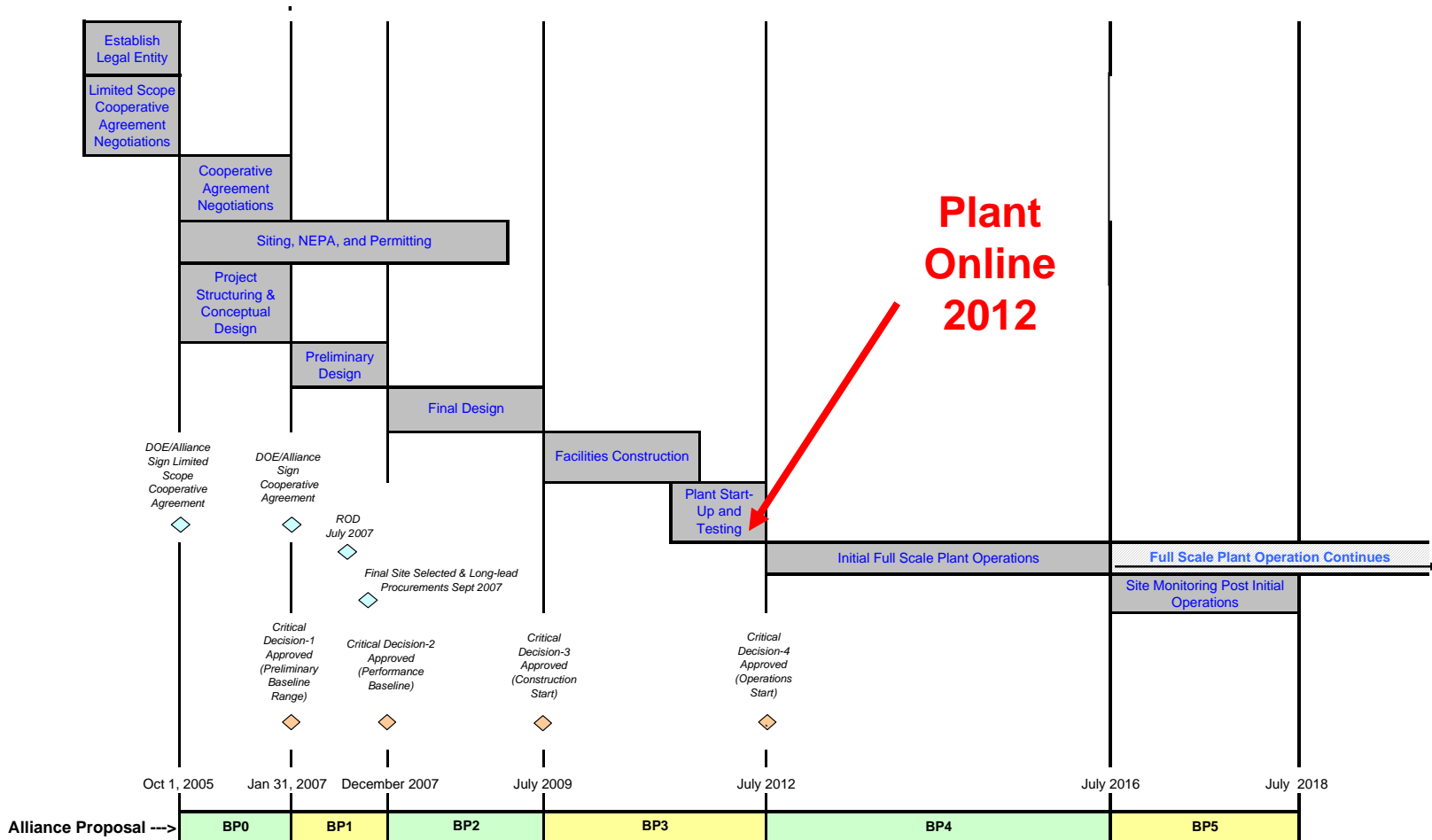


“Research
User Facility”





FutureGen - Schedule





Leading the way

We Believe...

- AEP has a responsibility to take a leadership role in developing CO₂ solutions
- We will take a diversified approach to reducing our “carbon footprint”.
- We can leverage our heritage of engineering development to bring new technological answers to the table
- We will continue to work with other collaboratives and demonstration projects, on a national and international stage, to make a difference on climate change issues:

