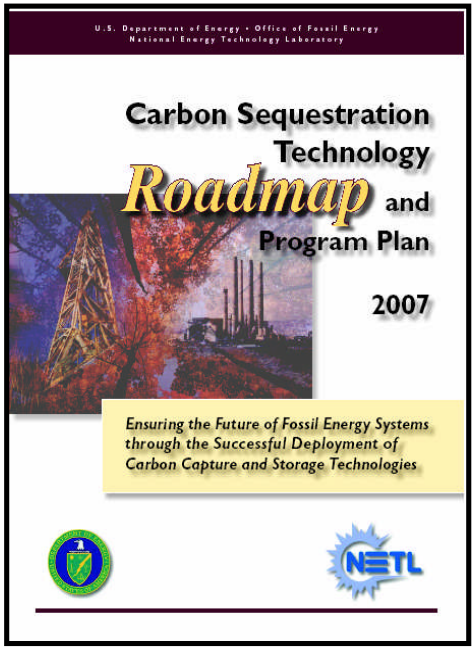
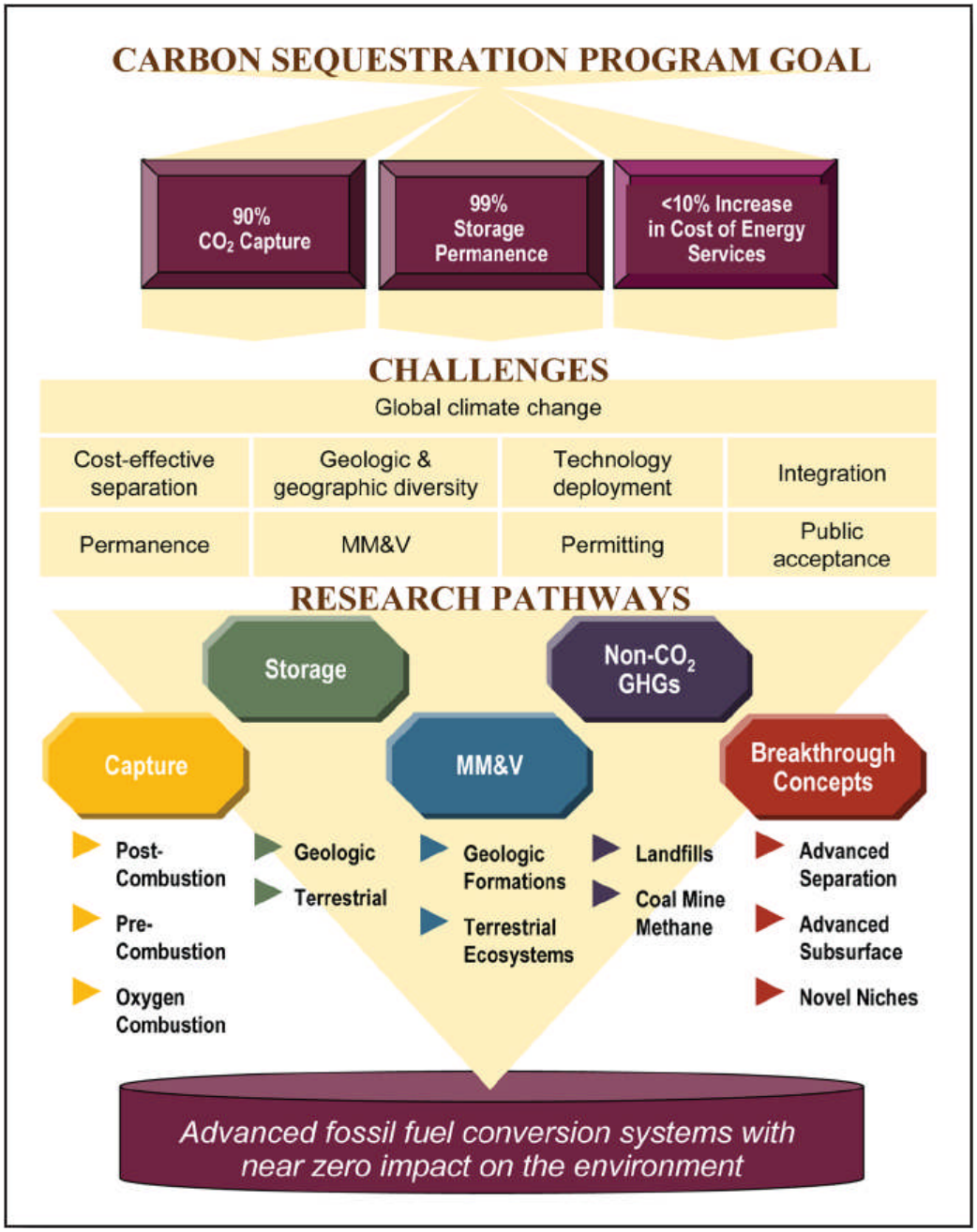
CSLF Technical Group Meeting
Dhahran, Saudi Arabia



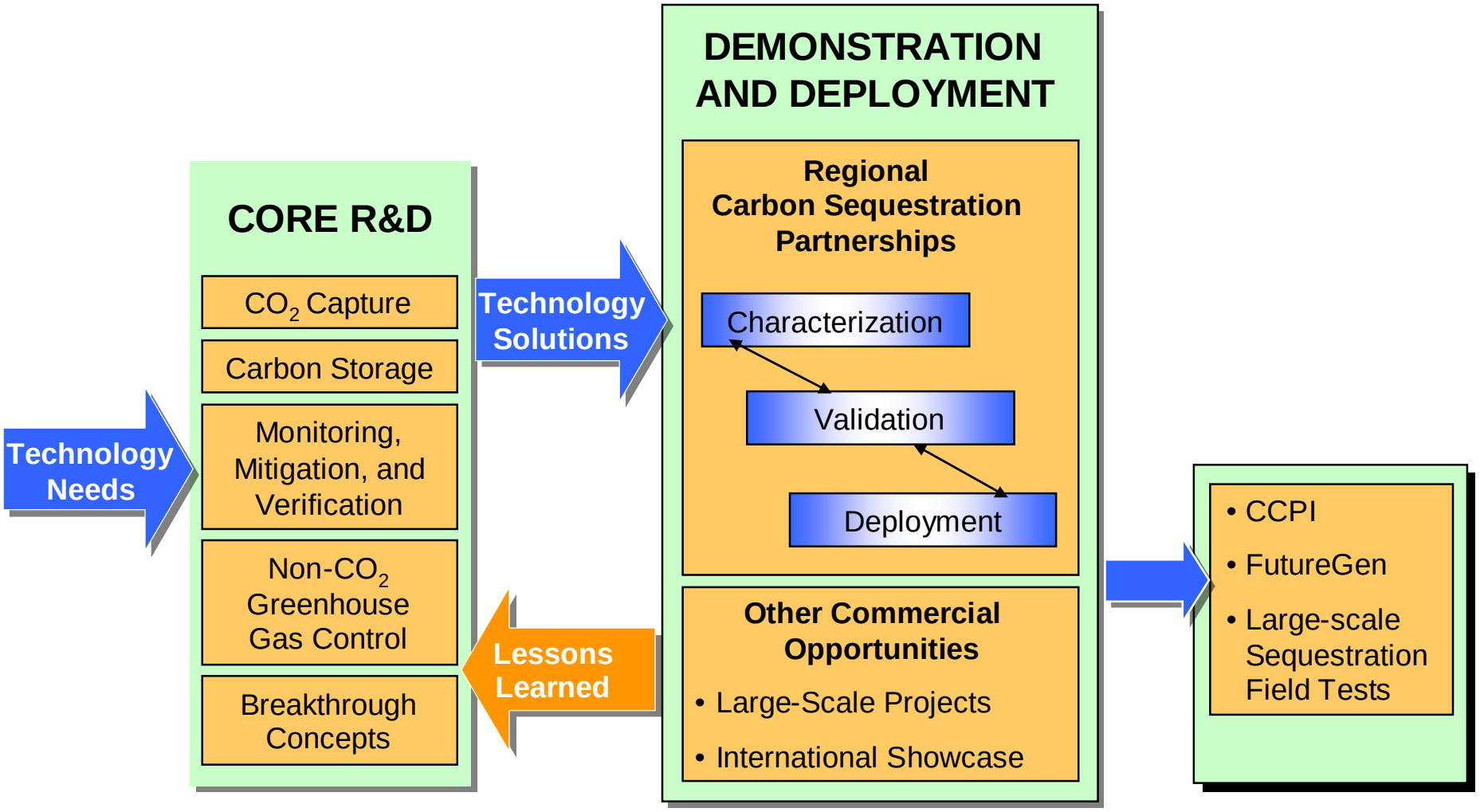
United States Carbon Sequestration Technology Roadmap and Program Plan/FutureGen

January 29, 2008

Joseph Giove III
Senior Program Manager
Office of Clean Coal, Office of Fossil Energy,
U.S. Department of Energy


CARBON SEQUESTRATION PROGRAM GOAL
90% CO_2 Capture
99% Storage Permanence
<10% Increase in Cost of Energy Services
CHALLENGES
Global climate change
Cost-effective separation
Geologic & geographic diversity
Technology deployment
Integration
Permanence
MM&V
Permitting
Public acceptance
RESEARCH PATHWAYS
Storage
Non-CO_2 GHGs
Capture
MM&V
Breakthrough Concepts
Post-Combustion
Pre-Combustion
Oxygen Combustion
Geologic
Terrestrial
Geologic Formations
Terrestrial Ecosystems
Landfills
Coal Mine Methane
Advanced Separation
Advanced Subsurface
Novel Niches
Advanced fossil fuel conversion systems with near zero impact on the environment

Carbon Sequestration Program



Regional Carbon Sequestration Partnerships

Characterization - Phase I

- 24 months (2003-2005)
- $16M DOE funds

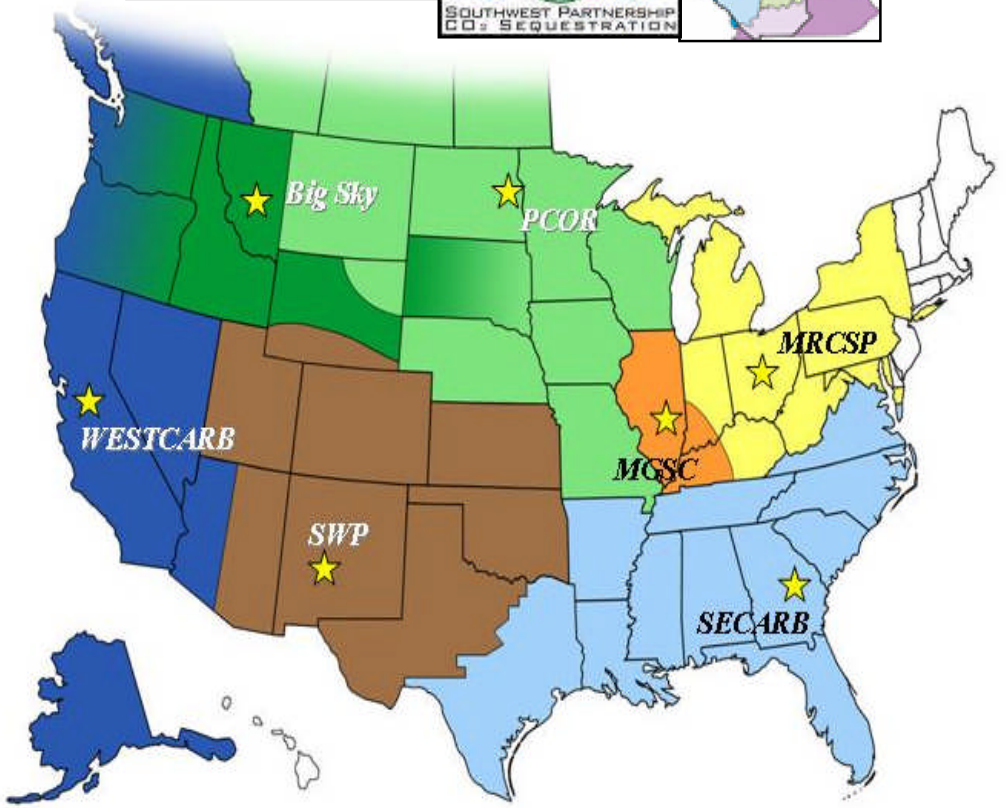
Validation - Phase II

- 4 years (2005 - 2009)
- 7 Partnerships (41 states)
- 25 Geologic field validation tests
- $112M DOE funds

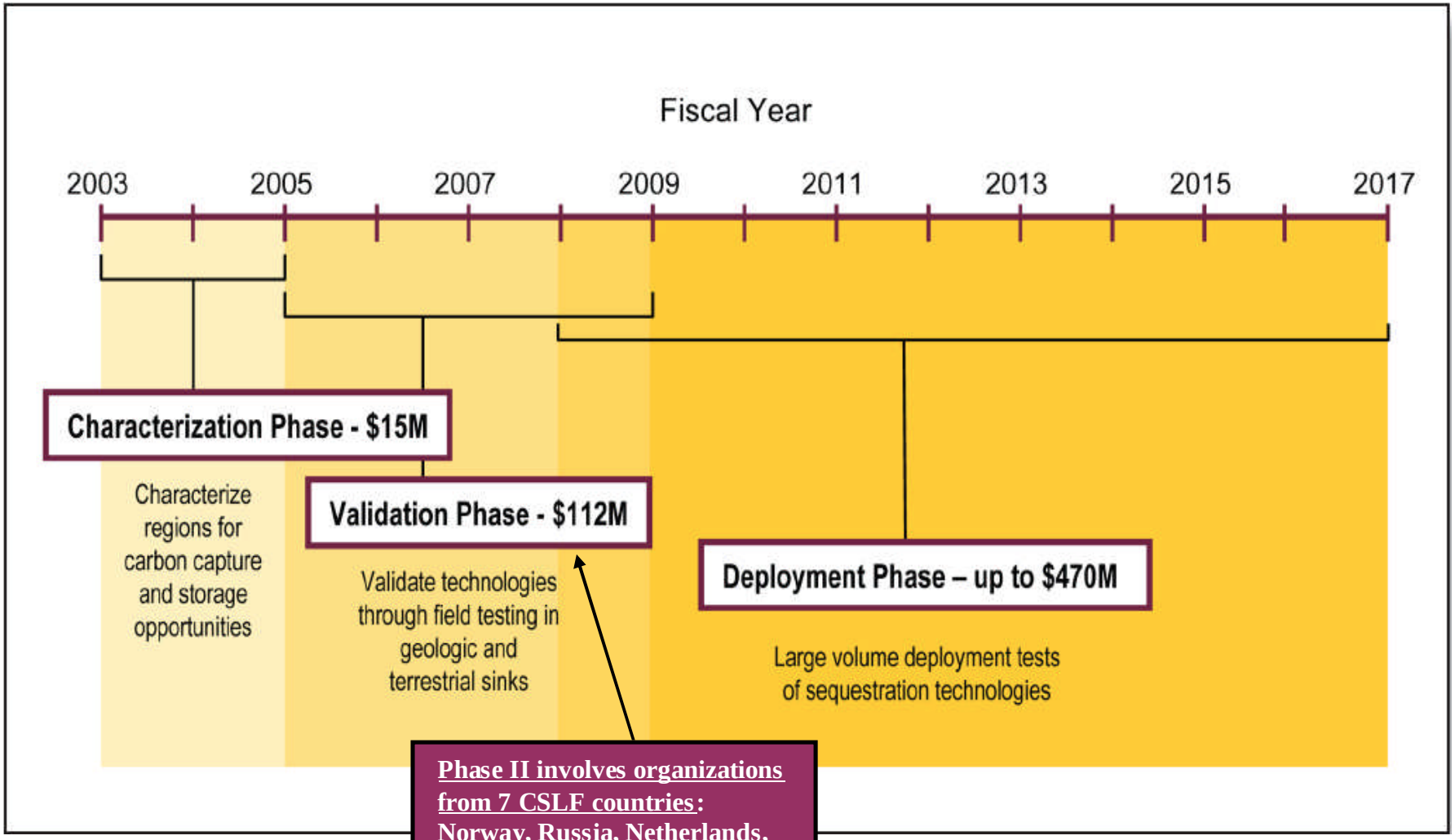
Deployment - Phase III

- 10 years (2008-2017)
- Several large injection tests in different geology

Participation from:
- >350 Organizations
- 41 States
- 4 Canadian Provinces



3 Phases of the Regional Partnerships



Initial Phase III Projects

- First set of projects - awarded October 9, 2007

- **Plains CO_2 Reduction Partnership**
  - Lead by University of North Dakota- EERC
    - Alberta Basin (deep saline) &Williston Basin (EOR and CO2 in deep carbonate/saline)
    - Total Project Cost: $135.6M (DOE Share: 67M)

- **SE Regional Carbon Sequestration Partnership**
  - Lead by Southern States Energy Board (SSEB)
    - Lower Tuscaloosa Formation Massive Sand Unit (Deep saline)
    - Total Project Cost: $93.7M (DOE Share: 65M)

- **SW Regional Partnership for Carbon Sequestration**
  - Coordinated by the New Mexico Institute of Mining and Technology
    - Jurassic-age Entrada Sandstone Formation
    - Total Project Cost: $88.8M (DOE Share: 65M)

Initial Phase III Projects

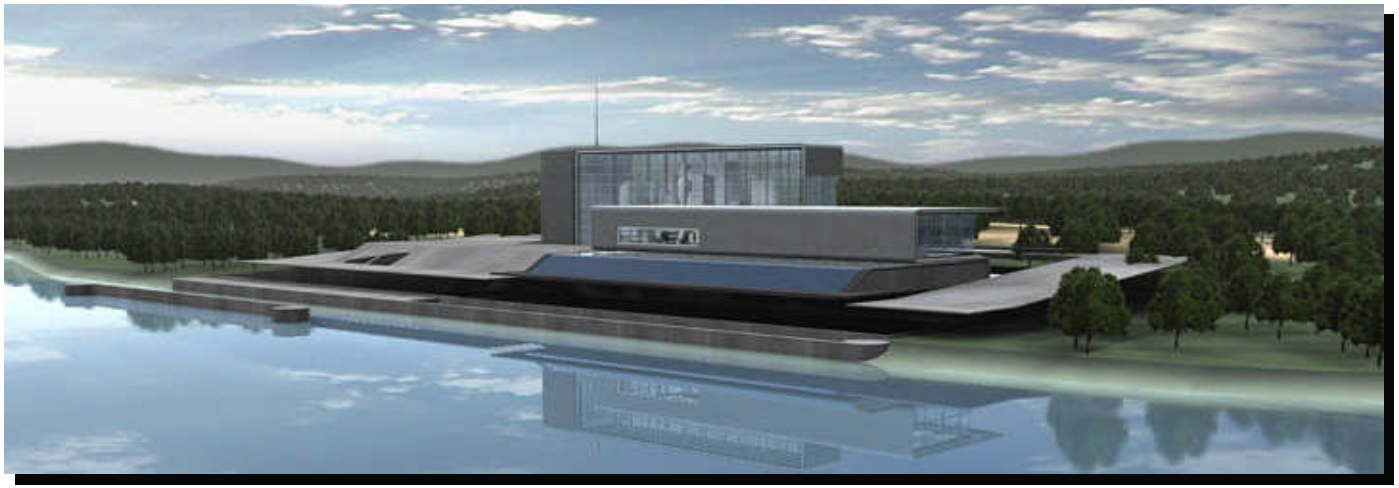
- Second set of projects - awarded December 18, 2007

  - **Midwest Geologic Sequestration Consortium**
    - Coordinated by Illinois State Geologic Survey (University of Illinois)
      - Mount Simon Sandstone Formation in Illinois
      - Total Project Cost: $84.3M (DOE Share: 67M)

- Several more projects will be announced

Critical R&D Areas

FutureGen



- The goal of the FutureGen research project is to establish the technical feasibility, economic viability and broad acceptance of co-producing electricity and hydrogen from coal with essentially zero emissions, including carbon (sequestration).
- To remove the environmental concerns over coal's use including climate change concerns by sequestering carbon dioxide emissions from coal power plants.