Working Together - The South and RD&D Partnering

John Litynski, P.E.
Carbon Storage Technology Manager
Office of Coal Power R&D
National Energy Technology Laboratory

Advancing energy options to fuel our economy, strengthen our security, and improve our environment

- Full-service DOE federal laboratory
  - Program Planning
  - Budget Formulation and Execution
  - Procurement
  - Project Management
  - Program Performance and Benefit Analyses
  - On-site Research
- Dedicated to energy RD&D, domestic energy resources
  - Fossil Energy
  - Support for EE and OE
- Emphasis on industry, academia, and government collaborations
**Energy Demand 2008**

- **United States**
  - 100 QBtu / Year
  - 84% Fossil Energy
  - Coal: 22%
  - Gas: 24%
  - Oil: 37%
  - Nuclear: 8%
  - Renewables: 8%
  - 5,838 mmt CO₂

**Energy Demand 2035**

- **United States**
  - 114 QBtu / Year
  - 78% Fossil Energy
  - Coal: 21%
  - Gas: 24%
  - Oil: 33%
  - Nuclear: 8%
  - Renewables: 14%
  - 6,311 mmt CO₂

- **World**
  - 487 QBtu / Year
  - 81% Fossil Energy
  - Coal: 27%
  - Gas: 21%
  - Oil: 33%
  - Nuclear: 6%
  - Renewables*: 13%
  - 29,259 mmt CO₂

**World**

- 716 QBtu / Year
- 79% Fossil Energy
- Coal: 29%
- Gas: 22%
- Oil: 28%
- Nuclear: 8%
- Renewables*: 15%
- 42,589 mmt CO₂

*Primarily traditional biomass, wood, and waste.*

DOE RD&D Portfolio

Integrated Technologies Are Necessary

Fuel Cells

Future Coal Energy Plant

Gasification

CO2 Capture

H2 Turbines

System Optimization

Geologic Storage
130 RD&D Project in the South
$3.2B Total Value, DOE - $1.2B
123 Applied R&D Projects in the South
$688M Total Value, DOE - $528M

University of Kentucky
Heat Integrated Carbon Capture
$19.3M – Total
$14.5M – DOE

Virginia Tech
CO2 Injection in Eastern Coal
$14.3M – Total
$11.5M – DOE

Coaltek, Inc
Biomass Infused Briquettes for Gasification
$2.8M – Total
$1.8M – DOE
CCUS Demonstration Projects in the South
$2.6B Total Value, DOE - $0.6B

Summit TX Clean Energy
Advanced IGCC w/Full Carbon Capture
~$1.7B – Total
$450M – DOE

NRG
Post-Combustion CO\textsubscript{2} Capture
$333.6M – Total
$166.8M – DOE

Southern Company
IGCC-Transport Gasifier w/CO\textsubscript{2} Capture
$2B – Total
$294M – DOE

Air Products
H\textsubscript{2} Production w/EOR
$431M – Total
$284M – DOE

Leucadia Energy
Methanol w/EOR
$436M – Total
$261M – DOE

RTI
Gasification Warm Gas Cleanup
$178M – Total
$172M – DOE
Large U.S. Reservoirs Amenable to Utilize for CO₂ Storage and Enhanced Oil Recovery (EOR)

- Over 40 years of RD&D history in EOR
- The South has Significant Resources
  - ~50% of national EOR potential
  - 30+ billion barrels of oil
  - 10+ billion tonnes of CO₂ storage capacity in depleted oil fields
- Near term opportunities for Carbon Capture, Utilization, and Storage
- Can facilitate long-term transition to low carbon energy generation

<table>
<thead>
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<th>Cluster</th>
<th>Active Projects</th>
<th>Best Practices, Million Barrels</th>
<th>Next Generation, Million Barrels</th>
<th>Additional Technically Recoverable, Million Barrels</th>
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<td>Permian</td>
<td>58</td>
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<td>(non-Texas)</td>
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Thank you