

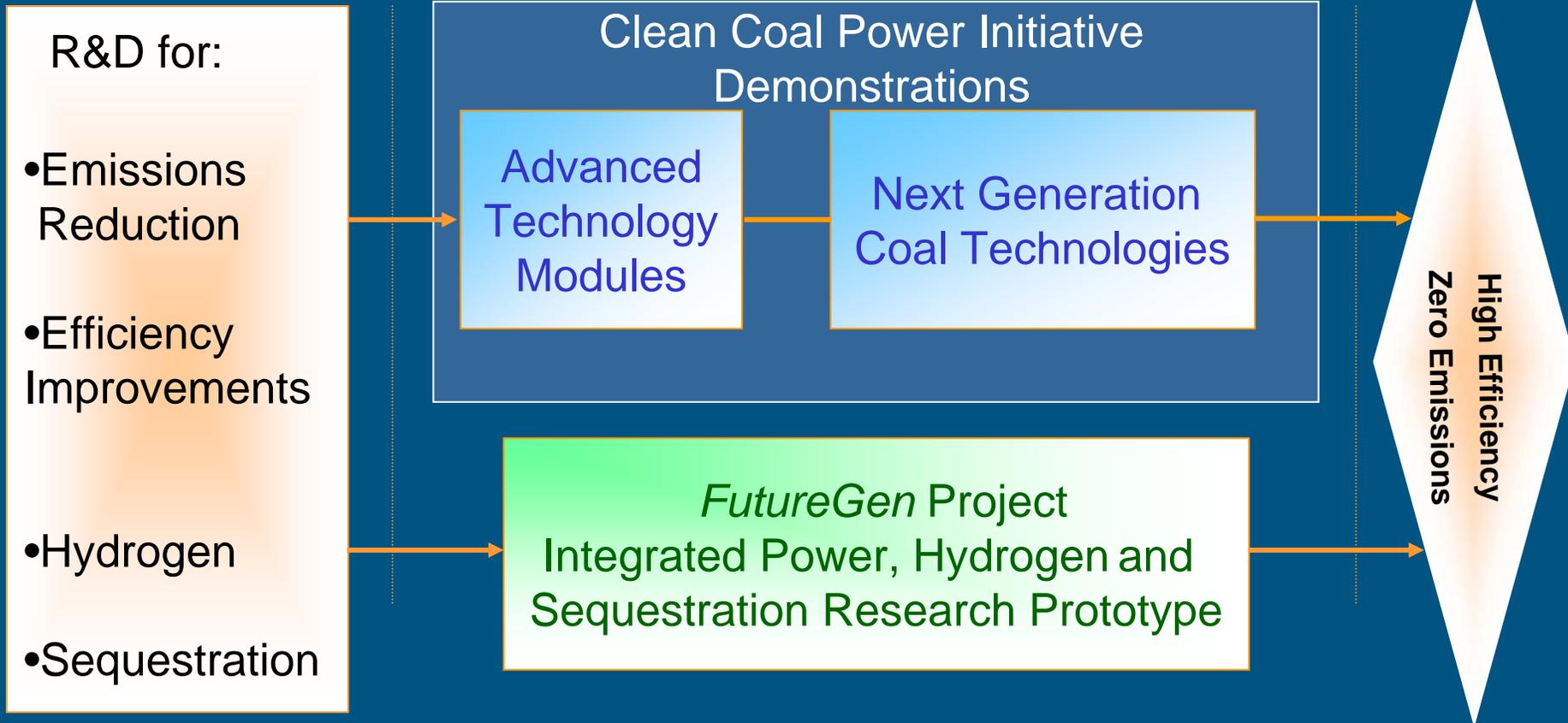
FutureGen and Clean Coal Power Initiative



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U.S. Department of Energy
November 18, 2005



US DOE Coal Research, Development, and Demonstration Program



Clean Coal Technology Demonstration

Building on a Successful Track Record...



➤ The 1985-93 Clean Coal Technology Program

- \$5.2 billion effort (DOE: 34%)
- 38 projects in 18 States
- 30 technical successes; 14 commercial successes
- Cleaner systems now on 75% of U.S. coal plants
- One-half to 1/10th cost of older systems

CCT Program Success Stories

Advanced Pollution Controls

- Installed on 75% of U.S. coal plants
- 1/2 to 1/10 cost of older systems

FGD Scrubbers



Low-NO_x Burners

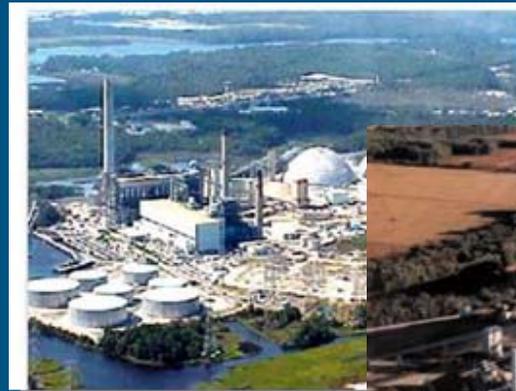
HAPS & Hg Data

- Quantified HAPS Levels
- Basis for Hg Regulations



Advanced Coal Power Systems

- World's largest CFBC power plant
- Two "super-clean" coal-based IGCC



JEA CFBC



Tampa IGCC

Wabash
IGCC

Projects in CCPI – Round 1

**Great River Energy
Lignite Fuel Enhancement**
\$11M – DOE
\$11M – GRE

**Wisconsin Electric Power Co.
TOXECON Multi-Pollutant Control**
\$25M – DOE
\$25M – WEP

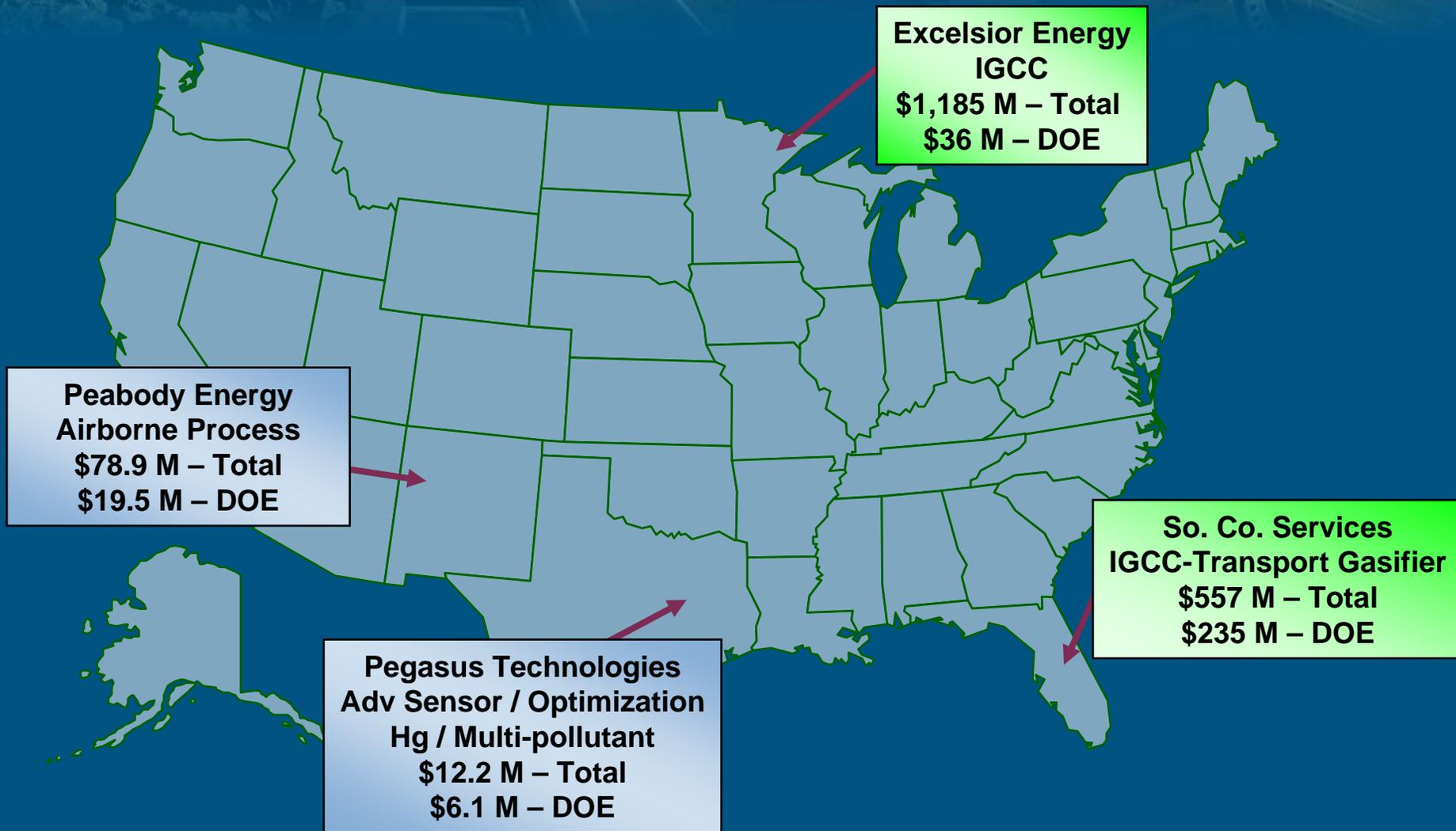
**NeuCo, Inc. Integrated
Optimization Software**
\$8M – DOE
\$10M – NeuCo

**WMPI PTY., LLC Coal-to-
Clean Fuels and Power**
\$100M – DOE
\$512M – WMPI

**Western Greenbrier
Clean Coal Co-Production**
\$107M – DOE
\$107M – WGC

**U. of Kentucky Research Foundation
Multi-Product Coal Utilization**
\$4M – DOE
\$5M – UK

Clean Coal Power Initiative (CCPI) – Round 2



Tomorrow's Energy Plant



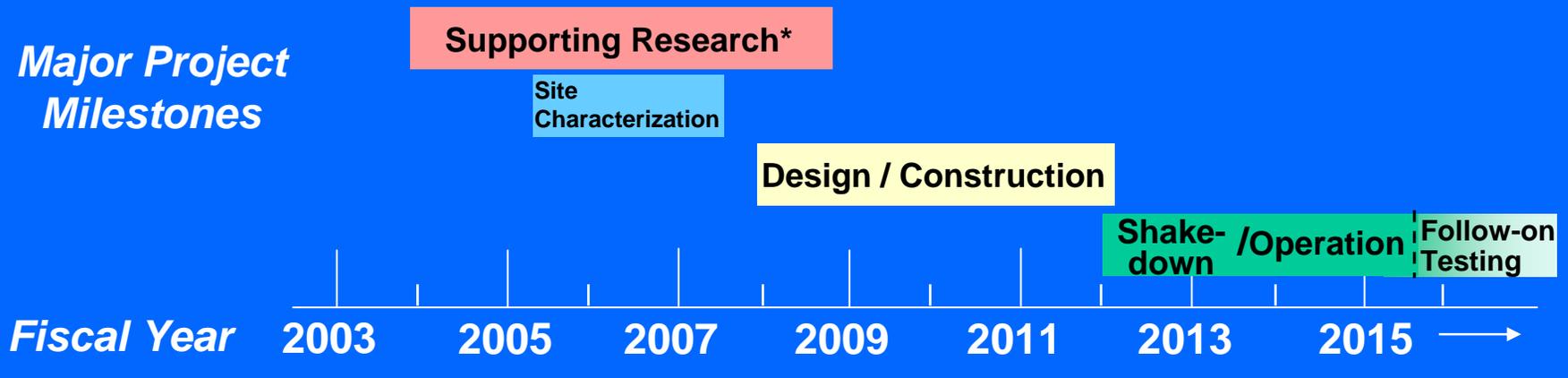
The goal of the FutureGen research project is to establish the technical feasibility, economic viability and broad acceptance of co-producing electricity and hydrogen from coal with essentially zero emissions, including carbon (sequestration).



FutureGen Goals

- **Design, construct and operate a 275 MW prototype plant that produces electricity and hydrogen fuel while sequestering CO₂ at an annual rate of 1-2 million metric tons.**
- **Sequester at least 90 percent of CO₂ initially and up to 100 percent sequestered eventually.**
- **Prove the effectiveness, safety, and permanence of CO₂ sequestration through validating the technology at large scale under real world conditions.**
- **Establish technology standards and protocols for CO₂ measuring, mitigation, and verification.**
- **Validate the engineering, economic, and environmental viability of advanced coal-based, zero emission technologies for commercial readiness in 2020.**

Project Schedule - Key Events



* Supporting research includes research embedded in the FutureGen project and additional research in FE's carbon sequestration, IGCC, turbines, and fuel cell R&D programs.

The FutureGen “Alliance”



- The Alliance presently consists of eight organizations representing over 15% of the U.S. coal-fired electricity generation and over 40% of the U.S. coal production.
- The Alliance is geographically diverse, including both eastern and western domestic coal producers and coal-fueled electricity generators.
- The Alliance is resource diverse by including producers and users of the full range of coal types.

- American Electric Power
- CONSOL Energy Inc.
- Kennecott Energy Company, a member of the Rio Tinto group
- BHP Billiton
- Peabody Energy
- Foundation Coal Holdings (Formerly RAG)
- Southern Company
- China Huaneng Group



Further Information

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