FutureGen™
ALLIANCE

Clean Energy for a Secure Future

FutureGen
The Right Project at the Right Time

Rice Global E&C Forum

September 25, 2007

www.FutureGenAlliance.org

Agenda

- Project Overview
  - Clear objectives
  - Organization
- Technology
  - Current schedule
  - Surface
  - Subsurface
- Siting
  - Site Comparisons
  - EIS key dates
  - Draft EIS public hearings
- Summary

FutureGen™ ALLIANCE

Clean Energy for a Secure Future

PROJECT OVERVIEW

Project Overview - Clear Objectives

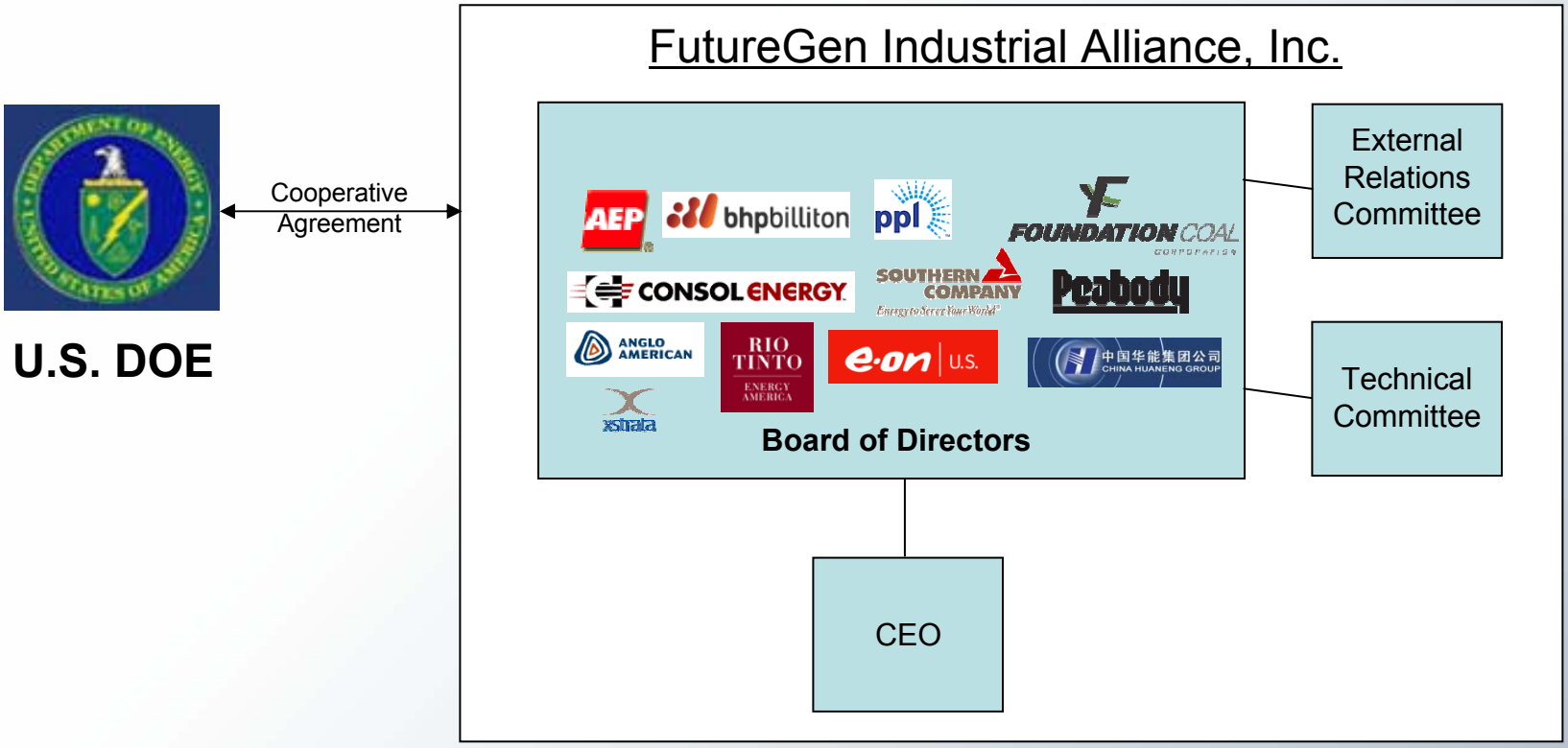
- Design, build, and operate a near-zero emission coal-fueled power plant including:
  - Capturing and sequestering more than one million metric tons of CO_2 per year in a deep saline geologic formation
  - Near-zero levels of NOx, SOx, PM, and Hg
- Facility on-line by 2012
- Advance near-zero emission technology so that future plants will be cost-effective
- Build stakeholder acceptance

Project Overview - Organization

- Industry
  - Twelve leading companies with operations on six continents
  - The Alliance is a non-profit 501(c) 3 organization
- Governments
  - United States, (discussions with China, India, Japan, South Korea and Australia underway)
- Partners
  - Technical and subsurface support from Battelle
  - Engaged with world-class technical experts
  - Engineering Construction Management surface plant support from Washington Group

*1Q 2004$

Project Overview - Organizational Structure



Project Overview
Importance of the Government Role

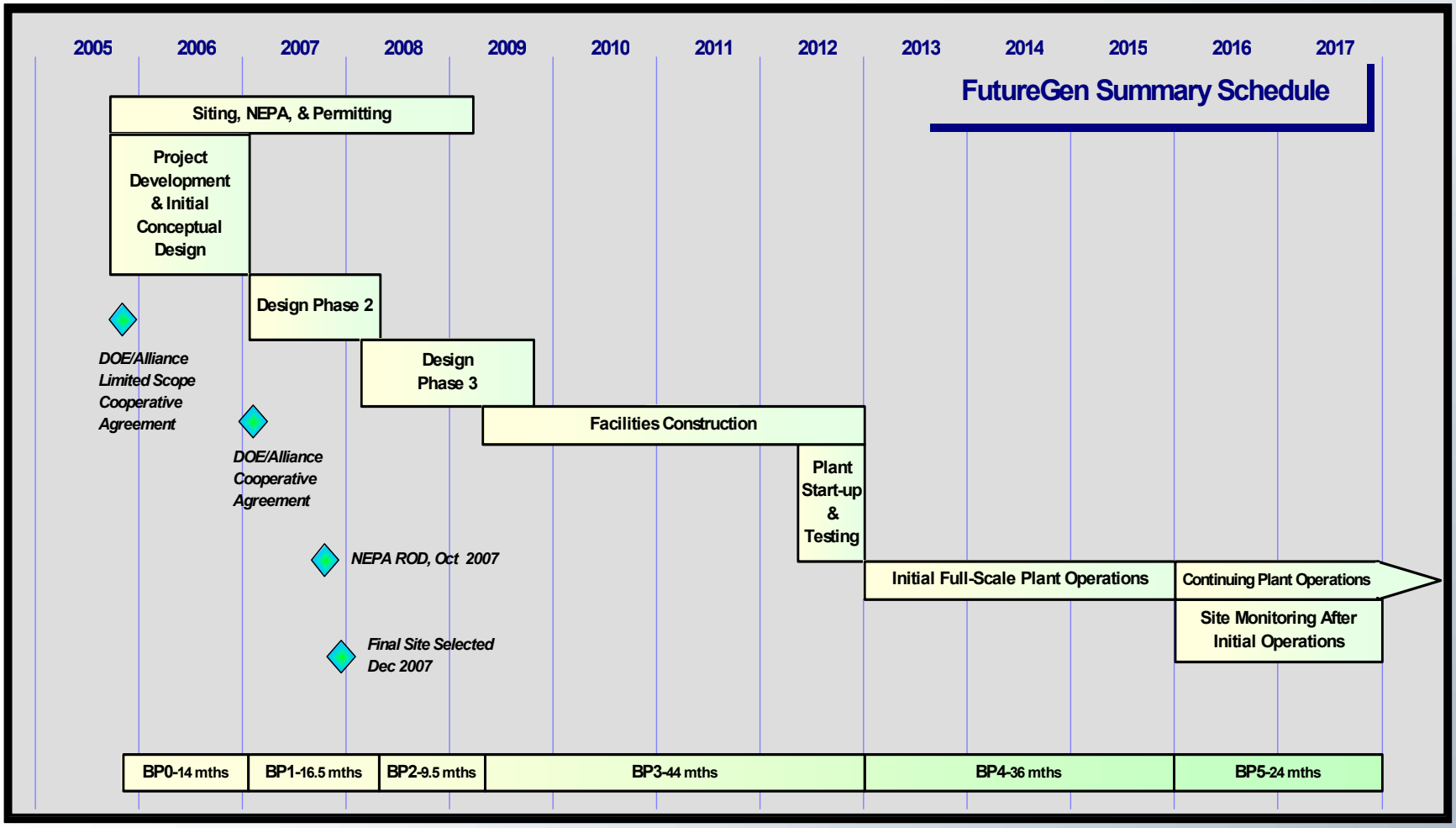
- Public benefit project
  - Could help fundamentally transform the global energy system and address the public's climate change concerns
  - Will lay the technical foundation for monitoring CO2 sequestration, its long term effects, and permanency
  - Industry's participation is on a non-profit basis
- Research on a first-of-a-kind technology
  - No IGCC plants currently with carbon capture and sequestration in the world.
  - Widely recognized that governments have an important cost-sharing role in pre-competitive research
- Global applicability of the technology is critical
  - Governments are uniquely positioned to build international partnerships that will strengthen acceptance of near-zero emission coal technology

FutureGen™ ALLIANCE

Clean Energy for a Secure Future

TECHNOLOGY

Technology - Project Schedule

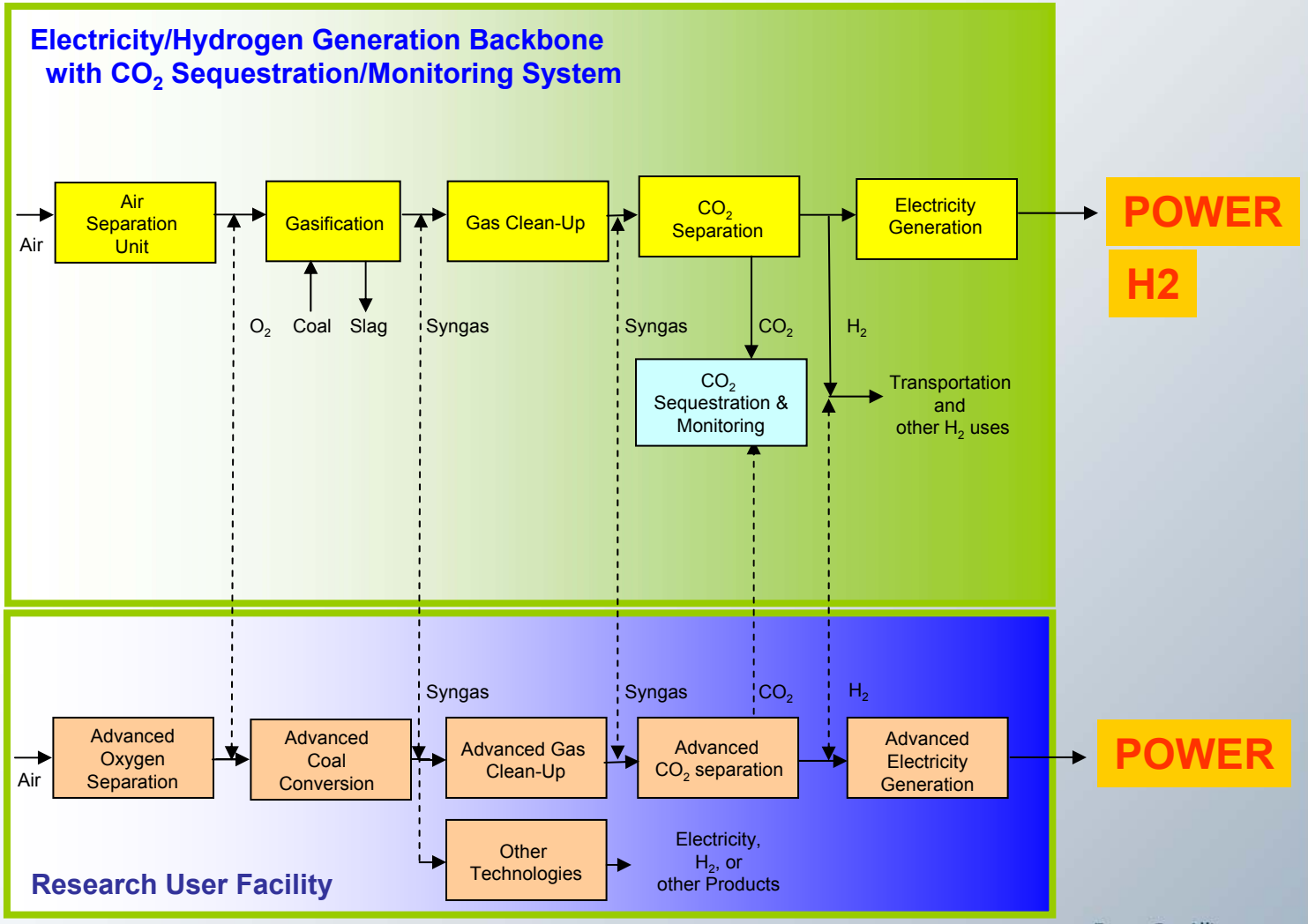


Technology - Facility Overview

State-of-the-Art Gasification Technology

Sequestration

Research User Facility

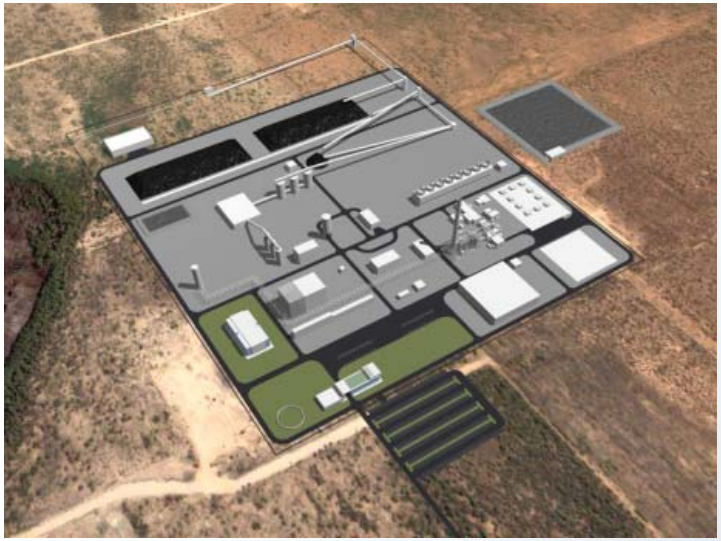


Technology Update- Surface Design

- ECM contract awarded to Washington Group in May 2007. WG has developed a overall process design that is driven by goals/objectives of the project
- RFI/RFP process underway for main blocks of the facility with a focus on long lead items
- Subscale system evaluation work underway to understand how to use slipstreams and implications of that use.
- Goal is to push the technology envelope – looking for ideas and ways to accomplish this goal and still meet the overall FG objectives

Technology - Architectural

- Conceptual Design



Technology – Surface Facilities
Request for Information (RFI)

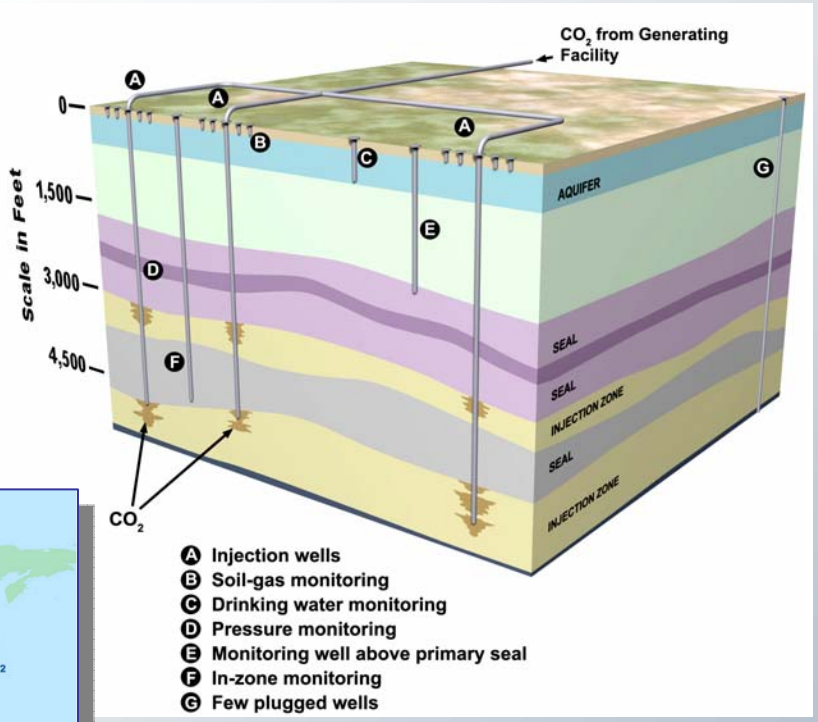
	Issue Date	Response
Gasifier	26-Jun-07A	4-Sep-07A
Combustion Turbine Generator (CTG)	9-Jul-07A	30-Aug-07A
Syngas Shift Catalyst	12-Jul-07A	13-Aug-07A
Acid Gas Removal Unit (AGRU)	21-Aug-07A	29-Oct-07
CO2 Compression	31-Aug-07A	13-Oct-07
Air Separation Unit (ASU)	2-Nov-07	31-Dec-07
Sulfur Recovery	8-Nov-07	20-Dec-07
Water ZLD System	27-Nov-07	21-Dec-07

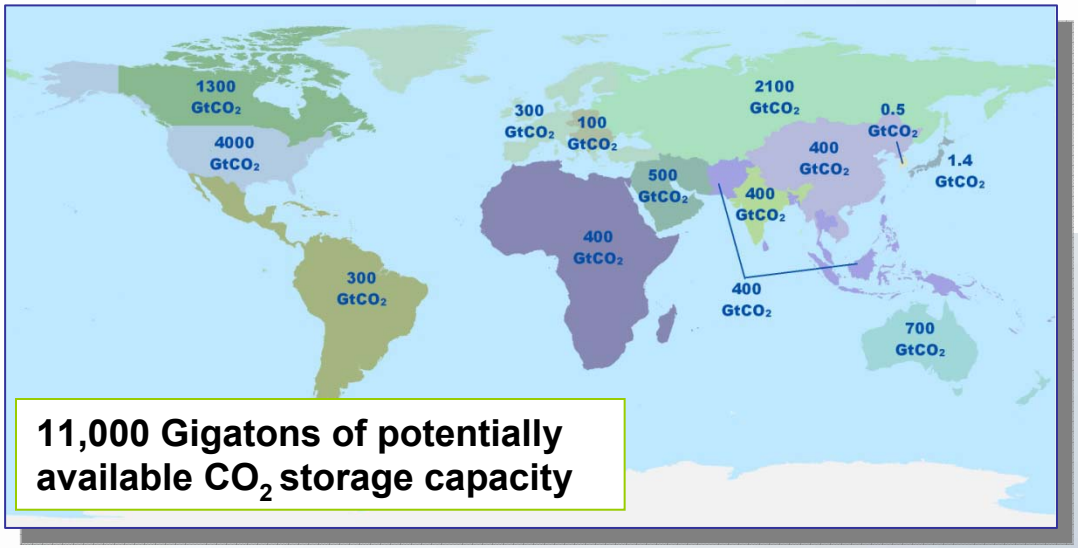
Technology – Surface Facilities Request for Proposal (RFP)

	Issue Date	Response
Site Seismic	1-Aug-07A	17-Aug-07A
Environmental Permitting Subcontract	27-Aug-07A	24-Sep-07
Gasification Island	5-Nov- 07	16-Jan-08
Heat Recovery Steam Gen (HRSG)	3-Dec-07	31-Jan-08
Combustion Turbine Generator (CTG)	4-Feb-08	17-Mar-08
Steam Turbine Generator (STG)	11-Feb-08	7-Apr-08
Acid Gas Removal Unit (AGRU)	3-Mar-08	14-Apr-08
CO2 Compressor	14-Apr-08	9-Jun-08
Air Separation Unit (ASU)	2-May-08	11-Jul-08

Technology - Advances Sequestration Technology

- Focused on deep geologic formations that are globally available
- Extensive modeling and monitoring program planned to verify the safety and permanence of CO_2 storage.





11,000 Gigatons of potentially available CO_2 storage capacity

Technology - Candidate Site Features

Mattoon

- Injection on-site
- ~8,000 ft deep
- Mt. Simon sandstone formation

Tuscola

- Injection off-site (~10 miles)
- New pipeline to be constructed
- ~8,000 ft deep
- Mt. Simon sandstone formation

Brazos

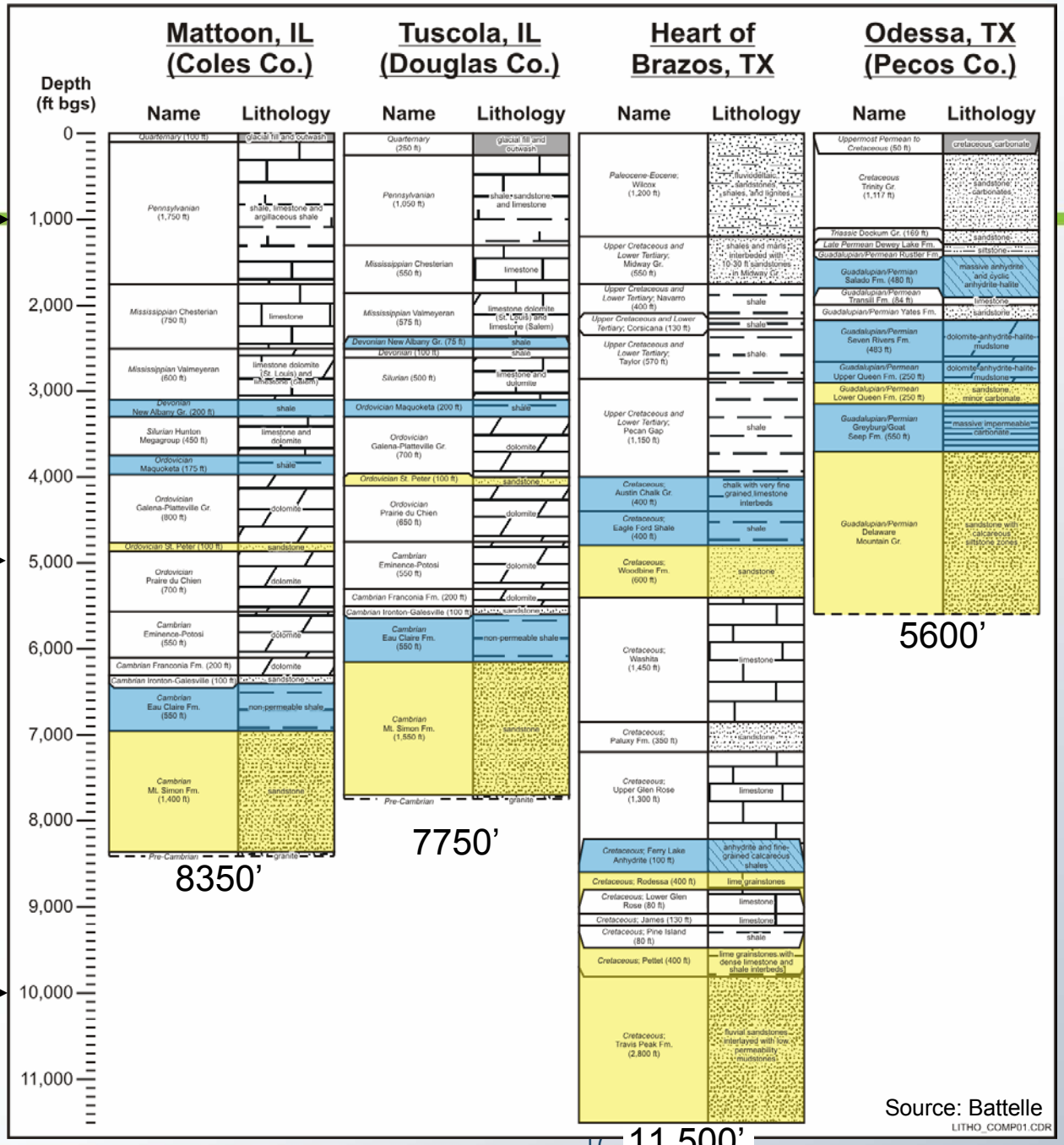
- Injection at two sites (~25 and 33 miles)
- New pipeline to be constructed
- ~6,000 ft deep in the Woodbine formation
- ~11,000 ft deep in the Travis Peak formation

Odessa

- Injection off-site (~56 miles)
- Potential to use existing pipeline with minor upgrades
- ~6,000 ft deep
- Guadeloupe Sands

FutureGen™ ALLIANCE
Clean Energy for a Secure Future

Subsurface-Comparison of Sites by Depth



Source: Battelle
LITHO_COMP01.CDR

Seal
Injection

Technology Update – Subsurface Design

- Working on final characterization of all four sites to develop plans for injection and monitoring and to support side-by-side site comparisons
- Seismic permitting contract awarded
- Seismic Contractor RFP bid evaluation underway
- Drilling Contractor RFP will be out in January, 2008

FutureGen™ ALLIANCE

Clean Energy for a Secure Future

SITING

Siting – Draft EIS

- All four sites worked on simultaneously
- Strong support from Illinois and Texas State FG teams
- Three volume, 2200-page analysis of the potential environmental impacts
  - Summary
  - Volume I – Introduction, Alternatives, Summary of Conclusions
  - Volume II – Affected environment and environmental consequences at each site
- Draft EIS concludes no significant adverse impacts

FutureGen
Draft Environmental Impact Statement

March 2007

Siting - EIS Key Dates

- EIS process started – August 2006
  - EIS process kickoff
  - First Public Hearings
- EIVs Complete – December 2006
- Preliminary Draft EIS – February 2007
- Draft EIS submitted to public – June 1, 2007
- Draft EIS public hearings – June 19,21, 26, 28, 2007
- Preliminary final EIS completed – August 2007
- DOE Record of Decision – November 28, 2007 (est.)
- Alliance Final Site Decision – December, 2007(est.)

Siting – Site Comparisons

- In parallel with the EIS process, the Alliance is working on a detailed side-by-side analysis of each site.
- Each site provided a Best and Final Offer (BAFO) based on the best value portions of their original submittals in 2006 and on guidelines provided by the Alliance
  - BAFO proposals were received on August 1
  - BAFO proposals are an important element in the side-by-side comparisons
  - Both States developed CO2 ownership and liability limitation legislation which is an element of their BAFO proposals.
- The side-by-side analysis includes the results of our due diligence during the past year, subsurface design work, constructability and construction related analysis, the BAFO proposals, operational considerations, etc.

FutureGen™ ALLIANCE
Clean Energy for a Secure Future

SUMMARY

Summary

- Supports a *technology-based climate change strategy*
  - Mitigates the financial risks of carbon dioxide emissions
- *Validates the cost and performance* of an integrated near-zero emission coal-fueled power plant
  - Advances IGCC technology
  - Advances carbon capture, sequestration, and hydrogen-production technologies
  - Sets groundwork for CO2 sequestration siting and licensing
- Creates the technical basis to *retain coal* in U.S. and global energy mix with a long-term goal of *zero emissions*.
- Enables the public and private sector to *share the cost and risk* of advanced technology demonstration.
  - Platform for emerging technology demonstration.
- FutureGen is real and *moving forward fast*