

# Kentucky Consortium for Carbon Storage

## CO<sub>2</sub> EOR/EGR Focus Group

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# Focus Group Meetings

- Initial consortium meeting on Dec. 7, 2007
- Over 100 in attendance
- Expressed desire to organize overall project by geographic area and project type
- 3 focus groups meeting this week:
  - Wednesday: Western Kentucky deep CO<sub>2</sub> storage
  - Thursday: Eastern Kentucky deep CO<sub>2</sub> storage
  - **Friday: Enhanced oil and gas recovery**



# Outline

- HB 1 funding and directives
- Kentucky Consortium for Carbon Storage
- Vision and expected results
- Project organization and structure
- Preliminary budget development
- Discussion and questions

# Why Are We Here?

- Kentucky HB 1 was passed in a 2007 special session and signed into law August 30.
- Provides financial incentives for coal gasification plants
- Provides \$5 million for carbon sequestration research in Kentucky
- "The Kentucky Geological Survey is encouraged to use these funds to match available federal and private funds to the extent possible."



# 2007 HB 1 Directives

- Quantify the potential for:
  - Enhanced oil and gas recovery
  - Enhanced coalbed methane recovery
- Test the Devonian shale for CO<sub>2</sub> enhanced gas recovery and CO<sub>2</sub> sequestration potential
- Drilling of deep wells in the eastern and western coal fields to estimate sequestration potential

# Vision

- \$5 million is not sufficient to accomplish everything in HB 1
- A joint industry–government consortium is the only way to achieve these objectives
- The **Kentucky Consortium for Carbon Storage** (KYCCS) has been formed by KGS



# Consortium Model

- Industry involvement is necessary for the success of this project
  - Cost sharing and well access
  - Guidance and direction of research
  - Provide expertise not available at KGS
  - Justification of the Commonwealth's investment in carbon management research

# Today's Goals

## Morning

- Identify likely members of the CO<sub>2</sub> EOR/EGR project
- Create a Project Advisory Committee and define its responsibilities
- Discuss and agree on funding structure, funding levels, deadline for participation, other concerns

## Afternoon

- Present our initial technical approach
- Discuss preliminary budget??



# HB 1 Research Organization: 3 Subprojects

- Western Kentucky Deep Sequestration
  - Rick Bowersox and Dave Williams
- Eastern Kentucky Deep Sequestration
  - Steve Greb and Warren Anderson
- **CO<sub>2</sub> EGR/EOR**
  - **Devonian shale CO<sub>2</sub> EGR, Brandon Nuttall**
  - **CO<sub>2</sub> EOR, Marty Parris**
  - **Enhanced coalbed methane production, Cortland Eble**
- Public Education and Outreach
  - Mike Lynch

# Subproject Integration

- Subprojects will run concurrently
- Communication between teams important
- Efforts will be made to coordinate work schedules and contracts to extent possible for cost savings
  - Seismic acquisition, drilling, logging

# EOR/EGR Project Goals

Demonstrate CO<sub>2</sub> EOR technology and applications in Kentucky reservoirs.

Test novel EGR concepts in the Devonian black shale.

Refine estimates of CO<sub>2</sub> that could realistically be used for EOR/EGR in Kentucky.



# Impact of Results

- Kentucky oil and gas fields vary in suitability for CO<sub>2</sub> EOR/EGR
- Demonstration sites will be as representative as possible, however, a successful project will not prove that CO<sub>2</sub> EOR/EGR will work everywhere
- We cannot guarantee success – there is risk involved

# Project Structure

- Industry cost-share to be administered separately by subproject
- University of Kentucky Research Foundation (UKRF) is a not-for-profit 501(c)(3) corporation
- This existing legal structure should suffice for tax benefits to contributors
- Maximum tax benefits may be realized through a gift mechanism, but this would preclude direct benefit or involvement in project decisions



# Another Option

- The western Kentucky group has decided to form a separate 501(c)(3) corporation to handle the industry cost share funds. Advantages include:
  - Liability protection
  - Avoid university overhead fees
  - More control/governance on industry money

# Project Advisory Committees (PACs)

- Separate advisory committees proposed for 3 subprojects
- Equal representation from major participating companies, the Commonwealth, and KGS
- Advisory committee responsibilities:
  - Major project decision points
  - Major expenditures
  - Main contact point for communications
  - Technical support, guidance, and oversight

# PAC

- HB 1 mandates that KGS lead the technical effort with input and collaboration from partners
- KGS to evaluate sites and develop objectives based on technical merit
- KGS will present major project decisions to PAC for agreement on significant expenditures



# Liability of Sponsors

- Sponsor liability for university research:
  - UK cannot indemnify sponsors, but we know of no case where a sponsor has been held liable for research activity
  - UK legal counsel is currently looking into this
- Liability related to injected CO<sub>2</sub> is a concern in all CO<sub>2</sub> projects (like FutureGen)
  - This project will involve small volumes of CO<sub>2</sub>
  - Will follow lead established by DOE demonstration projects
  - Liability insurance could be explored

# Confidentiality

- Data and results of project to be published
  - No confidentiality
- Confidential data provided by consortium members to aid in field or site evaluation will be held confidential within the consortium

# Probable Participants CO<sub>2</sub> EOR/EGR

- Commonwealth of Kentucky
  - Portion of \$5,000,000 total funding (to be determined)
- E.ON U.S.
  - Financial support for entire project (priority is W. Kentucky deep storage)
- Schlumberger Carbon Services
  - Consulting services, discounted logging and well services, Petrel and ECLIPSE software donation
- Case Drilling Co.
  - EOR western Kentucky



# Probable Participants CO<sub>2</sub> EOR/EGR

- Perry County Coal (TECO)
  - Devonian shale wells for EGR
- Hard Rock Drilling Co.
  - Interested in EOR/EGR in western Kentucky
- Travell Energy, Bowling Green
  - Warren County oil leases for EOR
- Interstate Natural Gas
  - Engineering services, oil wells, Devonian Shale wells



# Pending Participants

## CO<sub>2</sub> EOR/EGR

- Chesapeake Energy
  - Possible EOR/EGR project
- Cumberland Valley Resources LLC
  - EOR projects
- Pike County
  - Proposal for EGR/EOR
- Miller Energy/Bretagne
  - Probable EOR work in eastern or western Ky.

# Federal Cost Share

- No federal dollars identified yet for CO<sub>2</sub> EOR/EGR projects
- Appalachian Basin DOE CO<sub>2</sub> partnership (Battelle) a possibility
- DOE/NETL (Morgantown) will be issuing a RFP for CO<sub>2</sub> EOR projects in the near future

# Project Schedule

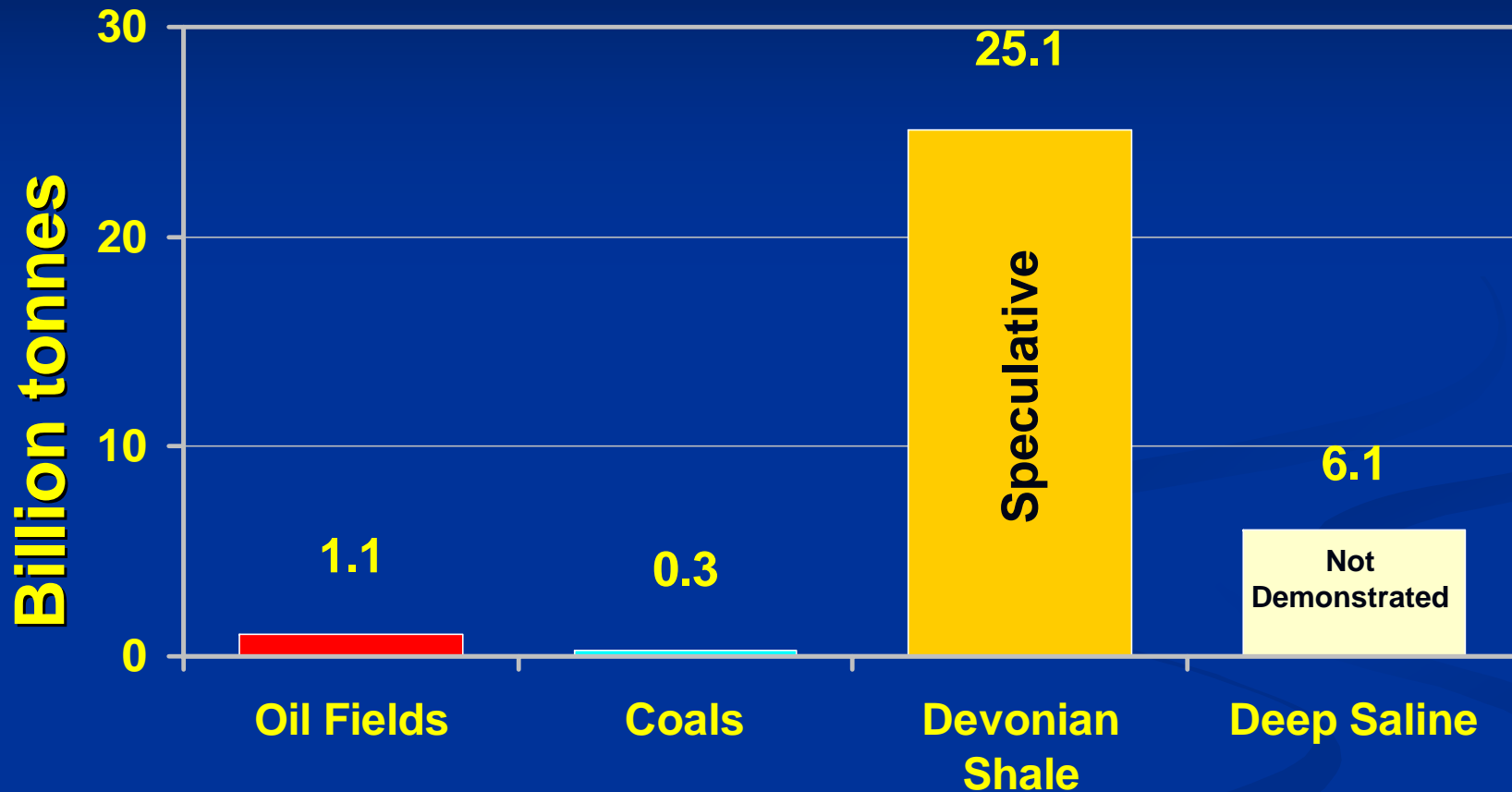
- Overall HB 1 project to take 3–4 years
- EOR/EGR projects will vary in timing, but we need to identify candidates ASAP
- Need to allow time to see meaningful results

# Discussion Points

- Project Advisory Committees
- Liability concerns
- Project schedule
  - Organization and participation deadline
  - Technical milestones
- Identification of additional participants
- Budget
  - Financial contributions: equal shares or variable?



# DOE Phase I CO<sub>2</sub> Storage Estimates



While CO<sub>2</sub> EOR potential is significant, deep saline or Devonian shale storage will be needed to handle expected volumes

# What's Next?

- Participation decisions requested by Jan. 15
  - Consortium will remain open after that date
- We expect the level of industry funding will vary
- In-kind participation is welcomed
- A company's participation and funding level cannot be held confidential
- Project results to released immediately

# Proposed Program Budget CO<sub>2</sub> EOR/EGR Subproject

State Funds		Industry Match	DOE	Total
EOR	\$850K	\$850K	\$250K	\$1.95M
EGR/ CBM	\$850K	\$850K		\$1.7M