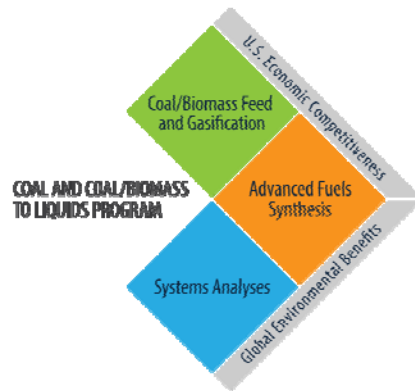
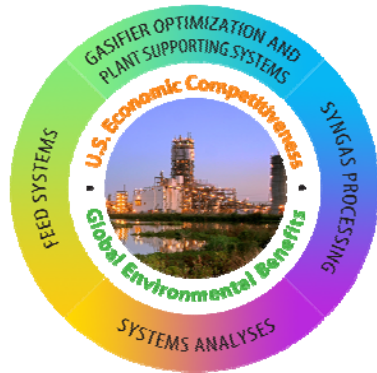


This meeting is “open- to-the-public”

- All information presented at this meeting must meet criteria for public sharing or have already been published and available in the public domain.
- Foreign nationals, who may be present today, have not been approved for access to DOE information and technologies.
- Please do not communicate information that is considered official use only, proprietary, sensitive, restricted or protected in any way during the presentations or during any sidebar or casual conversations.
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2015

Gasification Systems

and

Coal & Coal-Biomass to Liquids

Workshop

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August 10, 2015



U.S. DEPARTMENT OF
ENERGY

National Energy
Technology Laboratory

Workshop Purpose

- Too many constraints!!
 - *Show people most of the technologies the programs are developing*
 - *Enable new ideas for collaboration*
 - *Encourage outside the box thinking*
 - *2 days maximum*
- Think of it as speed dating technologies
- Be a rebel – play hooky if you need to
 - **Making connections useful to you is the most important thing that can happen at the conference**
 - **Selfishly, the second most important thing you can do is give me fresh ideas: fundamental concepts, technologies integration, collaborations, etc.**

Meeting Logistics

- Sessions will start and end on time
- To save time we will forgo speaker bios and acknowledgements
- There is time set aside for Q&A during the sessions
- We have posters set up – please tour them and ask questions
- There is a small conference room available on a first come first serve basis for any private meetings you may like to have
- Breakout Session “Methane Reforming (SMR) Hybrid Concepts” was changed to “New Coal and Biomass to Liquids Concepts”
Feel free to change the session you’ve already signed up for
- Except for the Techno-Economic Analysis Short Course, the *breakout sessions tomorrow afternoon are for brainstorming, information exchange, and energetic discussion!*

My Thoughts

- The rest of the world will continue to use coal & emit CO₂
- U.S. coal use will continue to decrease if (1) NG and Oil costs don't increase and (2) if coal conversion improvements are only incremental
- Future U.S. coal role may be limited to exports, where others get it's value, and release its CO₂
 - Economies in coal states damaged through lack of U.S. use
 - As coal use wanes, reliable power in U.S. may not be as solid as it could be

**Coal is on the Ropes.
Time to be bold.**

What do we Have that is New?

- **Advanced manufacturing**
 - Rapid cold flow prototypes
 - Organic shapes
 - Maybe pressure reactors in the future
- **Increasingly Powerful Multiphase Modeling**
- **Alternate energy, nano technologies, etc.**

**Maybe it's time to think of
coal in different terms**

What can Coal Do That...

- **Oil Can't:**
 - Stable prices; lower cost
 - Co-process more seamlessly with biomass
 - Encapsulate carbon in slag
- **Natural Gas Can't:**
 - Stable prices
 - Produce aromatics and tars
 - Co-process more seamlessly with biomass
 - Encapsulate carbon in slab
- **Biomass Can't:**
 - Lower production cost; lower transportation costs; lower storage cost
 - More experience burning and gasifying

MAYBE:

- **Smaller reactors to enable co-feeding with biomass**
- **Go after tars and aromatics**
- **Go after carbon encapsulation/reuse**

U.S. Coal Demonstrated Reserve Base

Approximately 485 Billion Short Tons

Anthracite



Bituminous

Illinois, West Virginia, Ohio, Pennsylvania, W. Kentucky

Sub-Bituminous

Montana, Wyoming

Lignite

Montana, Texas, Mississippi, North Dakota

China ~126 Billion Short Tons

Bituminous & Anthracite ~54%

Sub-Bituminous ~30%

Lignite ~16%

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