

# ***ConocoPhillips Gasification Outlook***

## ***Gasification Technology and IGCC – Programs & Progress***

McIlvaine Company Hot Topic Hour  
August 19, 2010

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**# 6 on Fortune 500 List (2010)**

**3<sup>rd</sup> Largest U.S. Integrated Energy Company**

**4<sup>th</sup> Largest Refiner in World**

**7<sup>th</sup> Largest Reserve Holder (Non-Govt)**

**Approximately 29,900 Employees**

**Operations in nearly 40 Countries**

**Oil**

**Coal**

**Oil Sands**

**Natural Gas**

**Petroleum Coke**

**Transportation Fuels**

**Coal Bed Methane**

**Gasification**

**Electricity**

**BioFuels**

**LNG**

**ConocoPhillips**



**ConocoPhillips**

## ADVANTAGES

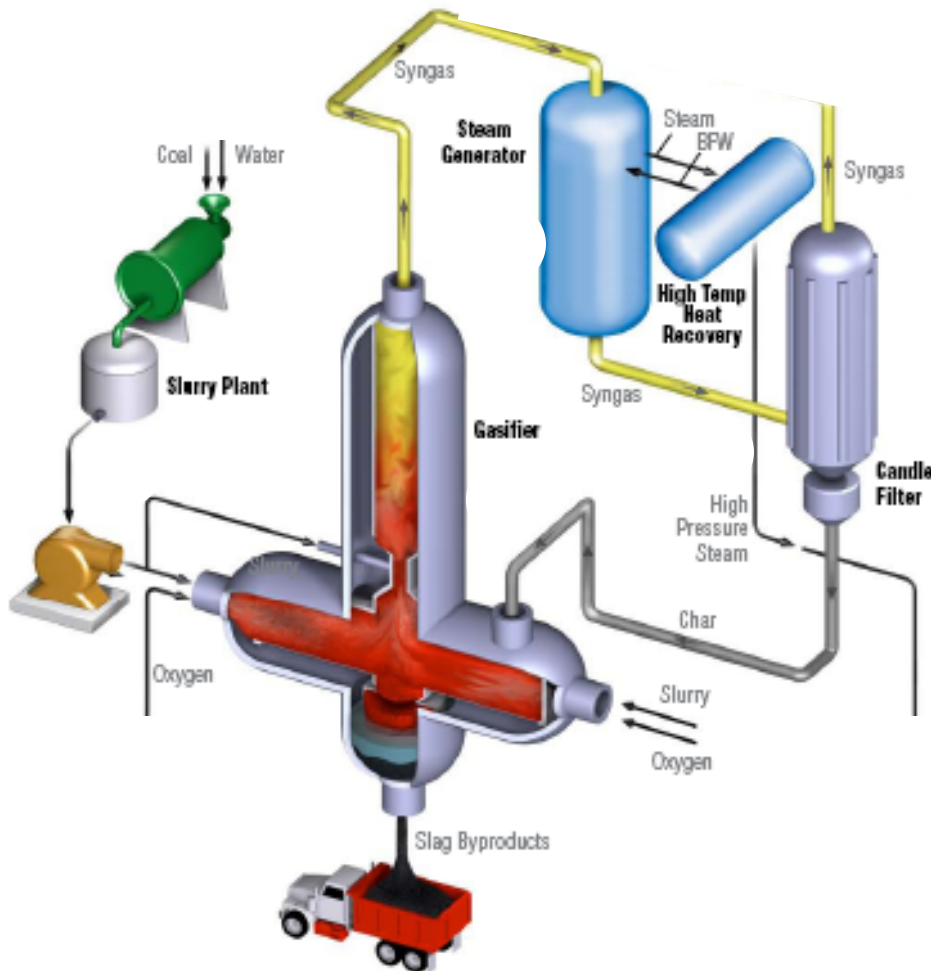
**Two stage for carbon conversion and heat recovery efficiency**

**Separate Fire-tube Syngas Cooler generating HP steam**

**Dry Char Recycle – No Wastewater Generation, No Carbon Lost**

**Continuous Slag Removal – No Lock-hoppers**

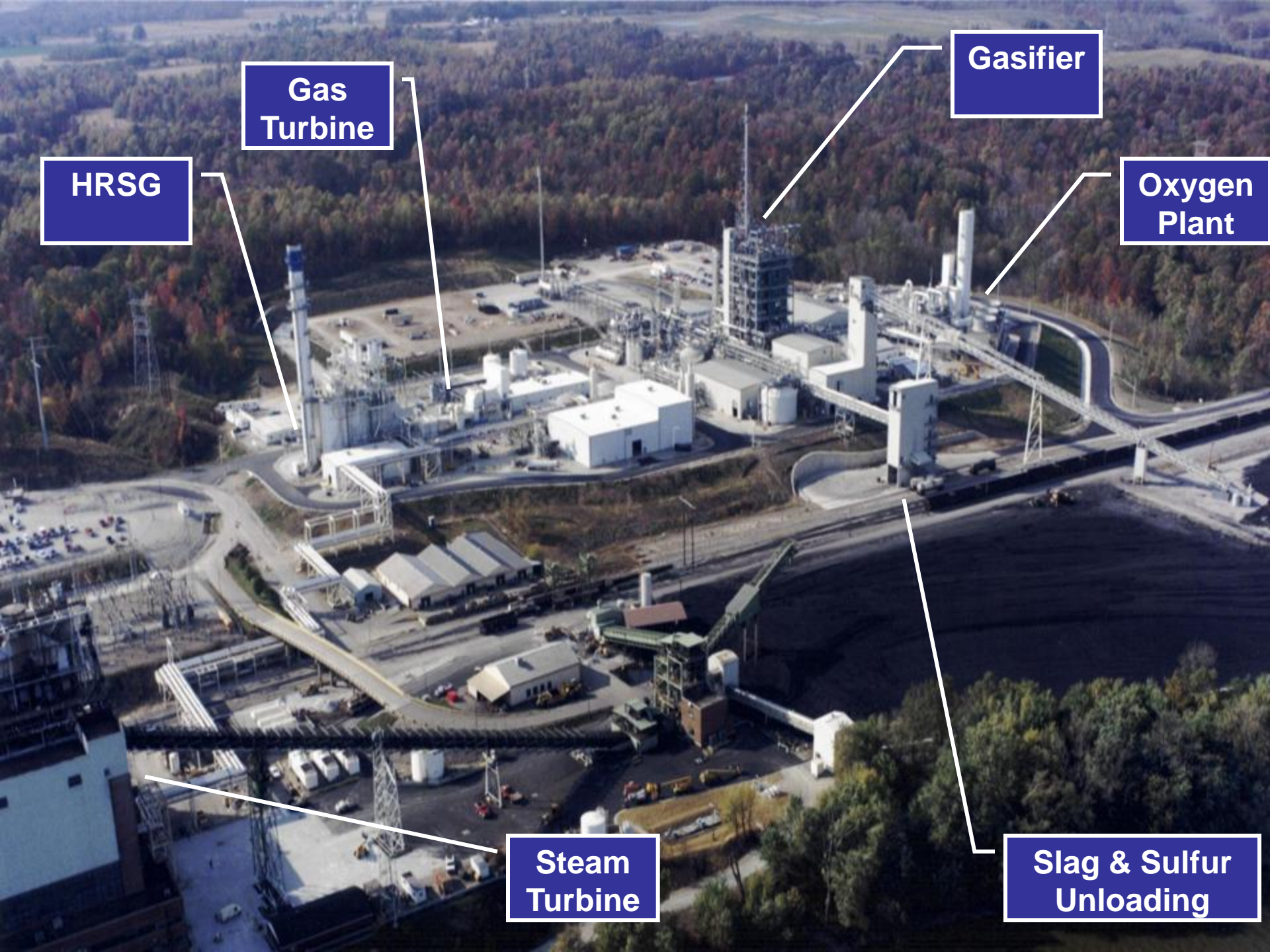
**Single Train Capacity to 3000 mTPD on bit Coal and Petcoke  
4000 mTPD on Sub-Bituminous**



# WABASH RIVER IGCC PLANT

## **One of the Cleanest Solid Fuel Power Plants in the World**

- **Fuel flexibility**
  - 1.7 million tons bituminous coal
  - Over 3.5 million tons of petcoke
- **2500 ton/day bituminous coal feed**
- **Operational since 1995 at Duke Energy's Wabash River Station**
- **262 MWe net output by repowering 1953-vintage PC 100MW STG (+ GTG)**
- **sgSolutions LLC owns Syngas Plant**
- **ConocoPhillips provides technical and professional services on site**



**HRSG**

**Gas Turbine**

**Gasifier**

**Oxygen Plant**

**Steam Turbine**

**Slag & Sulfur Unloading**

# Project Development in 1991

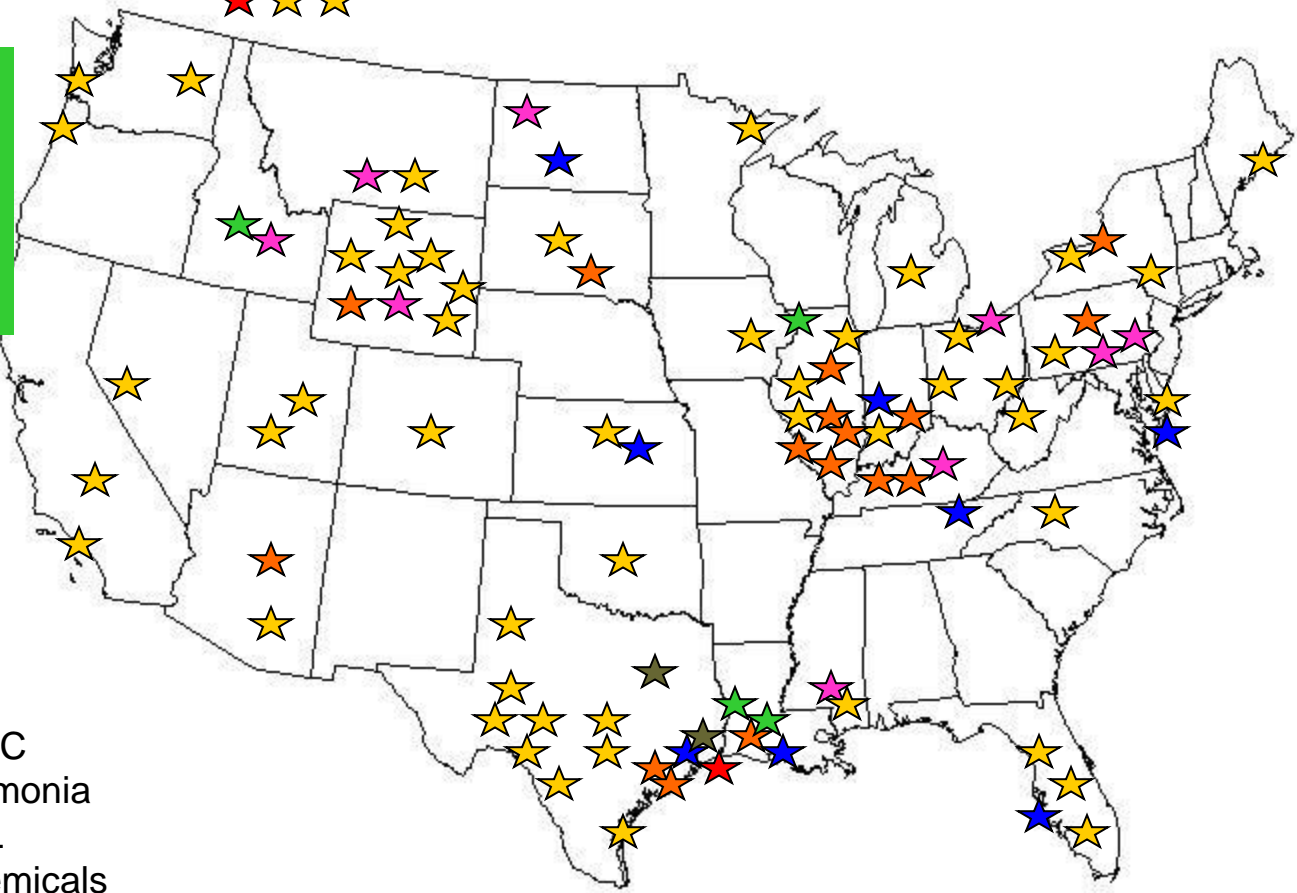
- Unknown & Unproven Technology
- Mild Natural Gas Price Volatility
- Relatively Immature DOE Program
- Strong Community Support
- 50% Cost Share
  
- DOE Selection to Start-Up, including NEPA ~ 4 years

# North American Gasification Projects

2005-2008



1Q2007: General Industry consensus is that 4-8 New, 'Real' projects could be starting up 2011-2014.

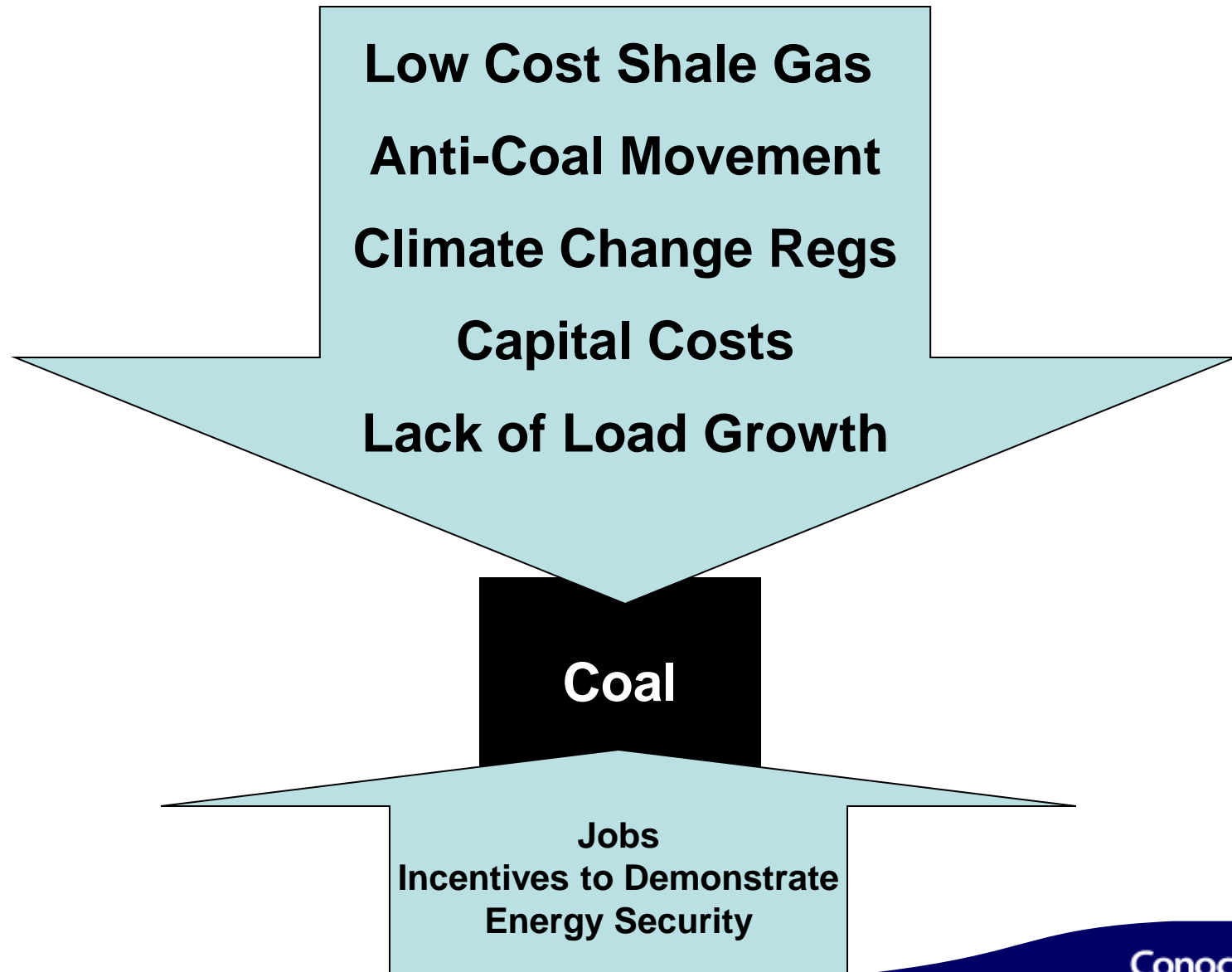


## Projects

- ★ IGCC
- ★ Ammonia
- ★ CTL
- ★ Chemicals
- ★ Hydrogen
- ★ SNG

★ Existing Gasification Facilities

Source: Gasification Technology Council











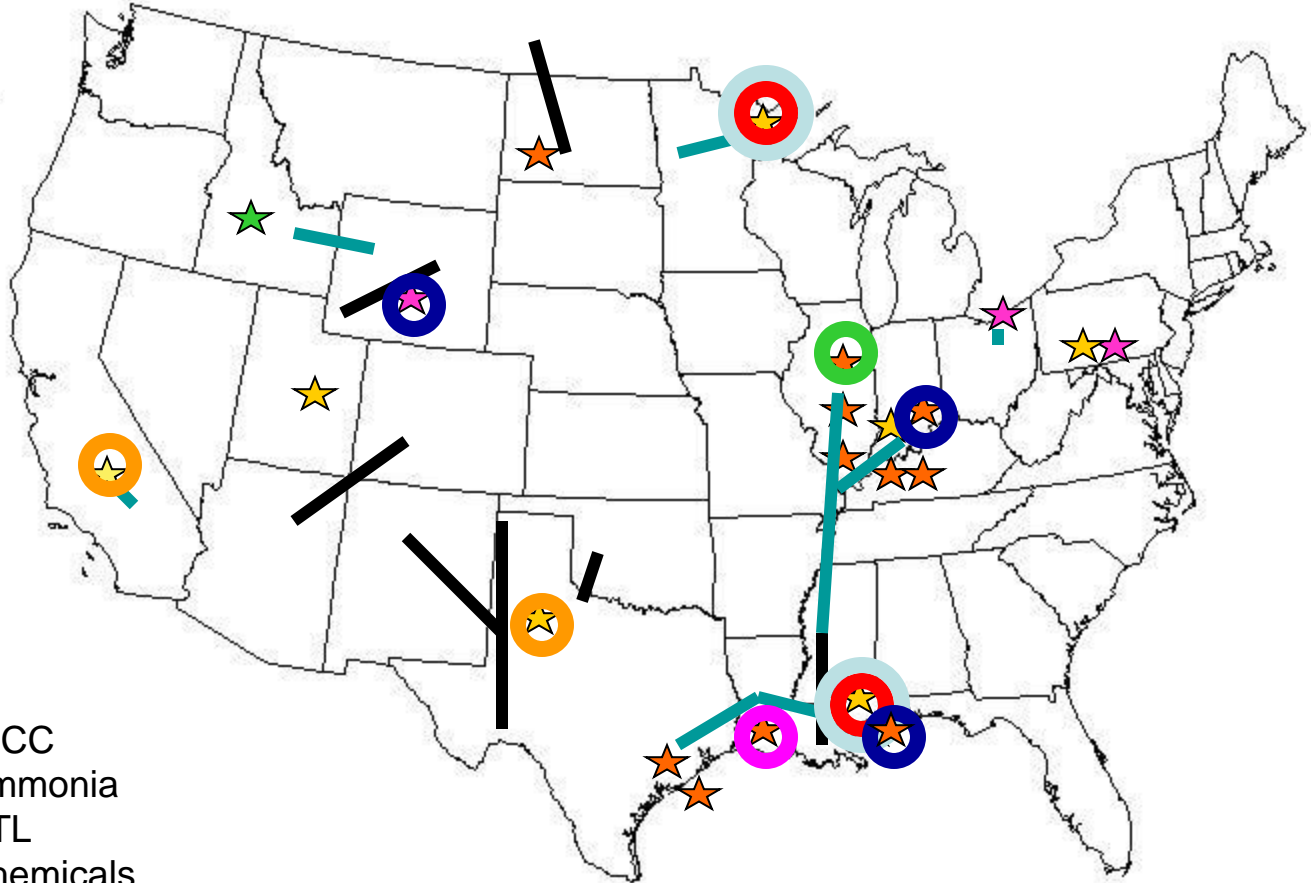
# North American Gasification Projects



Current Development Activity ?

-  CCPI Round 2
-  CCPI Round 3
-  FLG Round 1
-  FLG Round 2
-  Industrial CCS
-  FutureGen

## Projects

-  IGCC
-  Ammonia
-  CTL
-  Chemicals
-  Hydrogen
-  SNG



  General areas of existing and proposed CO2 pipelines

# Mesaba Energy Project

Fuel Flexible IGCC  
600 MW per Phase  
Final EIS received Nov 2009

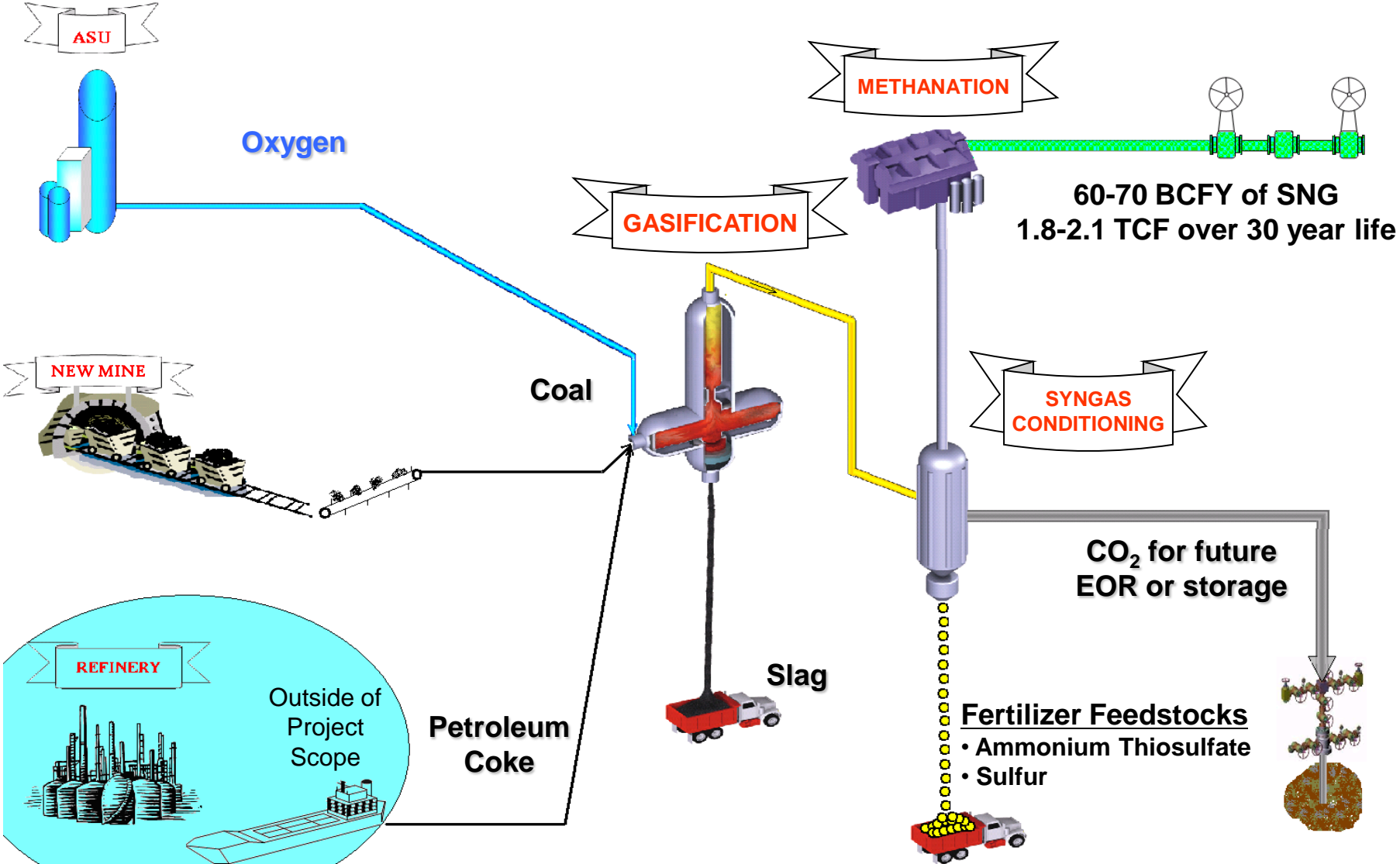


# Kentucky NewGas

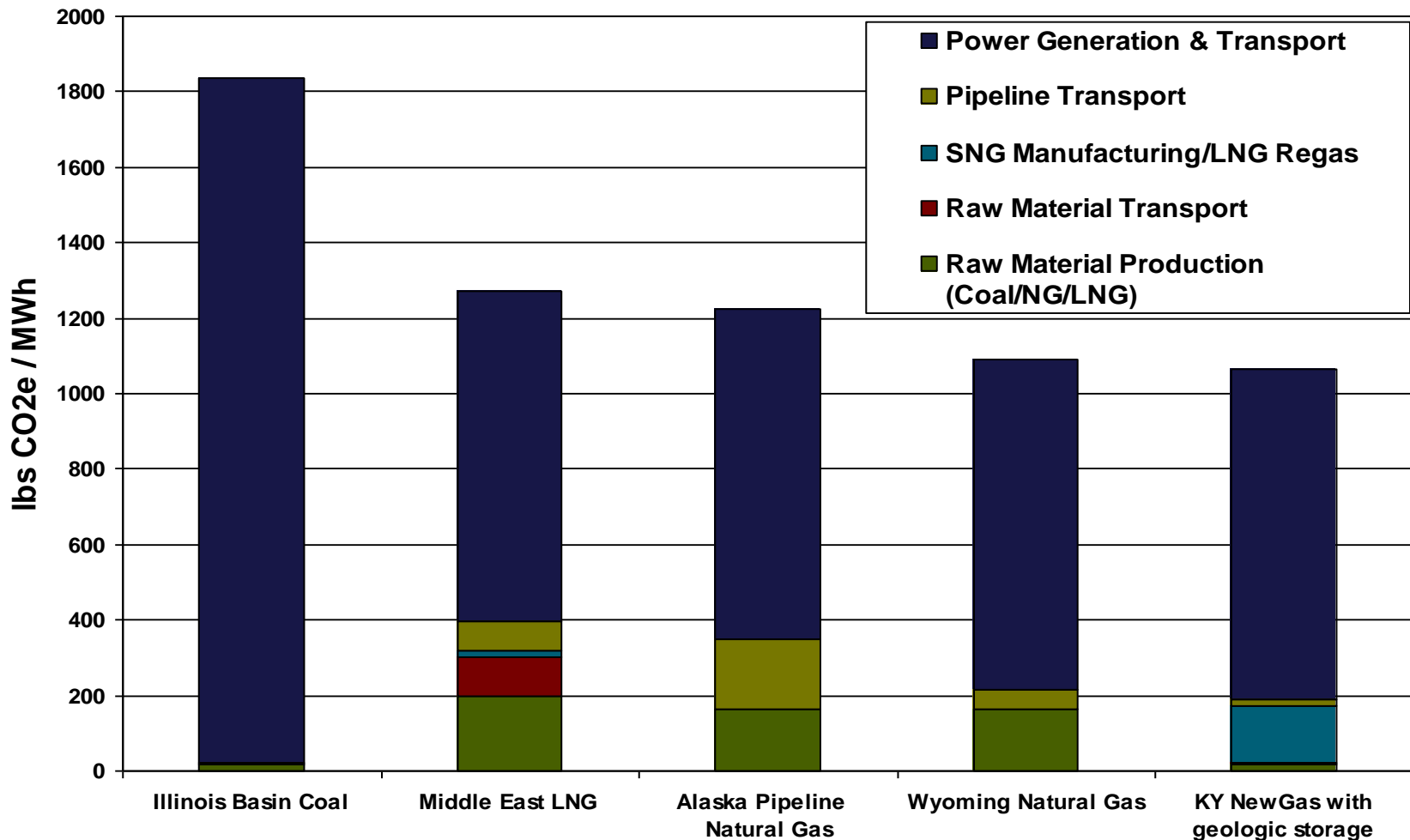


- ConocoPhillips and Peabody Energy are co-developers
- Domestic supply of clean natural gas increased by 60-70 BCF annually
- Emissions are 20 times less than a typical pulverized coal plant
- Greater than 90% carbon capture – “storage ready”

# Project Overview



# CO<sub>2</sub> Emissions from Electricity Generation



Electricity produced from Kentucky NewGas with geologic storage results in lower CO<sub>2</sub> emissions compared to other fossil fuels.

Source: Battelle Memorial Institute study, 2008

# Aggressive Pursuit of Multiple Carbon Solutions

- Funded Western KY CO<sub>2</sub> test well. Early testing indicates good storage potential.
- Negotiating EOR solution
- Collaborating to advance framework for permanent CO<sub>2</sub> storage



# Sweeny IGCC/CCS Project Update

- 2+1 E-Gas™ Technology gasifiers with 3CGT x 1ST
- 6,900 st/sd petcoke to 693 MW(net)
- 85% CO<sub>2</sub> capture – store 5 million Te/yr
- Filing air permit with TCEQ 1Q 2010



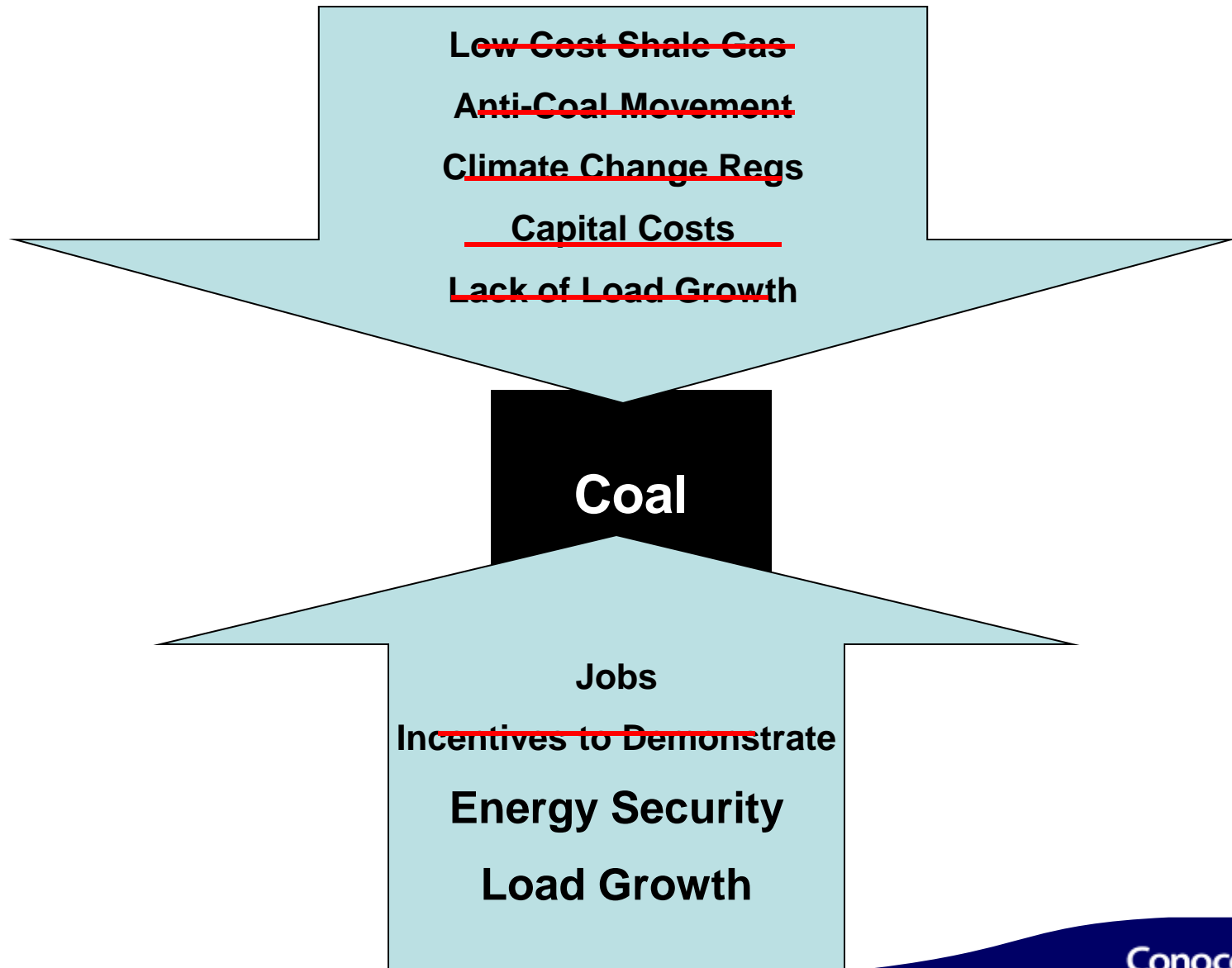
# Mississippi Gasification Project



- Mississippi Gasification LLC, a Leucadia affiliate
- Petroleum Coke to SNG
- 2+1 E-Gas™ Technology gasification trains
- 123 MM SCF/D SNG Production Capacity
- Carbon Capture to Denbury CO<sub>2</sub> Pipeline



# Asia Coal Projects



# China West-East Gas Pipelines



**China's National Development Reform Council (NDRC) has approved four SNG plants and a dozen more have been announced**



## **ConocoPhillips E-Gas™ Technology Selected for POSCO Gasification Project**

HOUSTON, April 13, 2010 -- ConocoPhillips [NYSE:COP] today announced the completion of an agreement with POSCO, a Korean steel manufacturing company, to use ConocoPhillips' E-Gas™ Technology in POSCO's Gwangyang coal-to-substitute natural gas (SNG) project.

The project, located near POSCO's Gwangyang steel mill near Gwangyang, Korea, will allow POSCO to produce 500,000 metric tons of pipeline quality SNG annually from the gasification of approximately 1.8 million tons of coal. Preliminary design work began in 2008 and site preparation is now underway.

"We look forward to this opportunity to work with POSCO on the first SNG project in Korea," said Mike Swenson, Manager, Power Generation & Technology. "Our E-Gas™ Technology will help them provide clean SNG to fuel industry in their country."

Under the agreement, ConocoPhillips will provide process engineering design and technical support relating to the gasification technology process block of the SNG facility. This process design package will be developed in the company's Houston offices.

POSCO is one of the world's largest steel makers. Headquartered in Pohang, South Korea, the company has approximately 30,000 employees.

Thank you.

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