Southern Company's Demonstration of a 285 MW Coal-Based Transport Gasifier Project

Project Presentation

Clean Coal Power Initiative

- Round 2 -

Demonstration of Air-blown Integrated Gasification Combined Cycle (IGCC) Power Plant With Coal-based Transport Gasifier

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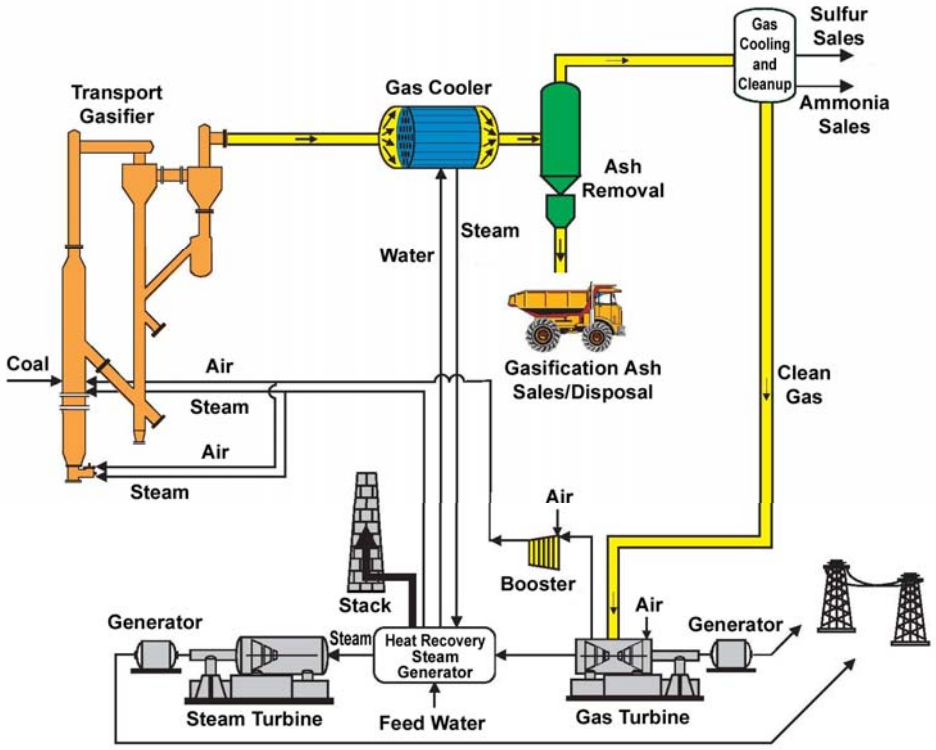
Demonstration of a 285 MW Coal-Based Transport Gasifier Project

- Air-blown Integrated Gasification Combined Cycle (IGCC) plant using technology proven in the petroleum refining industry
- Fuel flexible design is environmentally compliant and will readily adapt to possible future greenhouse gas management requirements
- Total project cost: $844 million (DOE share: $294 million)
- 3,300 tons sub-bituminous coal per day producing 285 MW electricity
- Located at the Stanton Energy Center, Orange, County FL
- Projected to be operational in 2010



Background

- **The coal-based transport gasifier with a fuel-flexible design is projected to have higher efficiency and lower capital and operating costs than the currently available oxygen-blown entrained-flow gasifiers**
  - Transport gasifier technology used successfully for more than 50 years in the petroleum refining industry
- **Team members include:**
  - Southern Company Services, Inc. (Birmingham, AL)
  - Southern Power Company Orlando Gasification, LLC (Birmingham, AL)
  - Orlando Utilities Commission (Orlando, FL)
  - Kellogg Brown and Root, LLC (Houston, TX)

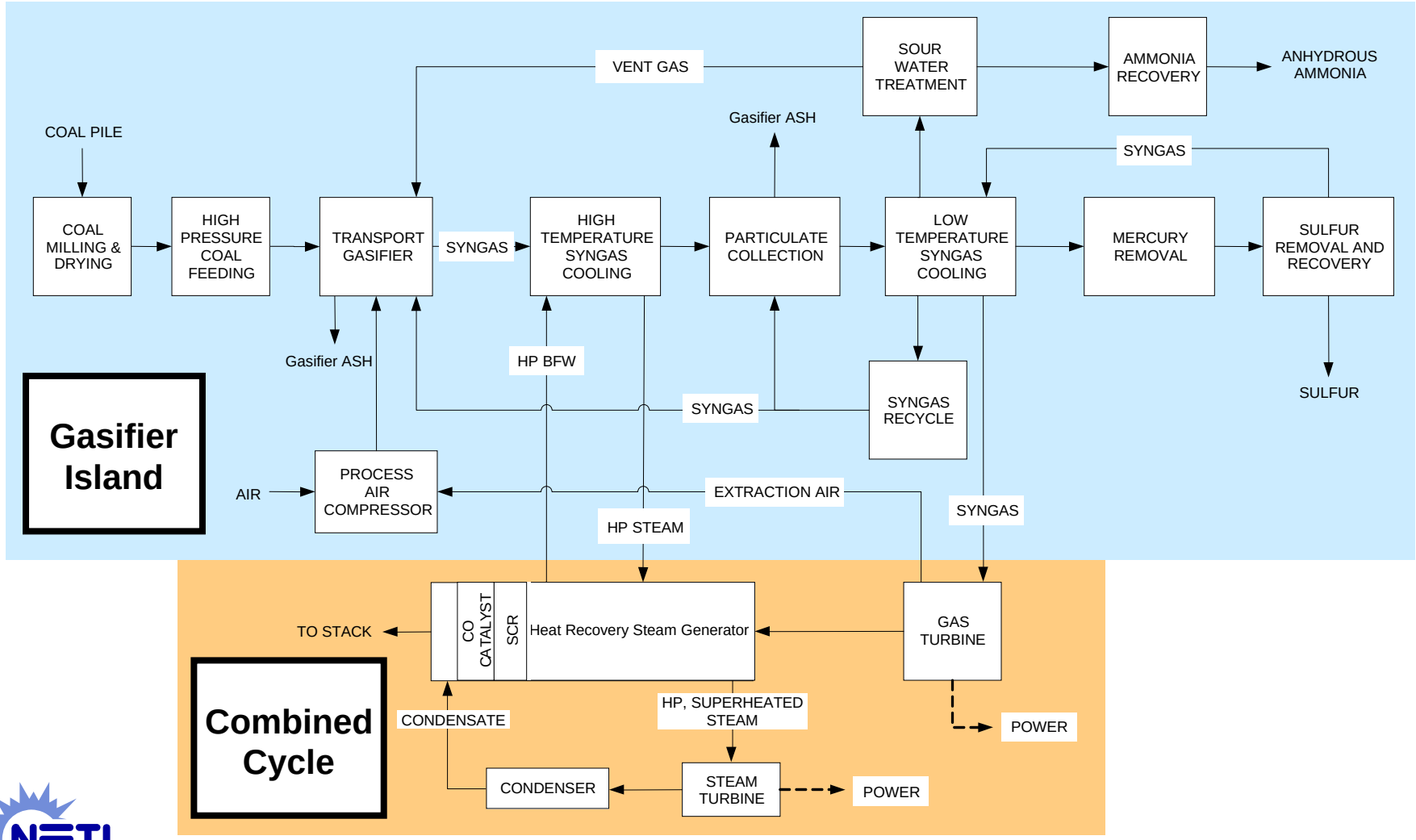
Background (continued)

- **Fuel**
  - Powder River Basin (Sub-bituminous coal)
- **Coal Input: 3,300 tons/day; electrical output: 285 MW**
- **The demonstration plant will be built at Stanton Energy Center, Orange County, FL and co-owned by Orlando Utilities Commission and Southern Power Company Orlando Gasification, LLC**

Unique Technology Aspects

- **Adapts Fluid Catalytic Cracker (FCC) technology from petroleum refining industry to IGCC design. This project builds on substantial FE-sponsored research on the transport gasifier at the Wilsonville Process Development Facility.**
- **Process uses oxygen from the air to produce synthetic gas (syngas). Does not require the costly separation of oxygen from the air as in oxygen-blown gasifiers**
  - Offers a simpler and more efficient method of power generation than other existing IGCC designs
  - Capable of both air- and oxygen-blown operation
- **Economics preserved when incorporating CO_2 capture and sequestration into design**

Orlando Utilities Commission/Southern Company Services IGCC Summary Flow Diagram



Project Schedule

- **Start**
  - 2006
- **NEPA Process**
  - NEPA Record of Decision issued April 2007
- **Design**
  - Definition and front-end engineering design: 2006 to 2007
- **Construction**
  - 2007 to 2010
- **Operation**
  - 2010 to 2014
- **Completion**
  - 2014

Conclusions

- **Will process low rank coals and coals with a high moisture or high ash content**
  - These coals make up half the proven reserves in both the U.S. and the world
- **Higher efficiency inherent in combined cycle technology**
  - Operates at a heat rate of 8,400 Btu/kWh (40.6% efficiency)
- **Lower operating costs due to the fuel-flexible design**
- **Increased value and use of the nation's sub-bituminous reserves**
- **Uses oxygen from the air instead of an oxygen separation unit**
  - Simplifies the design and reduces capital and operating costs
  - Increases electrical output by eliminating the energy requirement for additional process equipment

Conclusions (continued)

- Will achieve high environmental emissions standards for SO_2, NO_X, particulates, and Hg
- Reduced water consumption is incorporated into the design
- Beneficial uses for gasifier ash have been identified
- This technology will readily adapt to possible future greenhouse gas management requirements