



# **SECARB Stakeholders Meeting Plant Barry CCS Demo**

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# Southern Company: SO



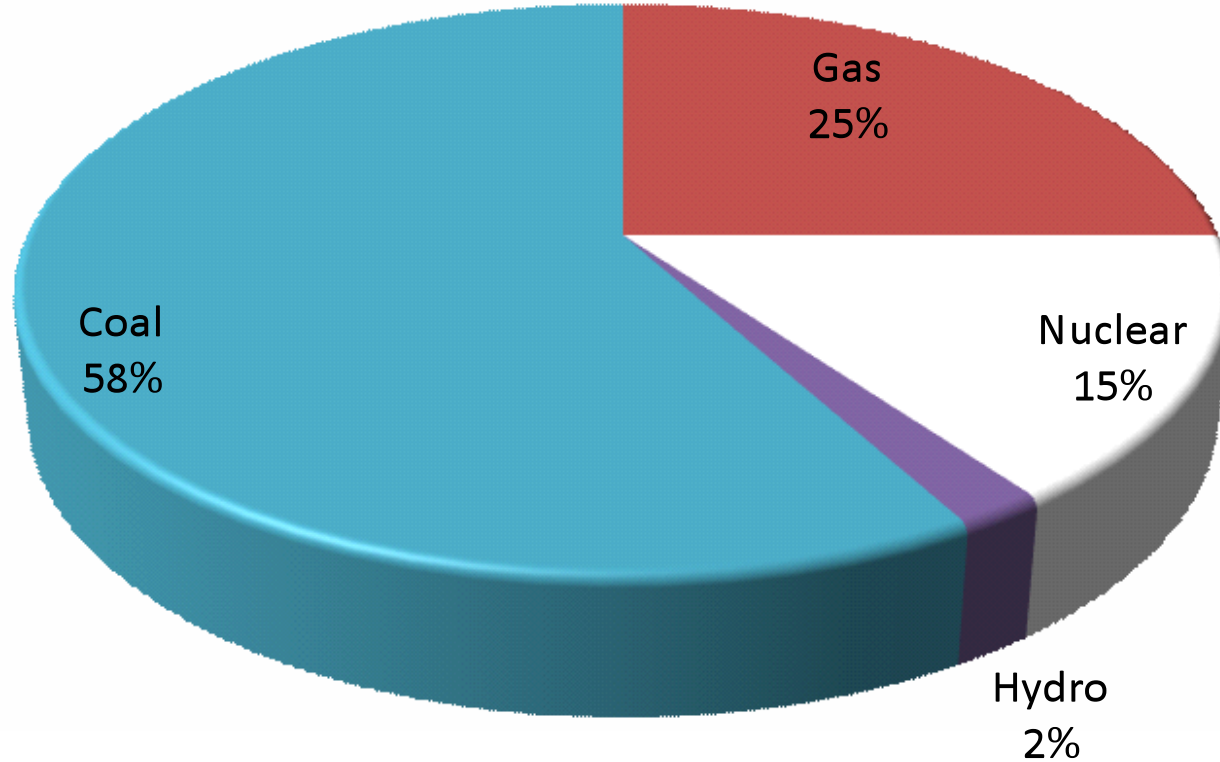
- **Headquarters:** Atlanta, Georgia
- **2010 revenues:** \$17.45 Billion
- **2010 net income:** \$1.97 Billion
- **2010 total assets:** \$55.0 Billion
- **Electric generating capacity:** 42,962 MW
- **Four regulated electric utilities:** APC, GPC, Gulf, MPC
- **One wholesale generator:** SPC



# Diversified Energy Sources



**Energy Sources 2010**



# CO<sub>2</sub> Capture and Storage Technology



## Capture

- Pure CO<sub>2</sub> captured from plant flue gas

## Compression

- Compressed to ~100-150 atm (~1500-2250 psi)

## Pipeline Transport

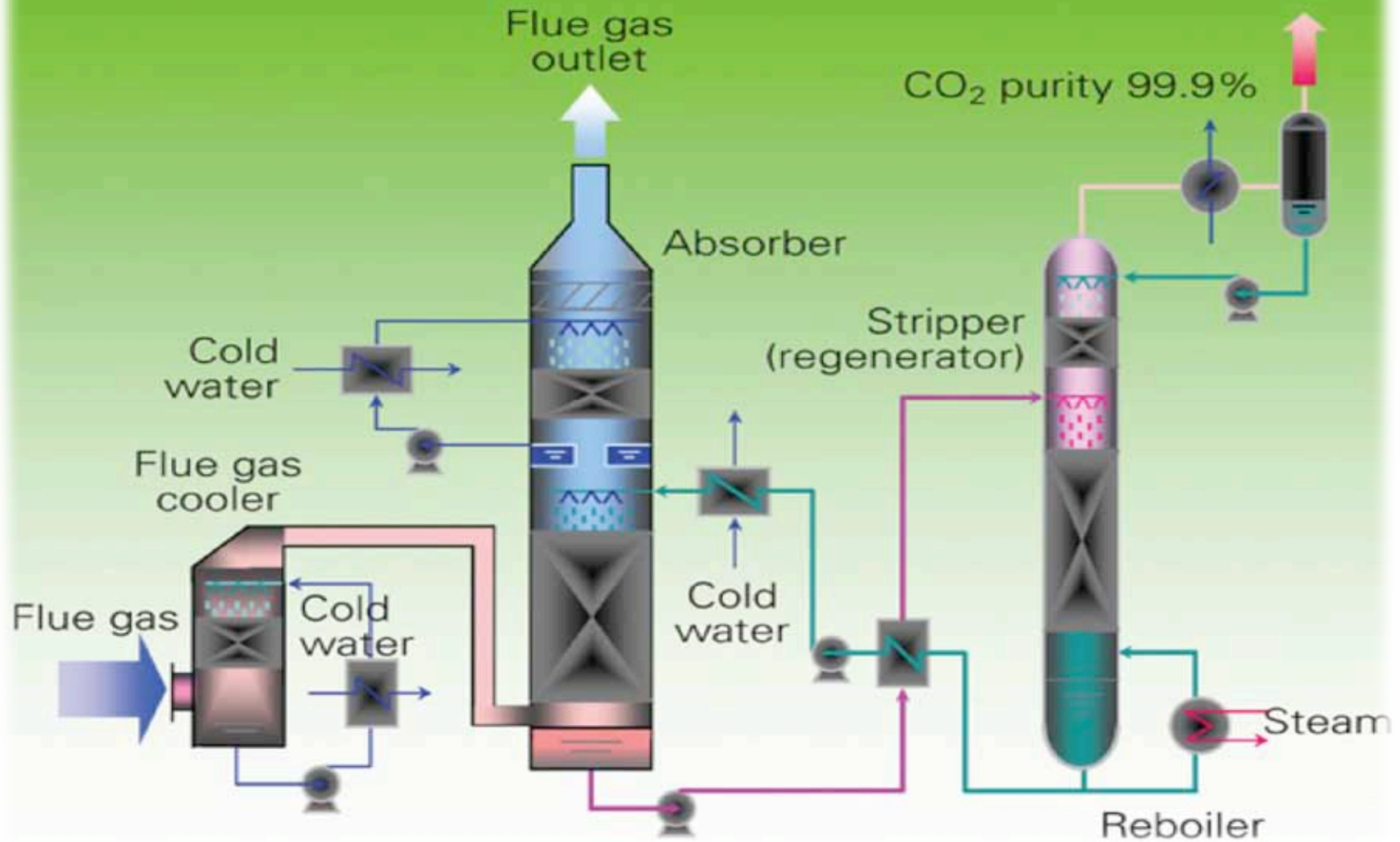
- Transported to injection site via underground pipeline

## Underground Injection

- Injected into deep geologic formations and sequestered for thousands of years

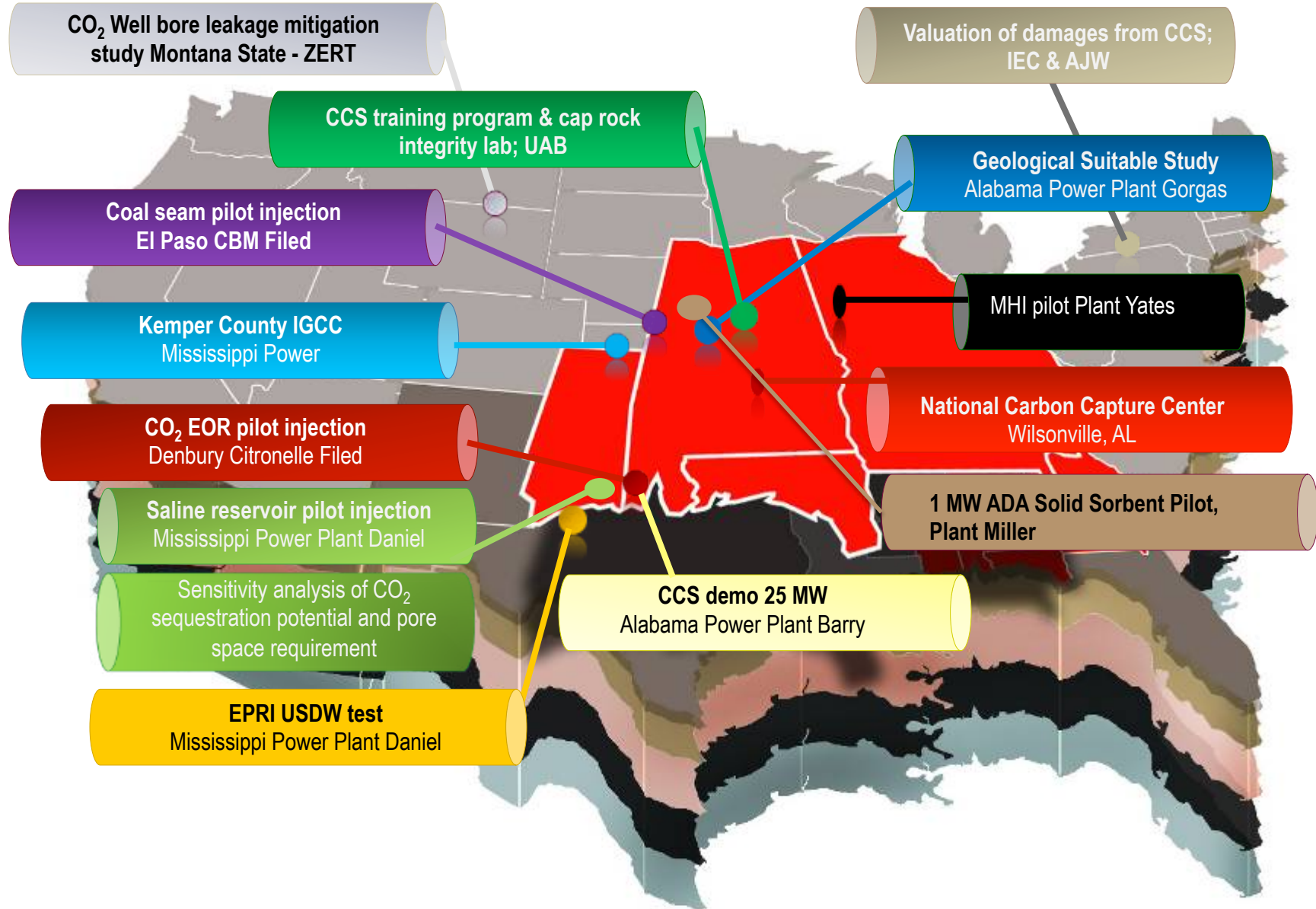
# Carbon Capture Process

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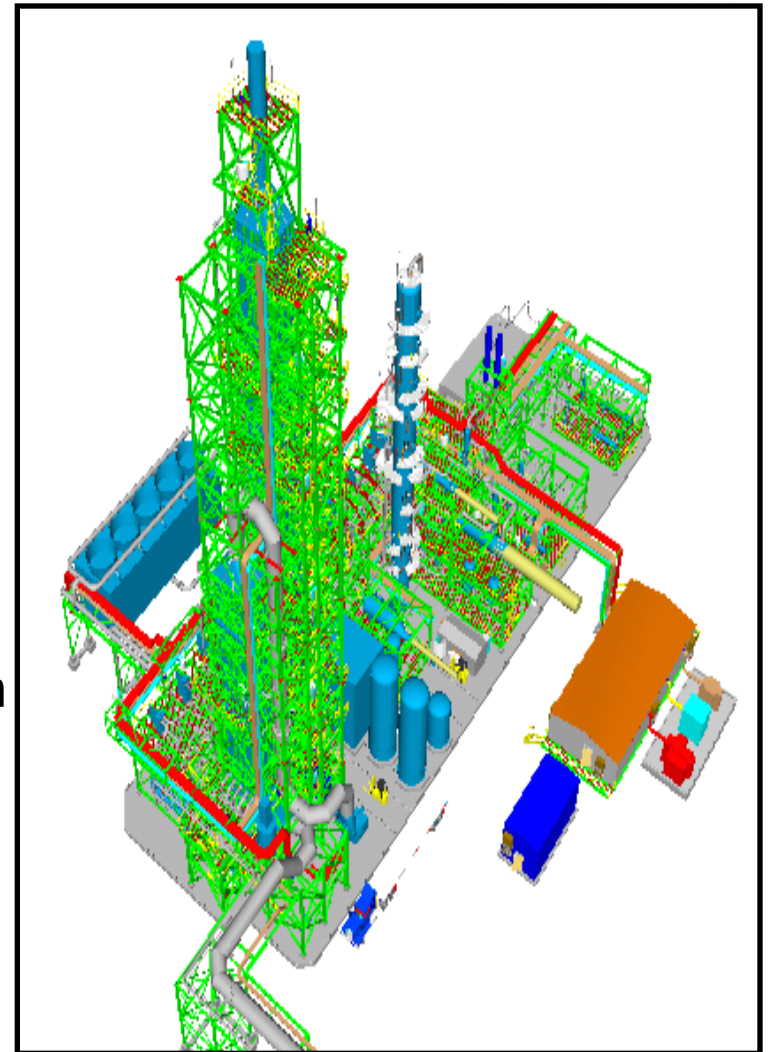
# Southern Company CCS Research



# 25 MW Integrated CCS Demo – APC Plant Barry



- CO<sub>2</sub> Capture and Compression
  - SCS/MHI collaboration with partners
  - KM-CDR capture technology (500 TPD)
- Transportation and Sequestration
  - DOE SECARB Phase III “Anthropogenic Test”
  - 150k tpy for up to 4 years into saline geology
  - ~15 mile CO<sub>2</sub> pipeline to Citronelle Field
- Objectives/Goals
  - Advance saline sequestration technology through large field test
  - Characterize operations to support full scale deployment
  - Continue outreach and education to insure seamless deployment



# CCS Demo: Project Structure

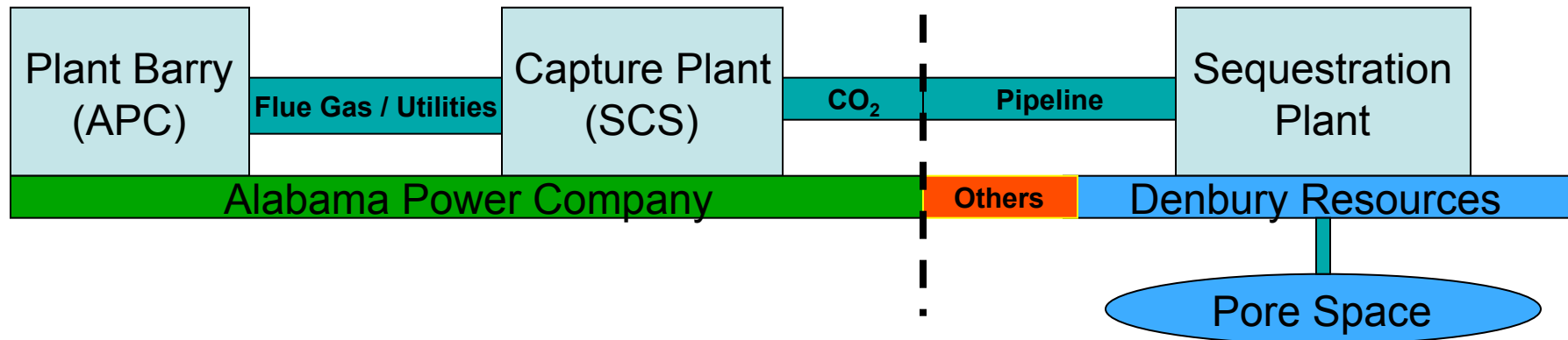


## Capture Project

- SO collaborating with MHI
- Location: APC's Plant Barry
- Execution and contracting: SO

## Sequestration Project

- Project: DOE's SECARB Phase III
- Prime contractors: SSEB and EPRI
- CO<sub>2</sub>: SO supplying
- Sequestration location: Denbury's Citronelle Oil Field





# 25 MW CCS Demo: Execution



2010

2011

1Q

2Q

3Q

4Q

1Q

2Q

3Q

4Q

Design

Construction

Pipeline cons

Startup

Operation

Foundation-Startup :  
< 1/2 est time

\$35 million  
construction  
execution: staff <10

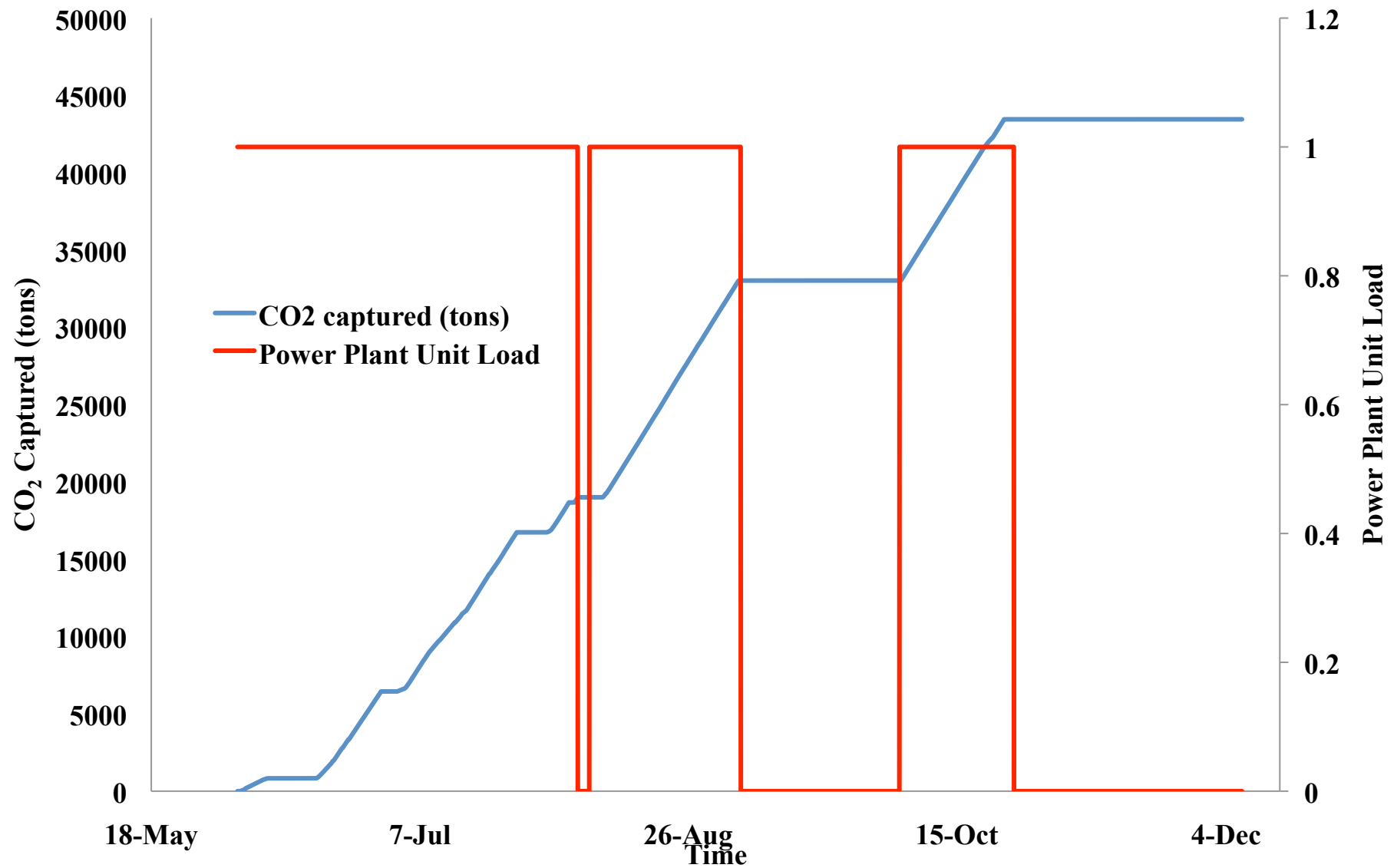
Man hours: 303,283  
Safety: 1 recordable

# 2011 Update - Plant Barry

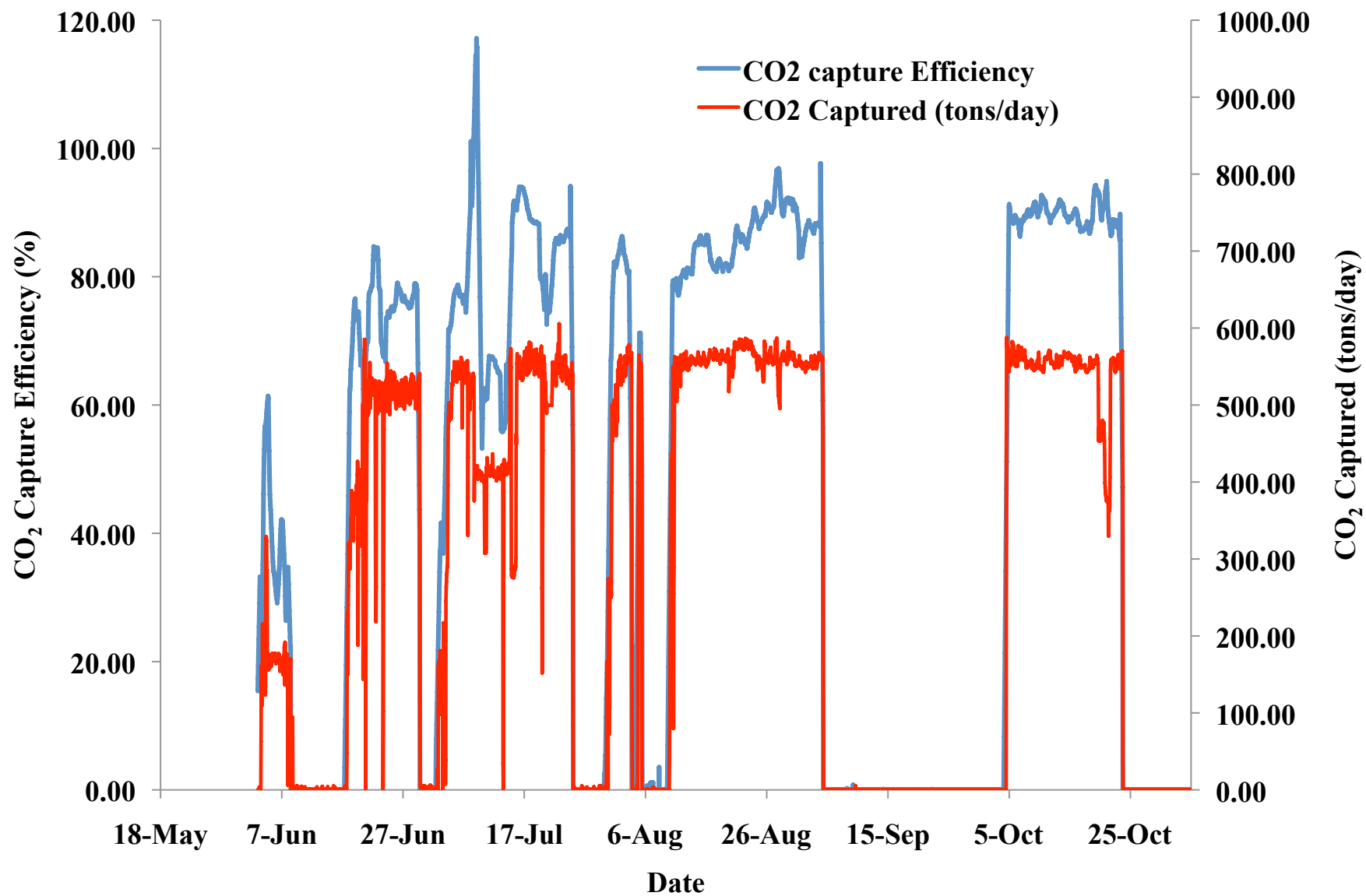


- Started up on June 2<sup>nd</sup> 2011
    - Steam Optimization and Parametric Testing
    - Compressor commissioning
  - Unit 5 on reserve shutdown has been an issue
    - Capacity Factor ~ 38%
  - Illinois basin coal test burn on unit 5 at Barry (October 7-October 22)
  - 42,730 tons of CO<sub>2</sub> captured thru October 21
  - World's largest start to finish CCS project on coal fired power plant
-

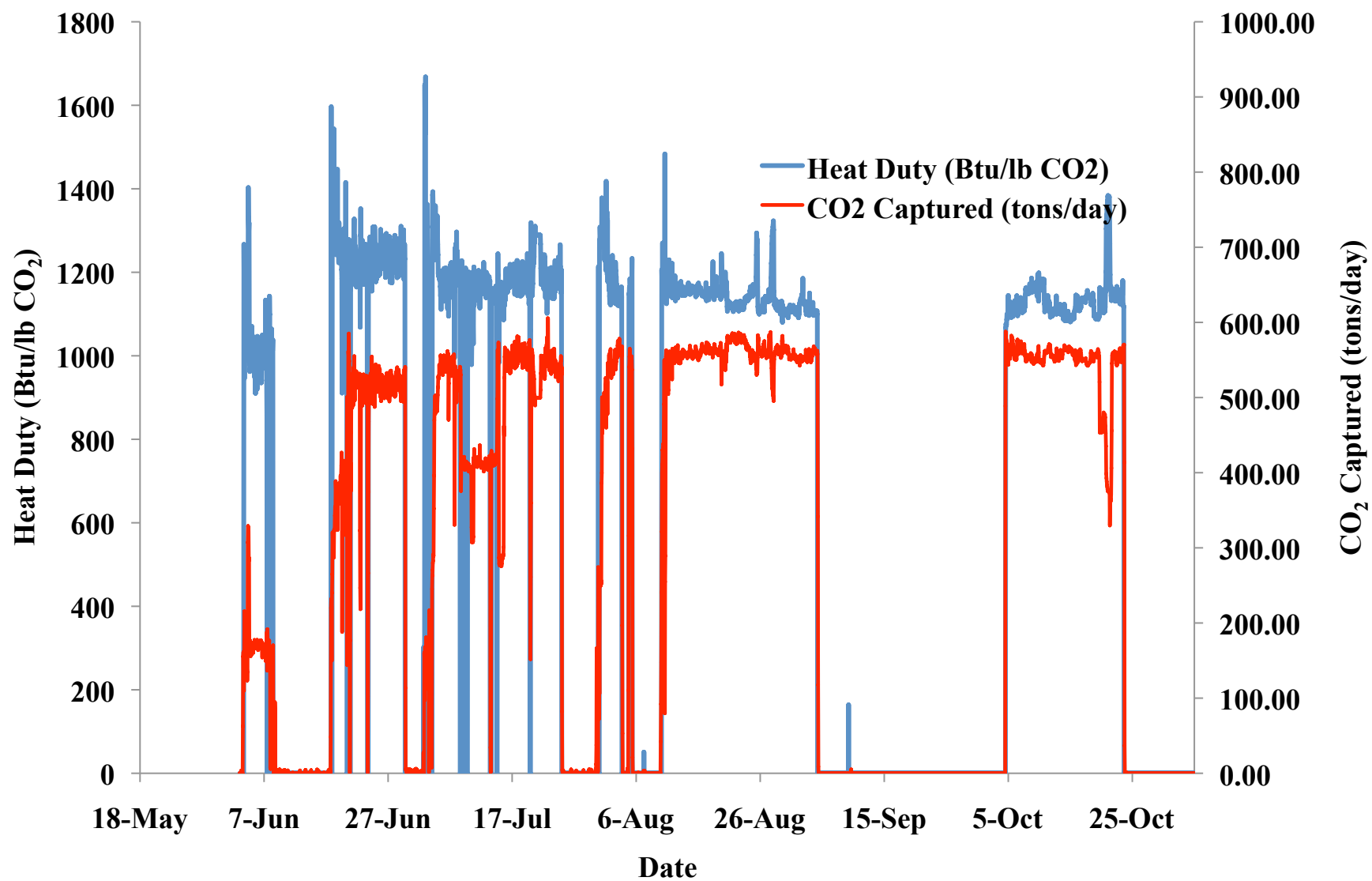
# Results



# Results



# Results





# 2012 Outlook



- Barry unit 5 (host unit) capacity factor increased to approximately 65%
- Pipeline in service April-May 2012
- Goals
  - 100 K tons CO<sub>2</sub> down the pipeline
  - Heat rate improvements
  - Robustness of plant with high impurities
  - Minimize amine emissions and KS-1 make-up requirement
- Test plans
  - Emissions testing
  - CO<sub>2</sub> compressor performance
  - Long-term parametric testing
  - Dynamic operation (load following testing)
  - Long term operability and reliability

# Questions?

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