Development and Demonstration of Waste Heat Integration with Solvent Process for More Efficient CO_2 Removal from Coal-Fired Flue Gas

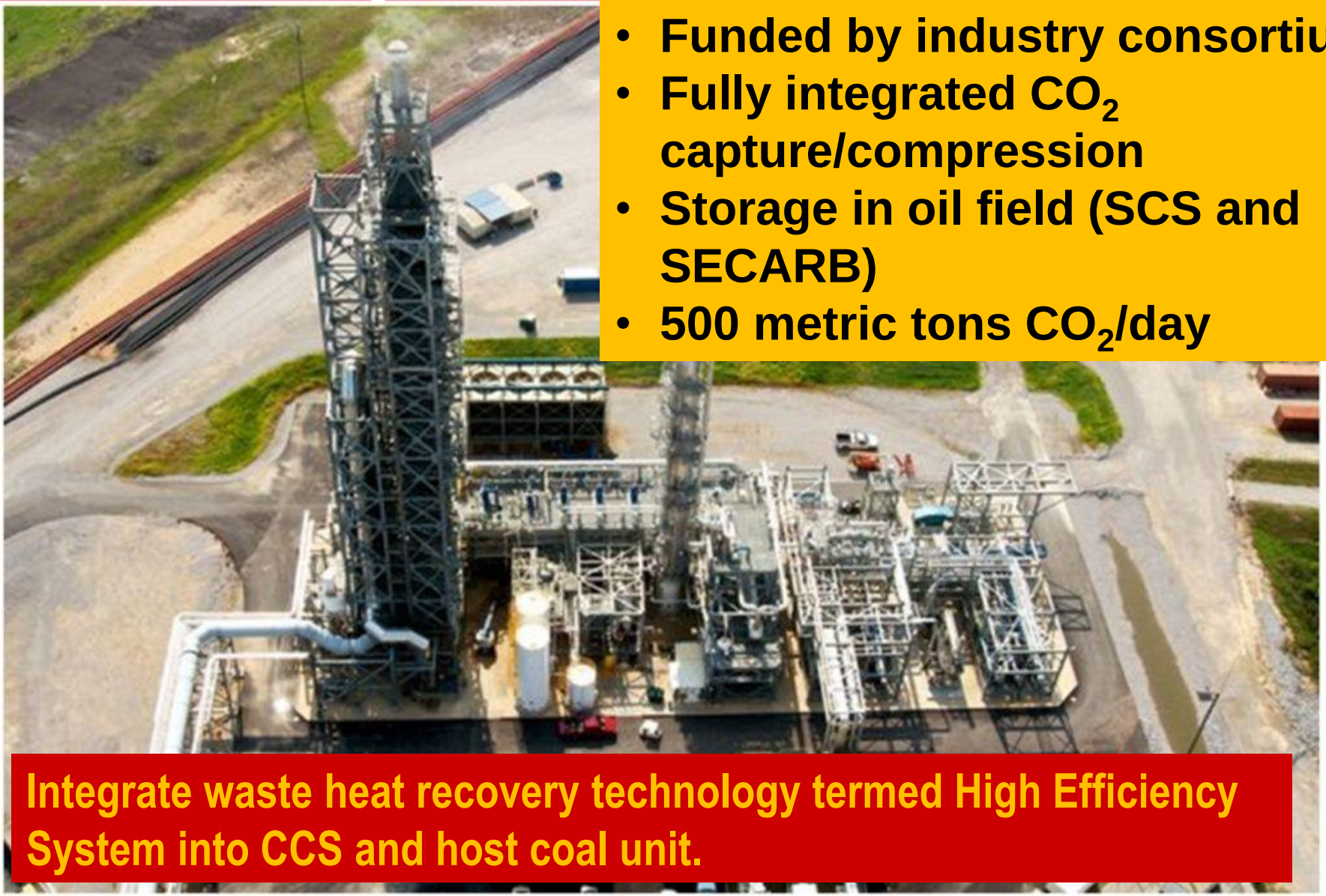
DE-FE0007525

Project Review Meeting

July 30, 2014

SOUTHERN COMPANY

Heat Integration with 25 MW KM-CDR at Plant Barry



- **Funded by industry consortium**
- **Fully integrated CO_2 capture/compression**
- **Storage in oil field (SCS and SECARB)**
- **500 metric tons CO_2/day**

Integrate waste heat recovery technology termed High Efficiency System into CCS and host coal unit.

Project Participants

SOUTHERN COMPANY

Nick Irvin
Todd Wall

MITSUBISHI HITACHI POWER SYSTEMS

Tim Thomas
Shintaro Honjo

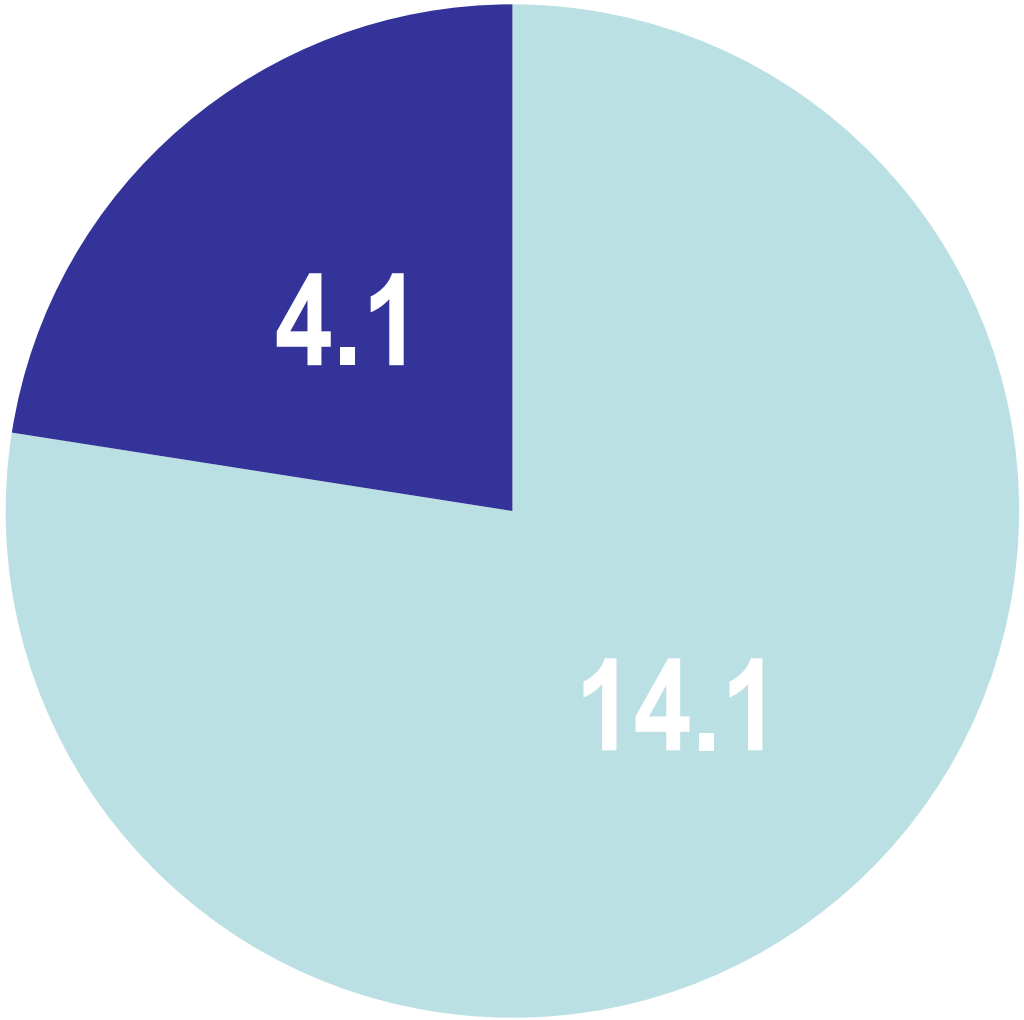
URS

Katherine Dombrowski

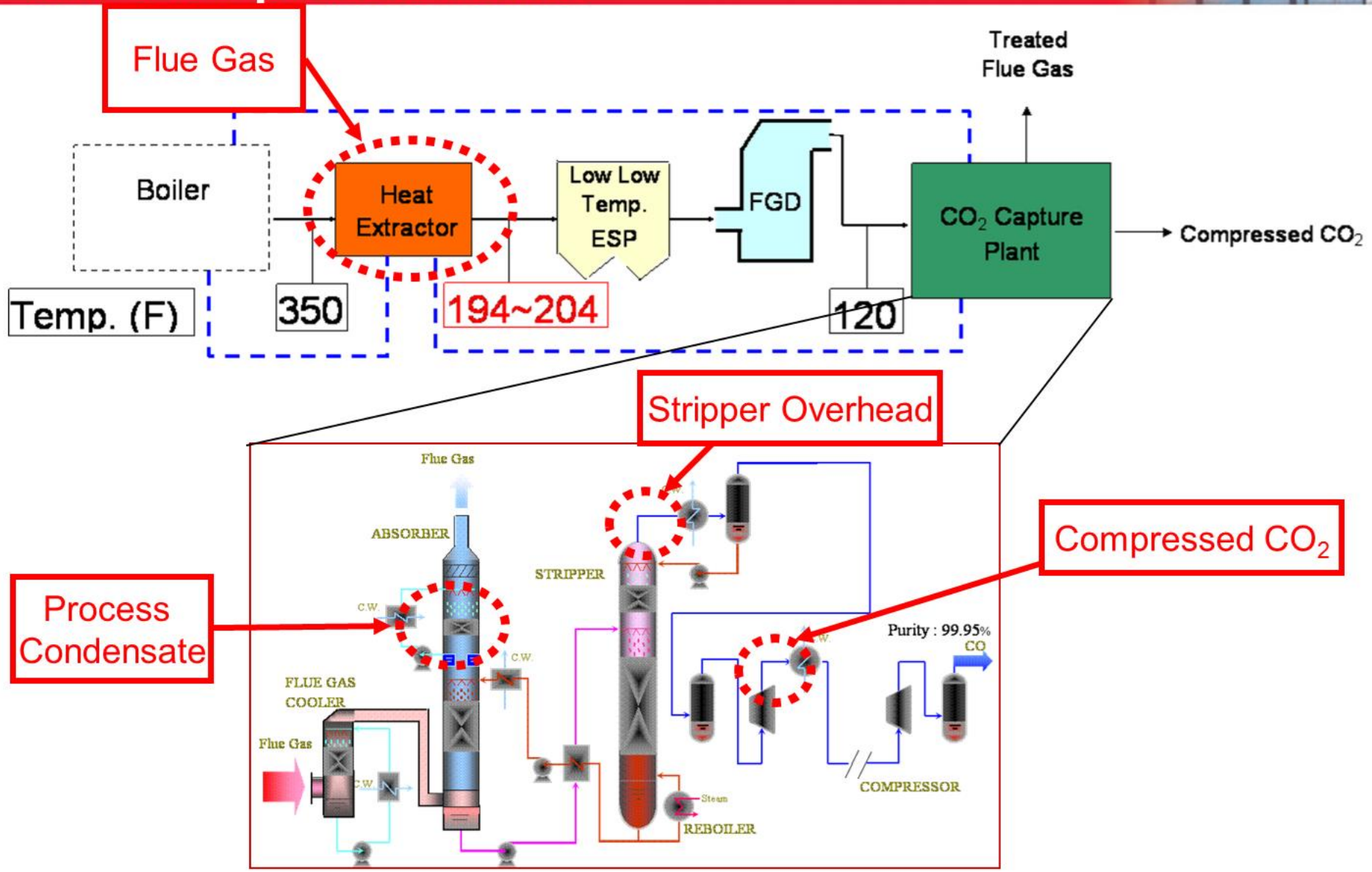
NETL

Bruce Lani

Total Project Budget ($MM)



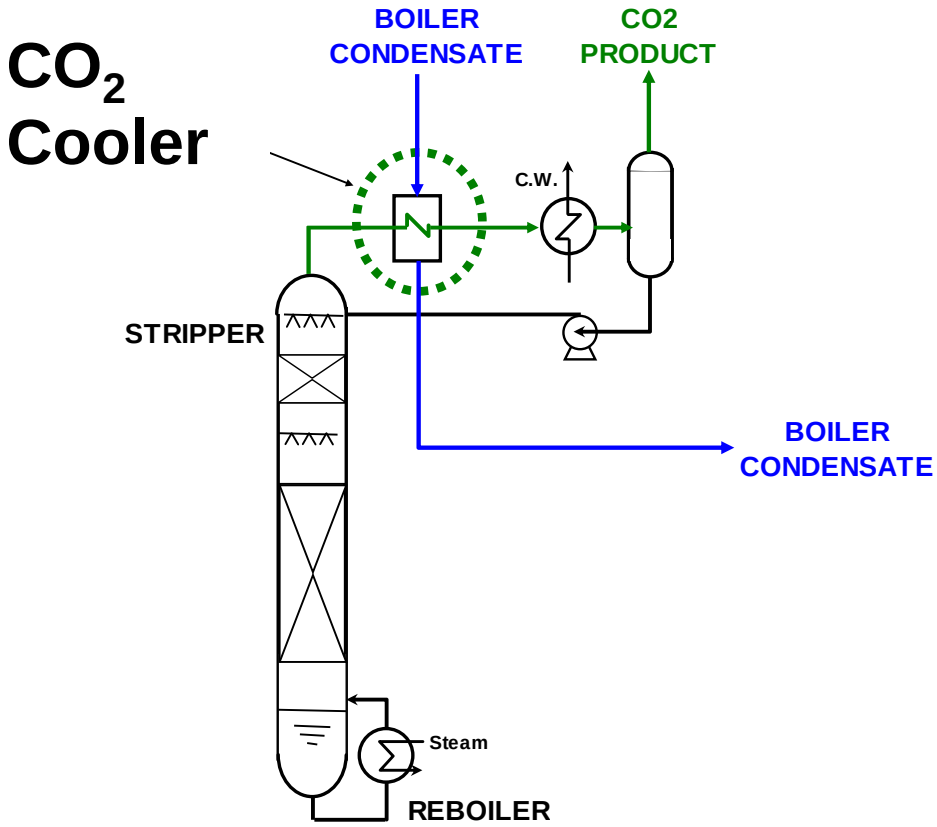
Waste heat sources include flue gas and CCS plant streams



Boiler feed water will be heated with CO_2 Cooler and Flue Gas Cooler

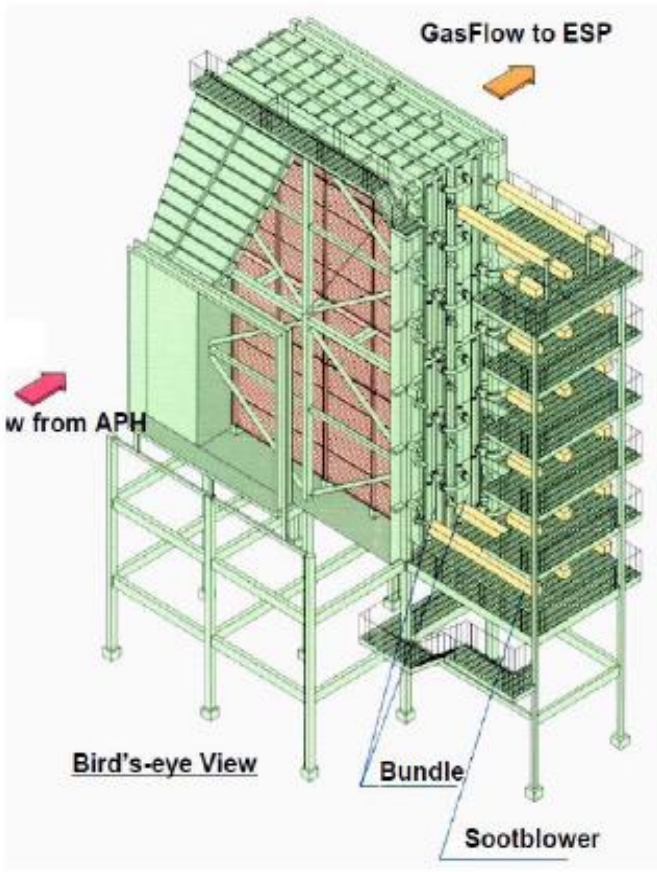
CO_2 Cooler

Standard heat exchanger



Flue Gas Cooler

MHI proprietary heat exchanger



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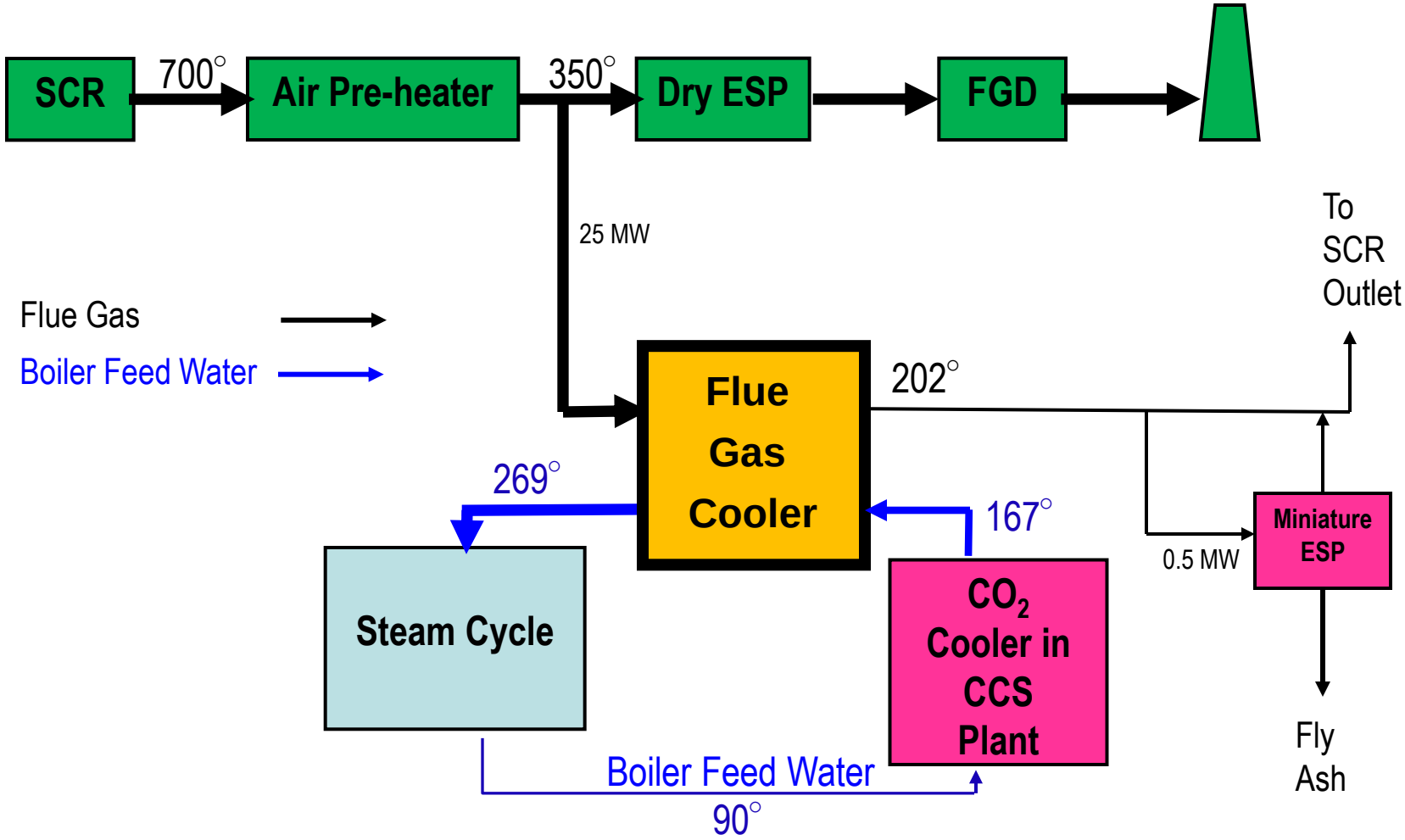


Project Objectives

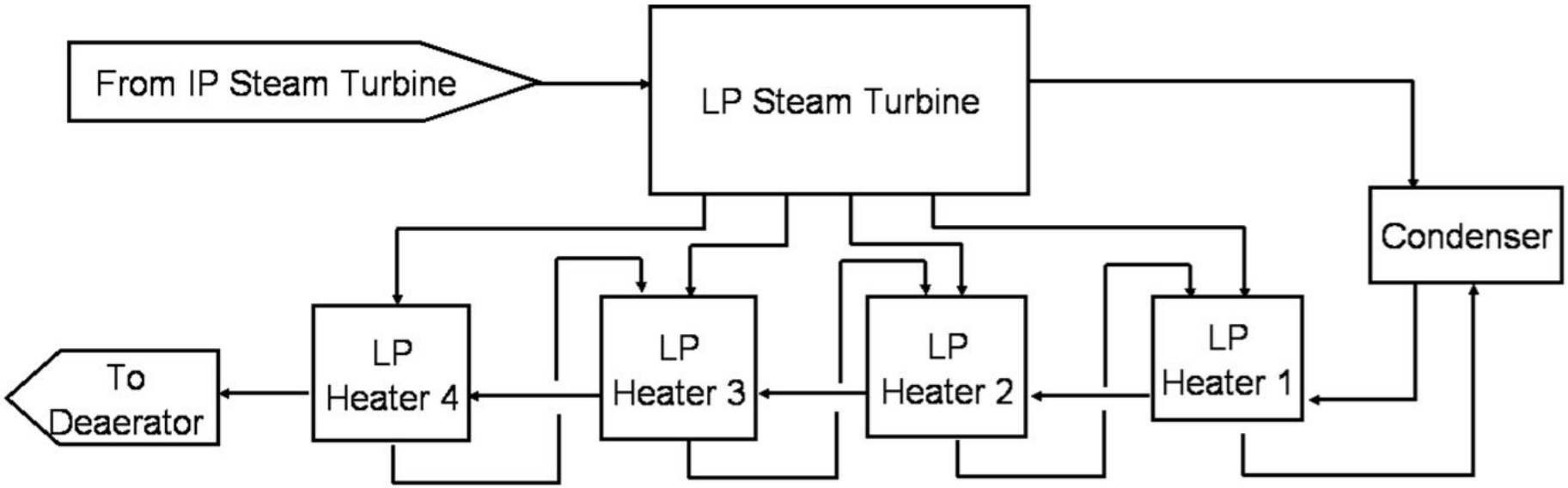
Quantify tangential benefits

- Better ESP performance
- Increase SO_3, Hg, Se capture
- Reduce CCS solvent consumption
- Reduce FGD H_2O consumption

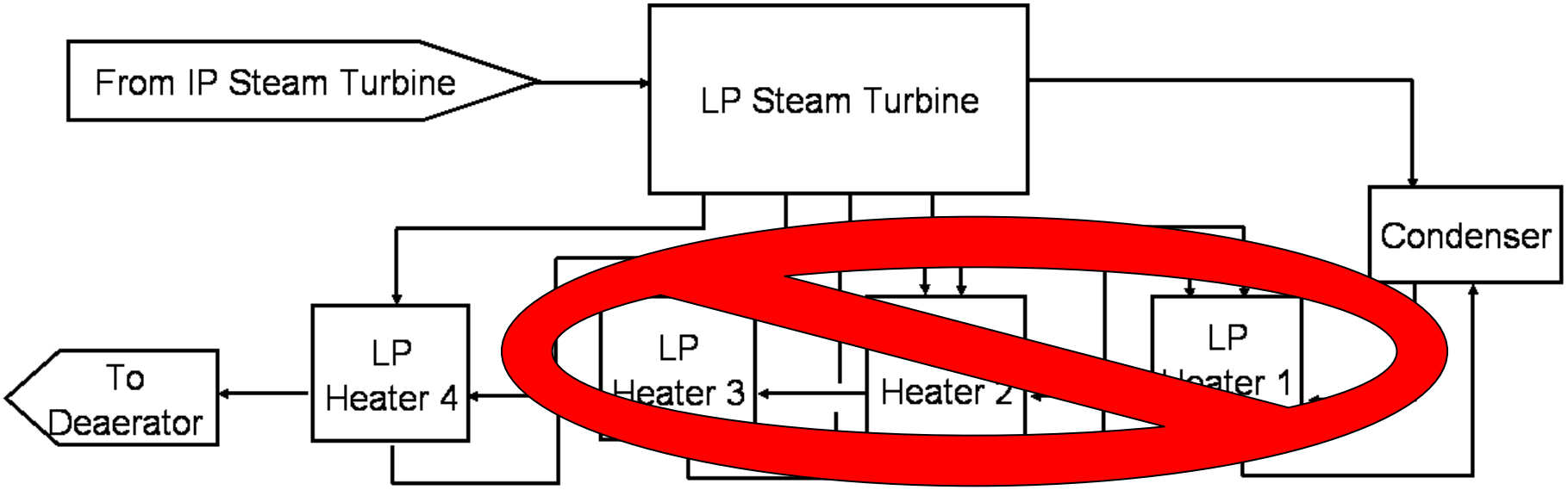
Resolve operational problems of integration

Quantify energy efficiency improvements and assess reliability of flue gas cooler

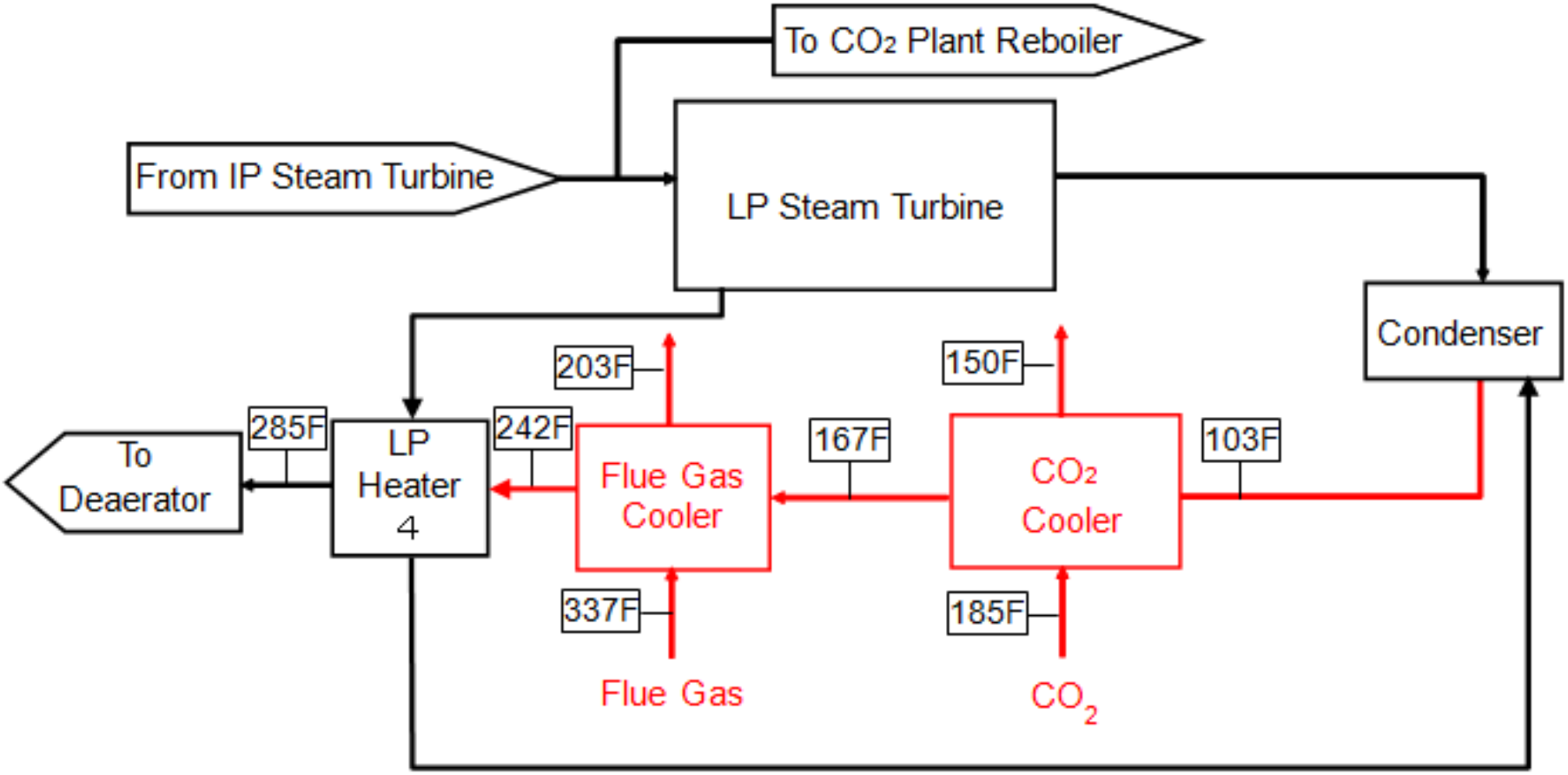
Heat integration eliminates LP heaters 1-3



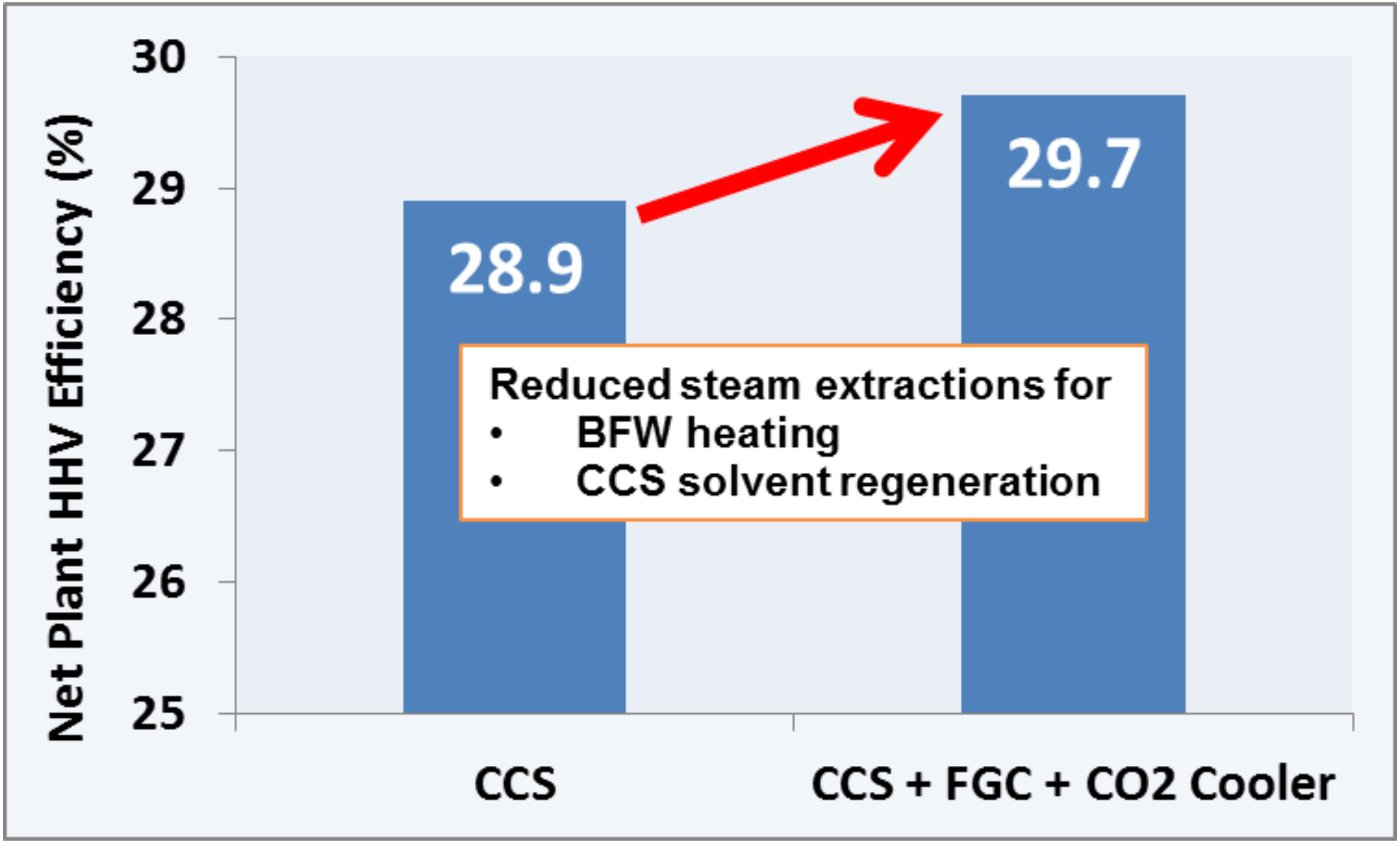
Heat integration eliminates LP heaters 1-3



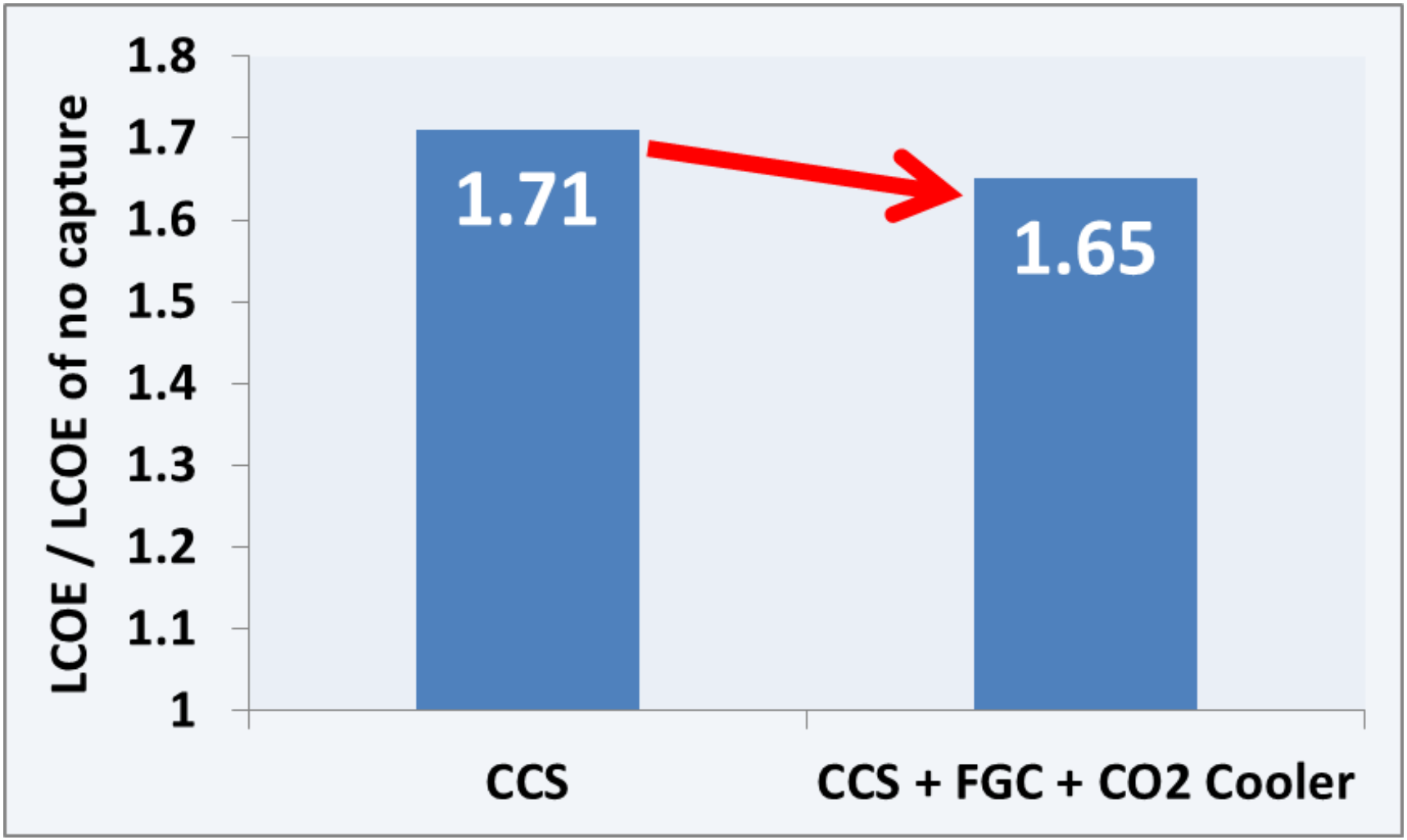
Heat integration eliminates LP heaters 1-3



Heat integration increases plant efficiency



Heat integration decreases cost of CCS



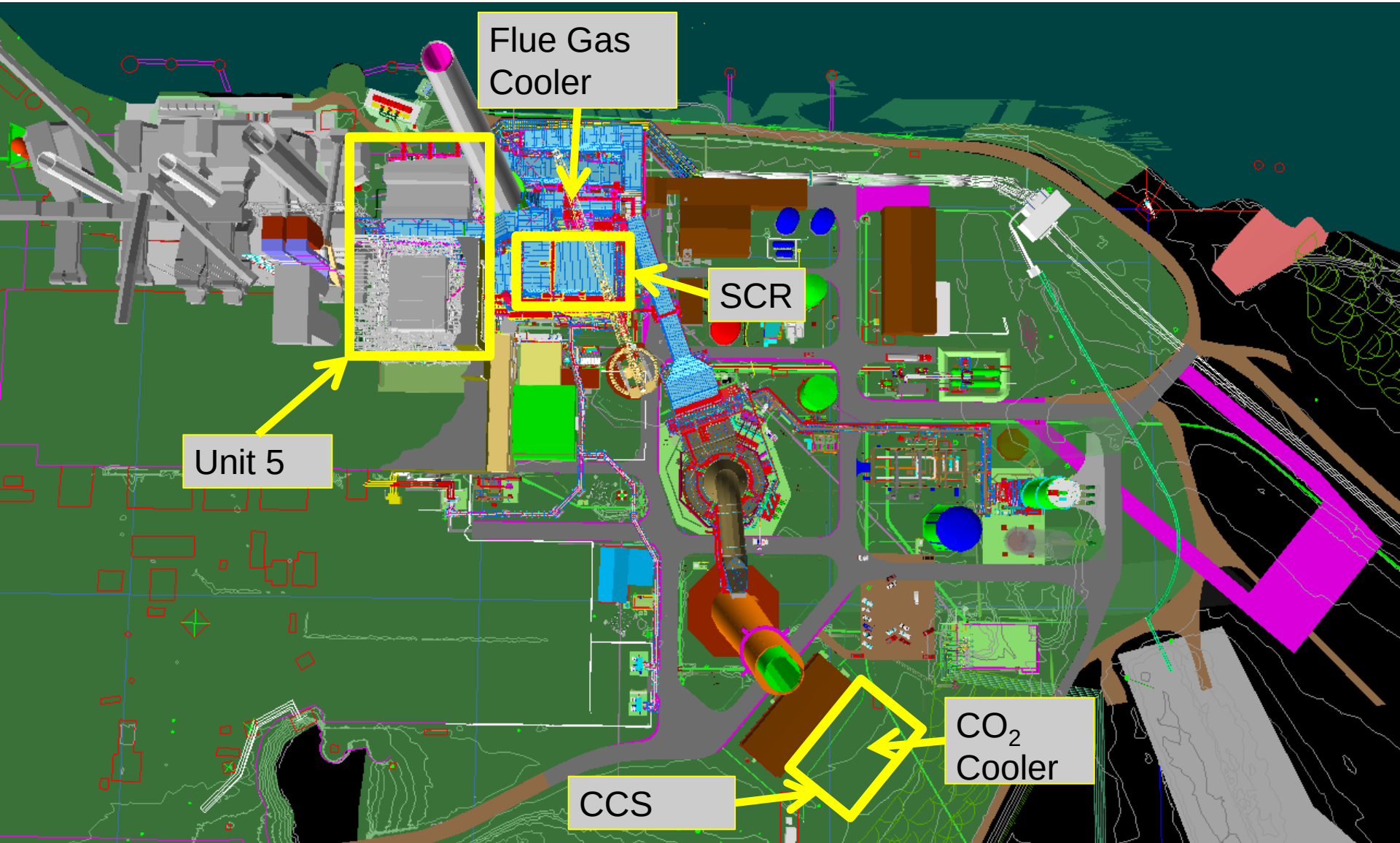
Analysis per 2010 DOE Cost and Performance Baseline

Flue Gas Cooler proven on low S coals

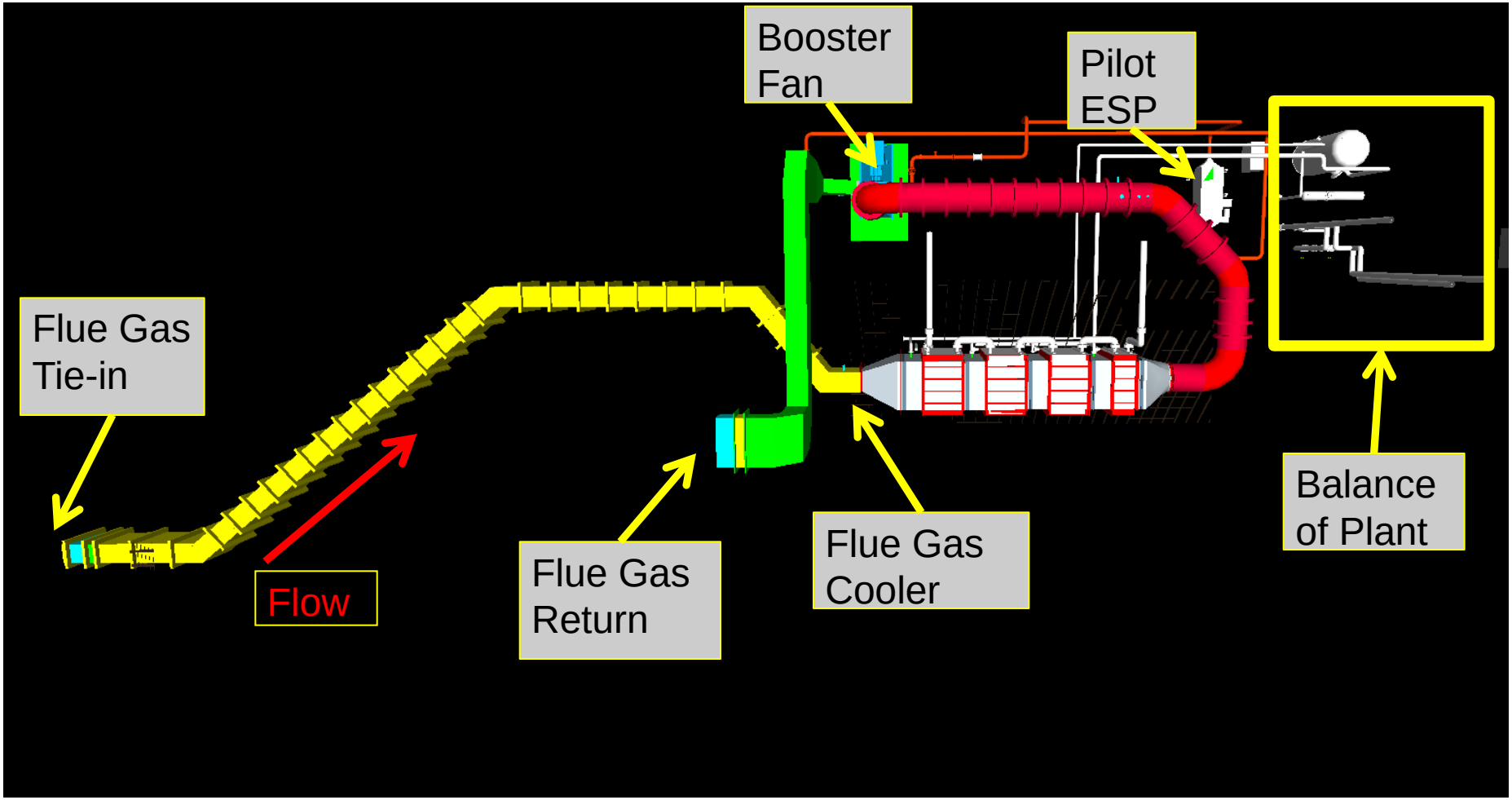
Carbon steel tubes in good condition after 2 years operation at Japanese plant

What happens with higher sulfur coals fired in US?

General Layout

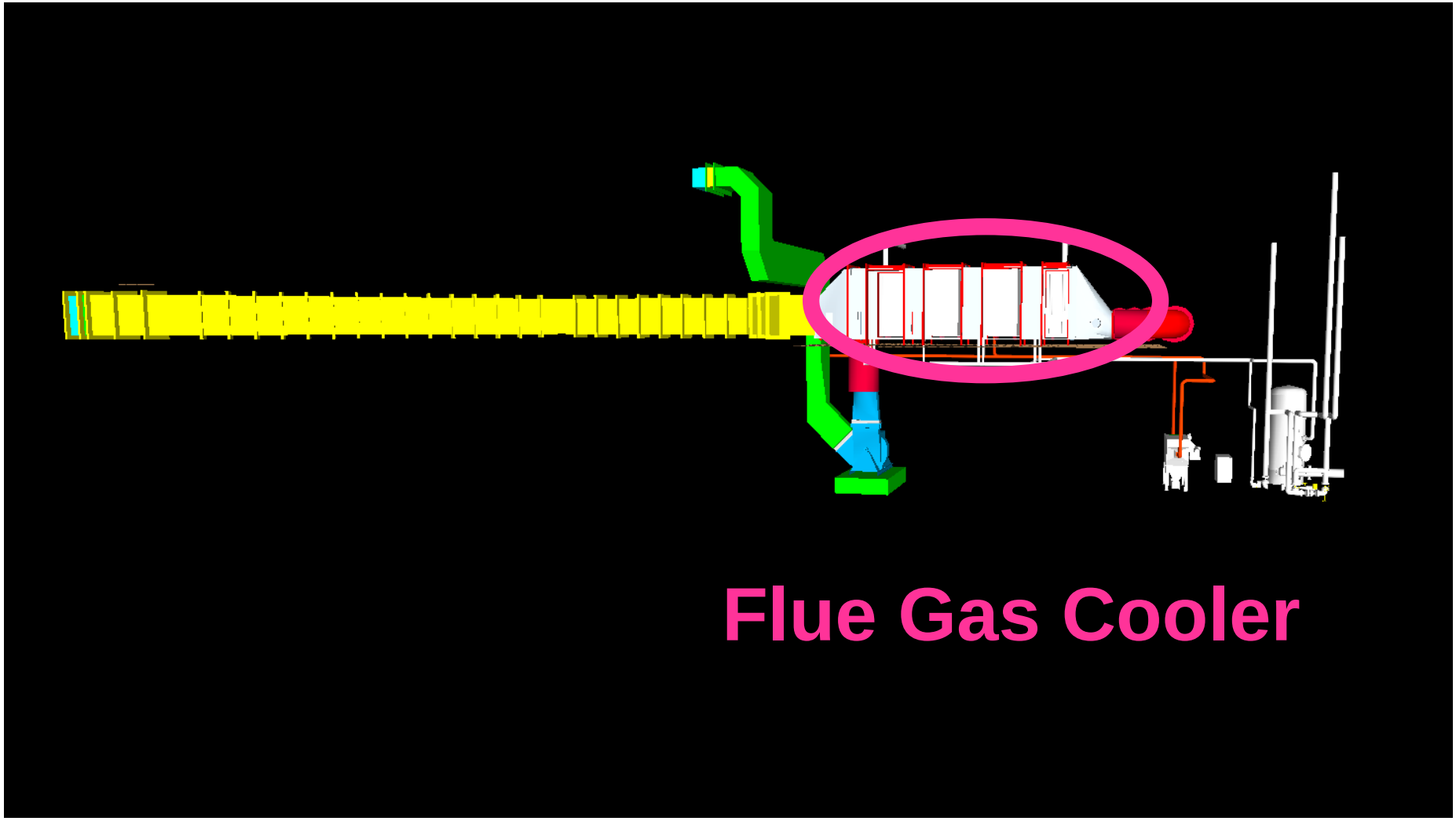


Flue Gas Cooler Area – Plan View



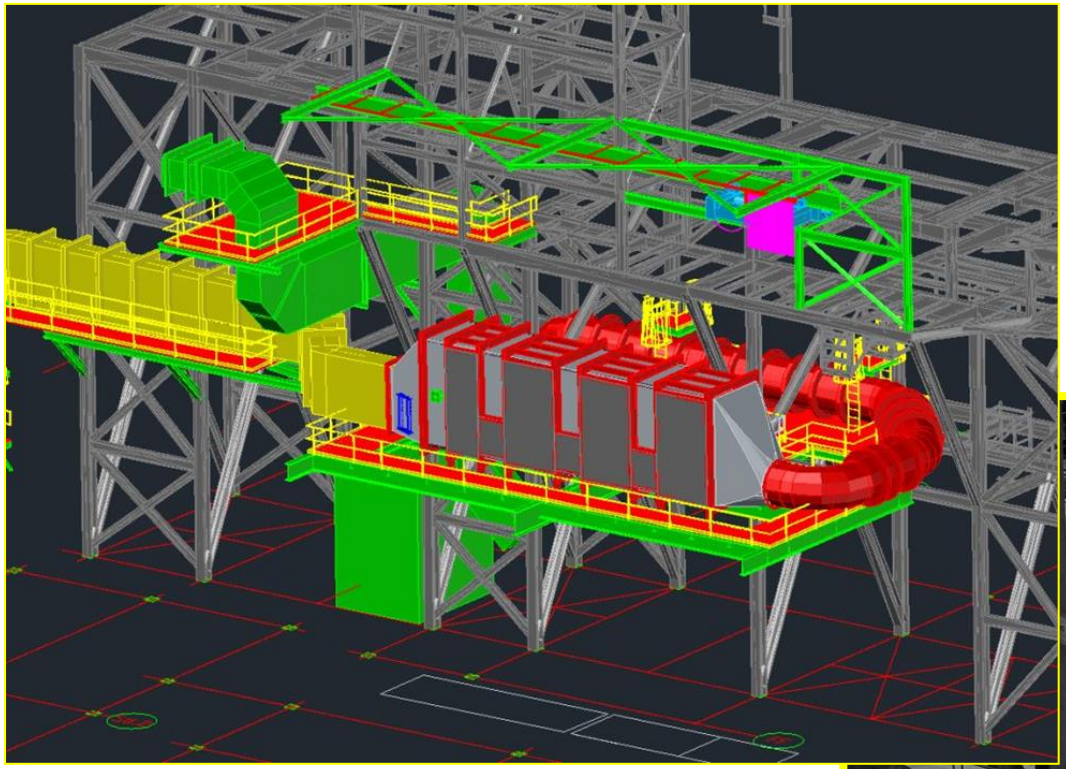
Flue gas tie point dampers installed

Side View

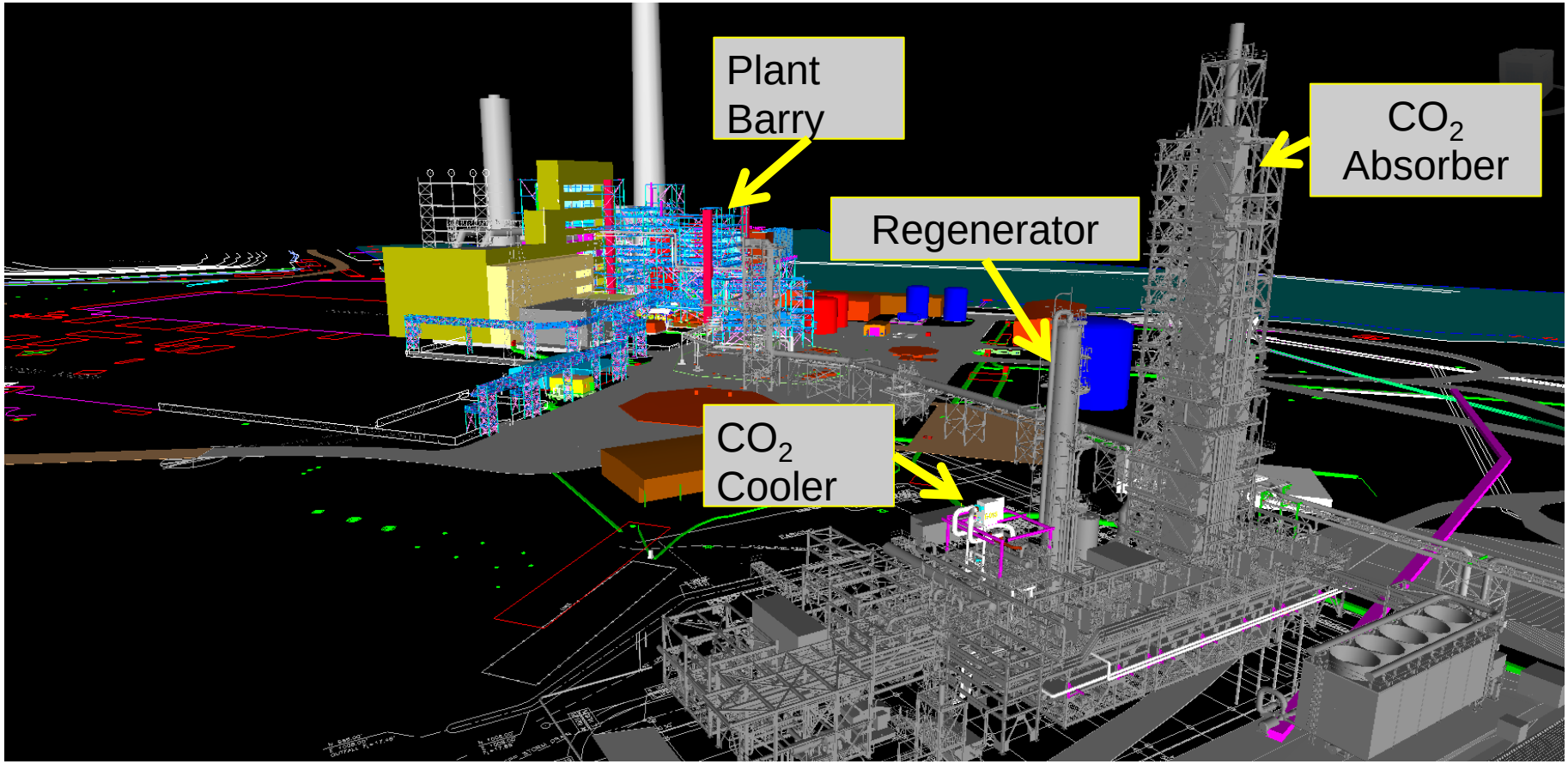


Flue Gas Cooler shell fabrication

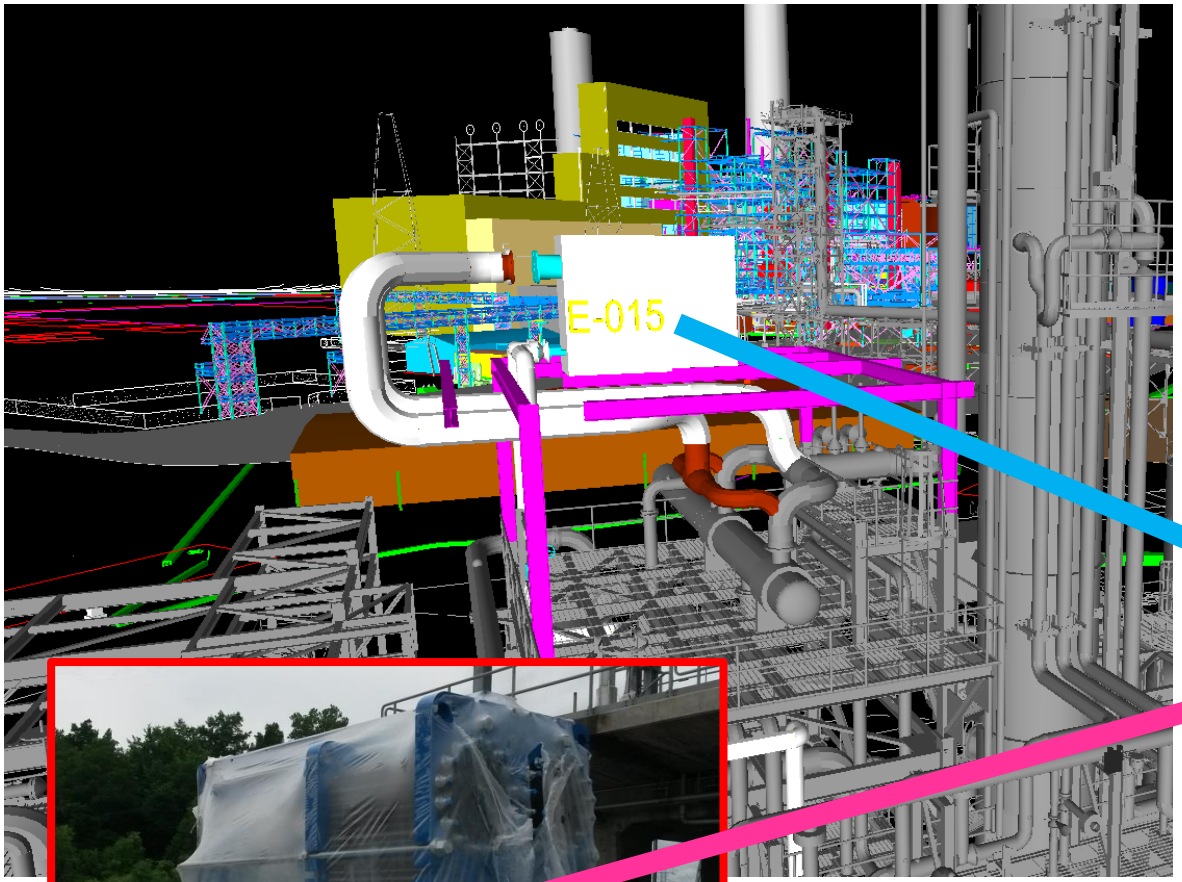
Grating for FGC deck installed



CO_2 Cooler General Arrangement



CO_2 cooler received; platform installed



BP2 completes October 2014

BP1

- FEED and Target Cost Estimate
- Permitting

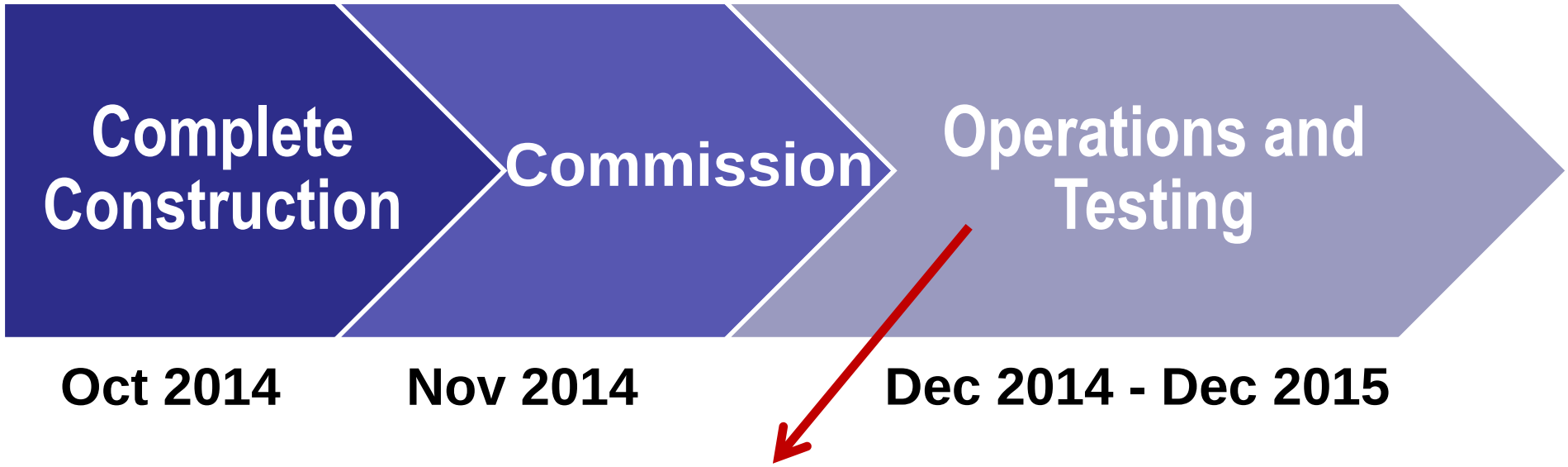
BP2

- Engineering, Procurement, Construction

BP3

- Operations
- Field Testing Analysis

Remaining project work



- Verify efficiency
- Estimate reduction in FGD water use
- Measure corrosion, erosion
- Test water quality
- Measure SO_3, trace metal removal