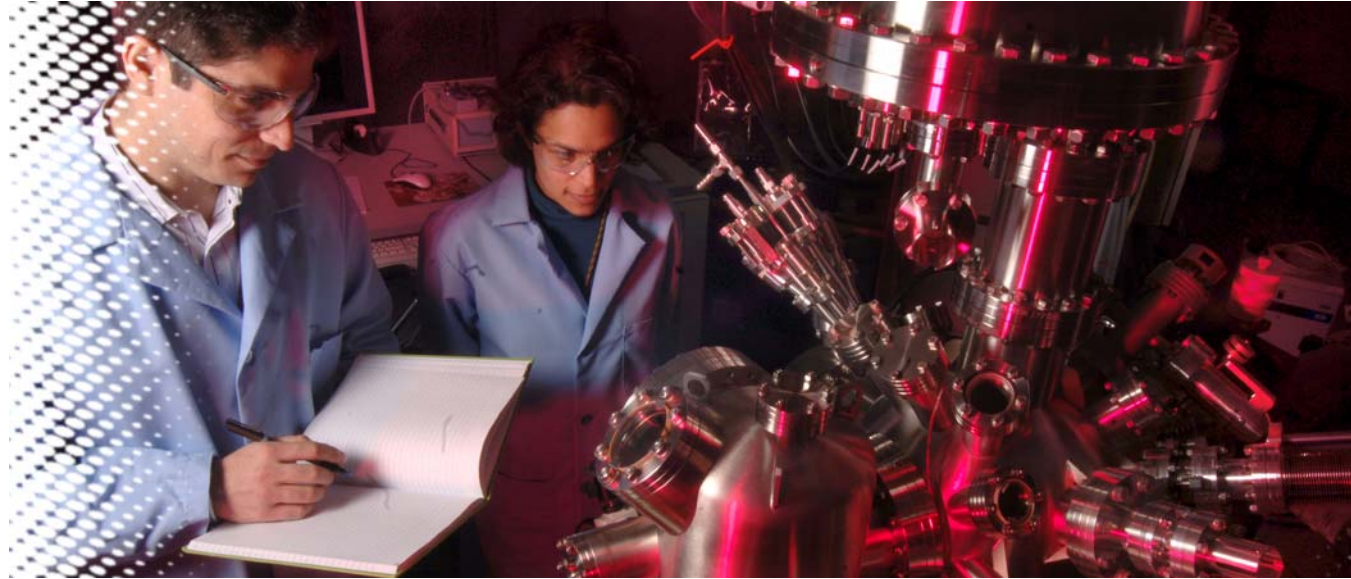




NATIONAL ENERGY TECHNOLOGY LABORATORY



Restructured FutureGen Workshop

Programmatic/Technical Overview – Tom Sarkus



Restructured FutureGen Objective

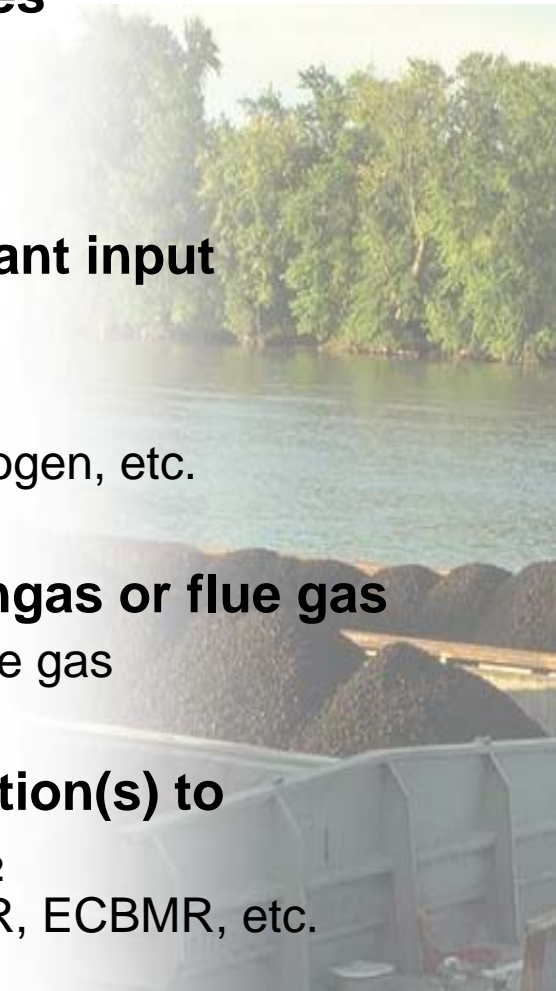
Seeking demonstration projects to achieve very low (or near-zero) emission levels by coupling advanced coal-based power generation systems with carbon capture & storage (CCS) technology



Restructured FutureGen

Technical Requirements

- **Projects must be located in the United States**
 - Power plant
 - CO₂ pipeline, CO₂ injection site & CO₂ plume
- **U.S. coal or coal refuse must be $\geq 75\%$ of plant input**
- **Electricity must be $\geq 50\%$ of output**
 - Remainder may be heat, fuels, chemicals, hydrogen, etc.
- **Project must capture $\geq 81\%$ of carbon in syngas or flue gas**
 - Goal is to capture $\geq 90\%$ carbon in syngas or flue gas
- **Project must sequester CO₂ in saline formation(s) to achieve an expected rate ≥ 1 million tpy CO₂**
 - Excess CO₂ to saline or other formation(s), EOR, ECBMR, etc.



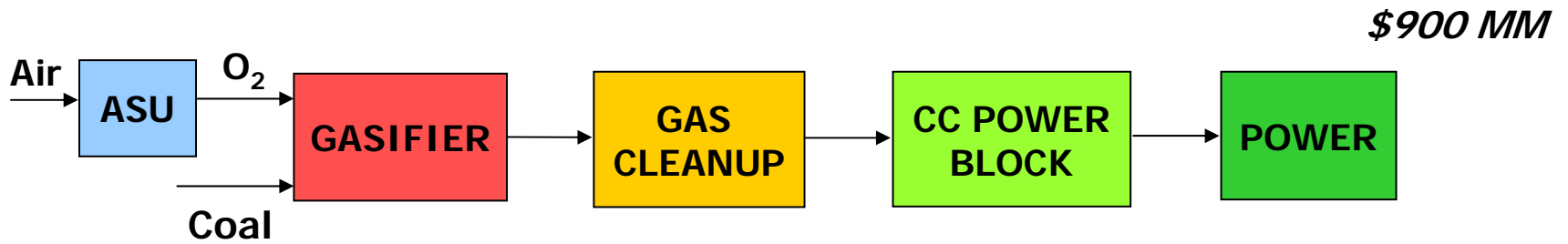
Restructured FutureGen

Technical Requirements (cont'd)

- **Other “near-zero” emissions**
 - $\geq 90\%$ mercury removal/capture
 - $\geq 99\%$ S capture or, for low-S coals, ≤ 0.04 lbs/MM Btu
 - < 0.05 lbs/MM Btu NO_x
 - < 0.005 lbs/MM Btu particulates
- **Minimum demonstration scale**
 - Gasification project:
 - ≥ 300 MWe gross, ≥ 250 MWe net, and ≥ 200 MWe CT
 - Non-gasification project: Commercially viable size
- **Demonstration project schedule & duration**
 - Start-up operations by Dec. 31, 2015
 - Demonstration project operations, 3-5 years
 - + 2 years additional MMV

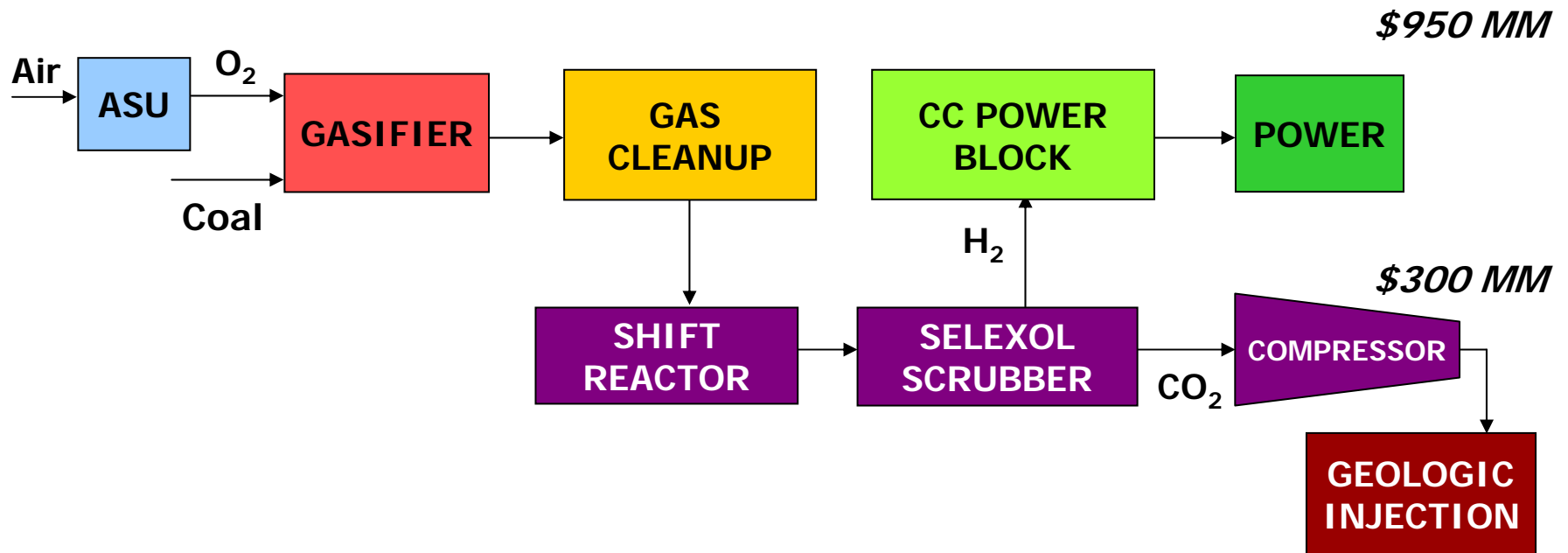
FutureGen Sample Case 1

New Single-Train IGCC Plant



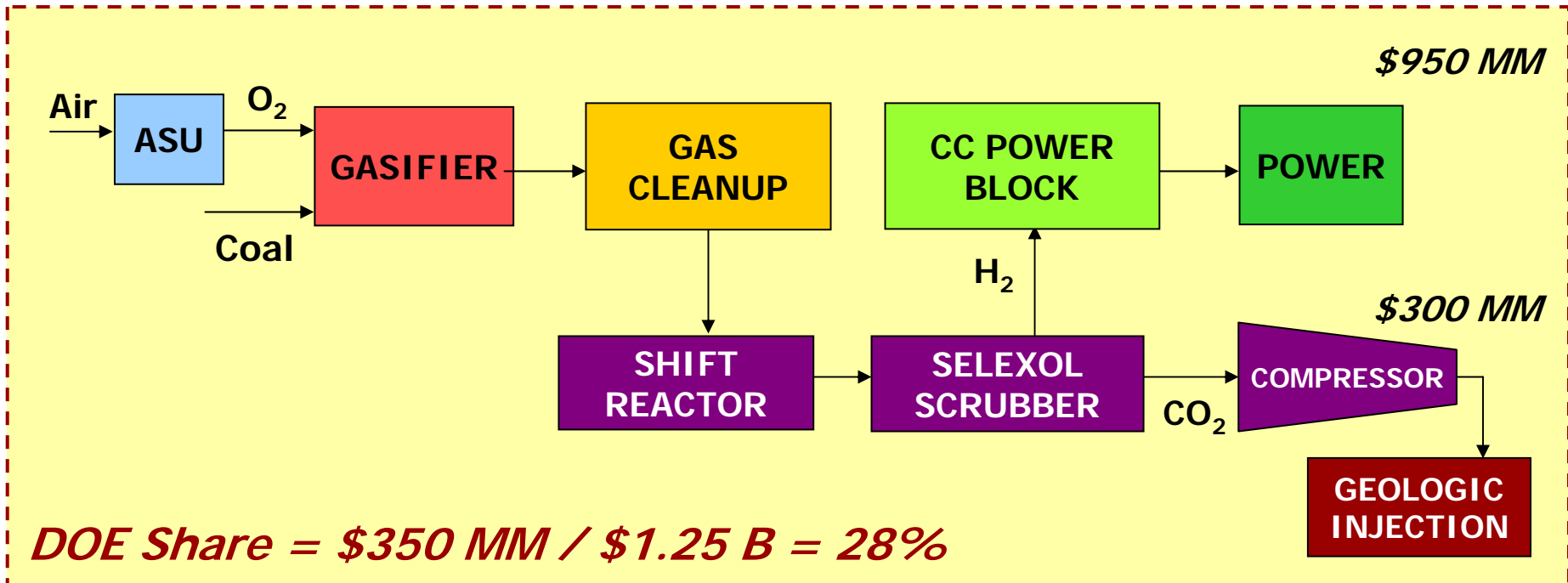
FutureGen Sample Case 1 (cont'd)

New Single-Train IGCC Plant w/CCS



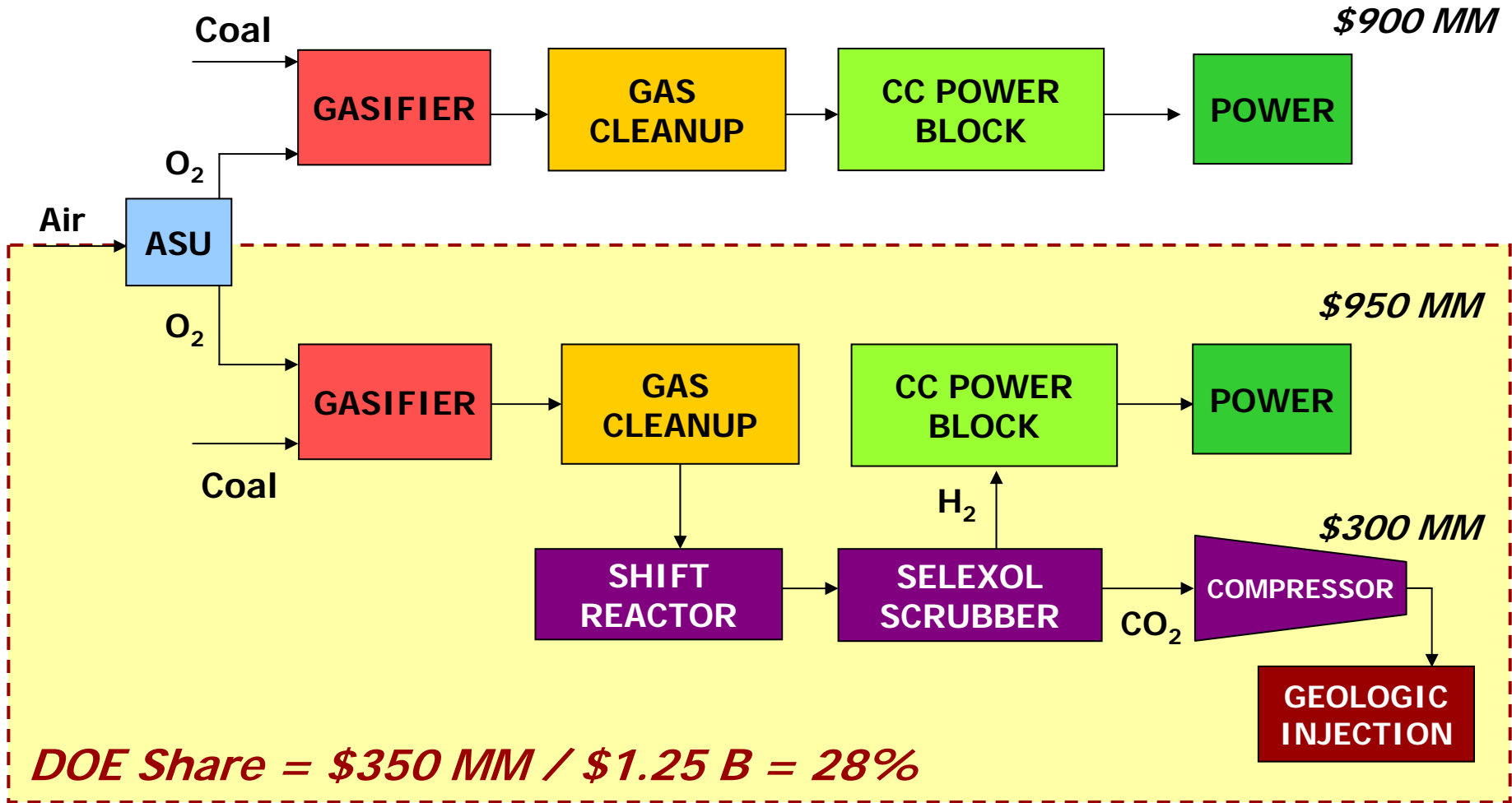
FutureGen Sample Case 1 (cont'd)

Demonstration Project Boundary

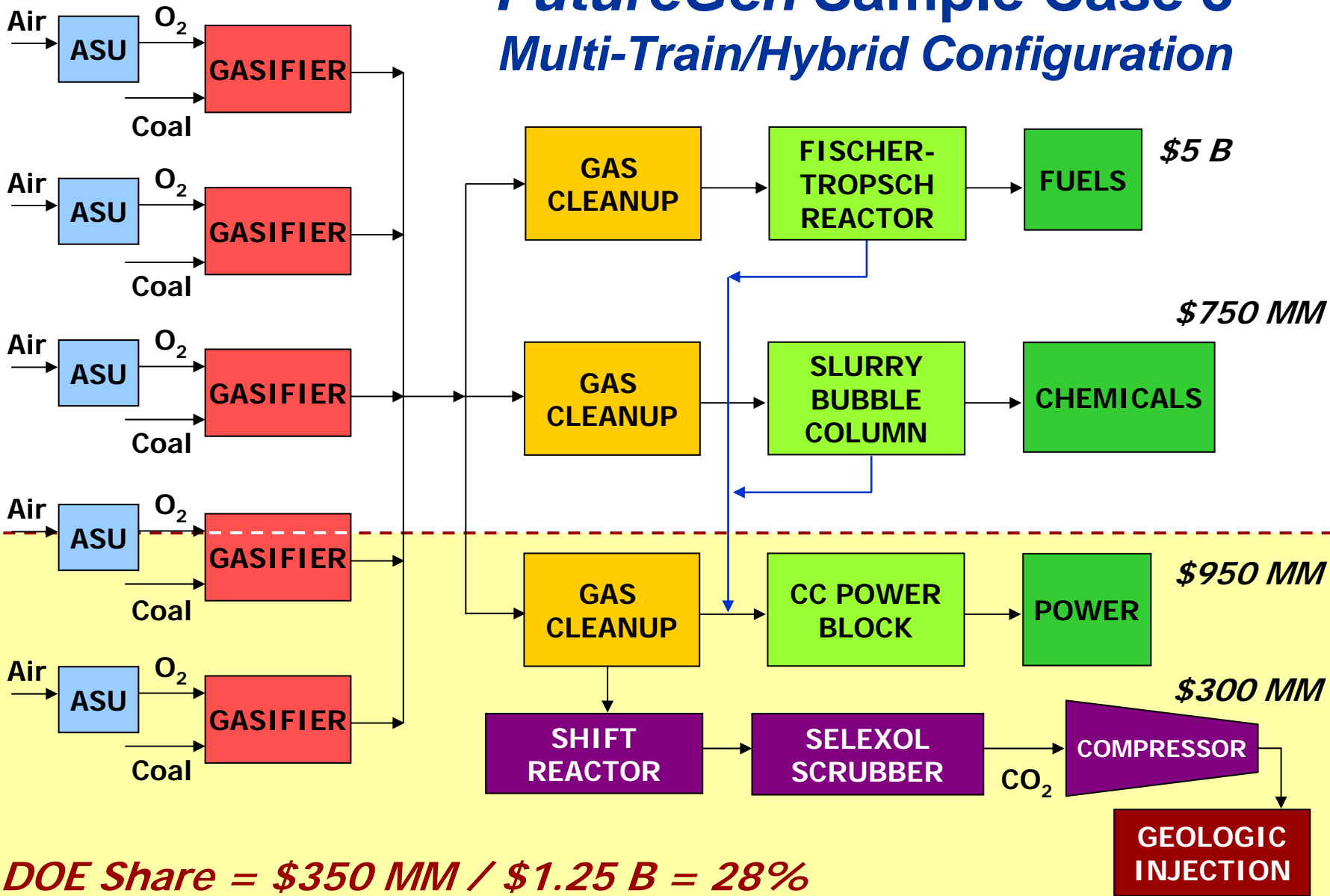


FutureGen Sample Case 2

New 2-Train IGCC Plant

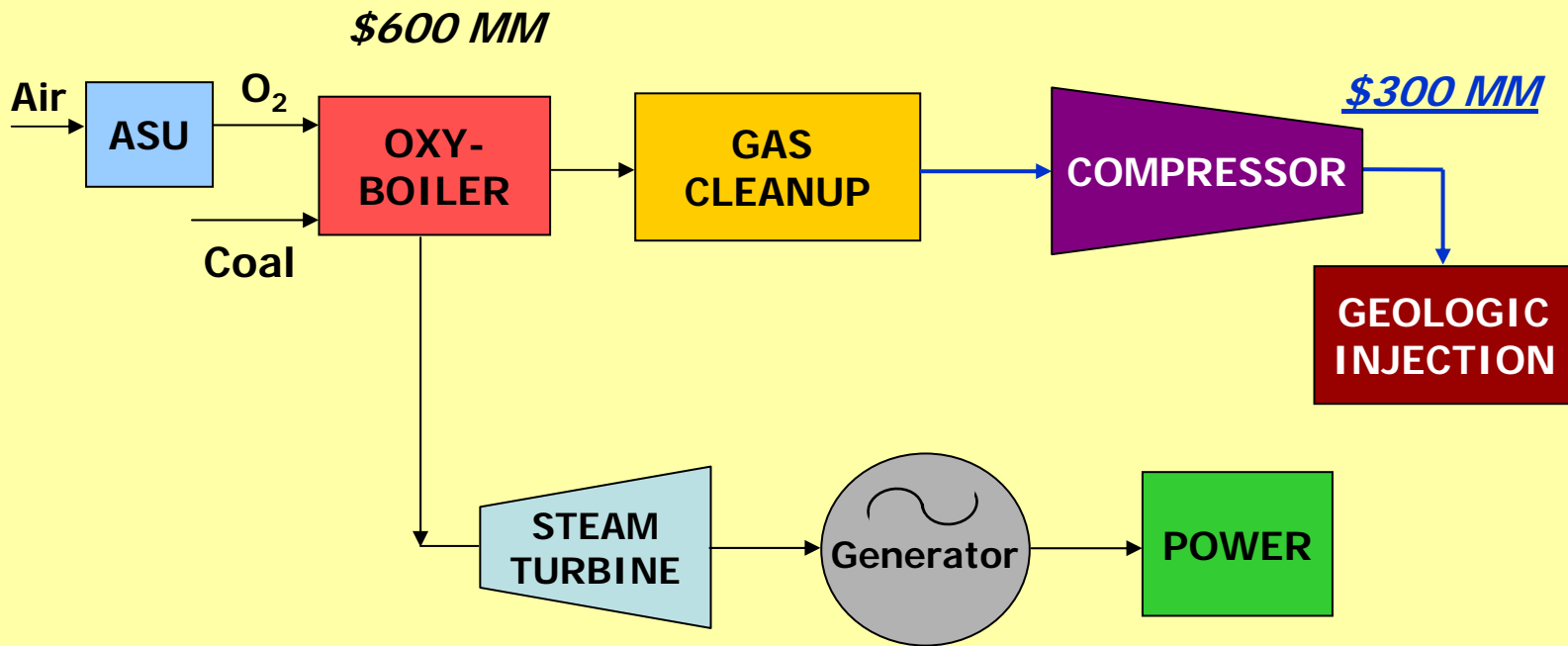


FutureGen Sample Case 3 Multi-Train/Hybrid Configuration



FutureGen Sample Case 4

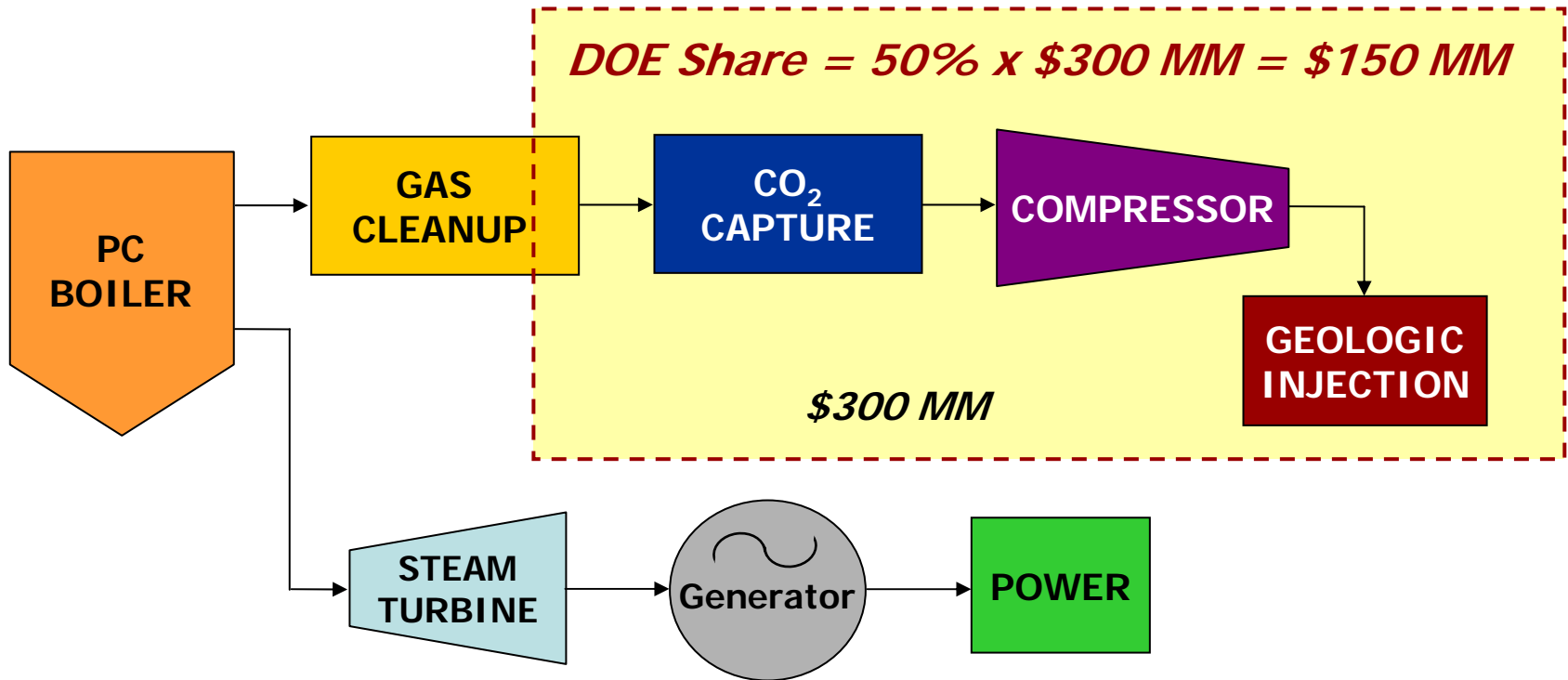
New Oxy-Combustion Unit



$$DOE \text{ Share} = \$300 \text{ MM} / \$900 \text{ MM} = 33\%$$

FutureGen Sample Case 5

Post-Combustion CCS Retrofit



Restructured FutureGen Program Schedule

Description	Date
Final FOA Issued	June 24, 2008
Industry Applications Due	Oct. 8, 2008
Project Selections Announced	Dec. 2008
Negotiations Completed & Agreements Awarded	Dec. 2009
NEPA (Environmental Impact Statements, 18-24 mos.)	Feb. 2009 - Jan. 2011
Plant Construction	2012 – 2015
Demonstration Project Operations	2015 – 2020
DOE Demonstration Project Operations Completed	2020

Summary

- **Competitive selection**
- **Multiple (e.g., 2-4) demonstration projects**
- **DOE's maximum cost share is lesser of:**
 - 50%; or
 - Cost of CCS & other step-outs
- **Specific objectives, requirements & instructions are provided in the:
Restructured FutureGen FOA
(DE-PS26-08NT00496, issued June 24, 2008)**

