

# Process Technology Group

# Separation and Capture

- Need to improve separation technologies (we know how to gasify)
- Need technologies that control multiple pollutants

# Hydrogen

- Need low cost source of hydrogen with no pollutant emissions
  - Need to develop improved technology to store hydrogen used in transportation applications
  - Need to develop fuel cells that don't require ultra-pure fuels
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# Hydrogen (cont'd)

- Need to reduce capital cost of producing synthesis gas (e.g., indirect gasification)
- Need to develop technologies for producing and storing hydrogen and electricity at times of fluctuating load (i.e., flexibility to produce desired product mix at peak market times).

# Hydrogen (cont'd)

- Need to develop infrastructure for hydrogen storage and delivery
- Only reasons to move to hydrogen economy are government mandated carbon reduction incentives
- Must reduce cost of carbon sequestration



# Summary: Short Term

- Not enough time to develop new process technology for plant that comes on line in 2005

# Summary: Mid Term

- Improved gasifiers, gas separation membranes, improved gas cleanup systems, large scale solid oxide fuel cells
  - Go to industry to identify financial hurdles
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# Summary: Long Term

- Integrated Gasifiers with Totally Different Technologies
  - ZECA
  - Indirect Gasification
  - Steam Gasification