

CO₂ Capture Technology: Options and Experiences



*Electricity Solutions for a
Carbon-Constrained Future*

August 6, 2007

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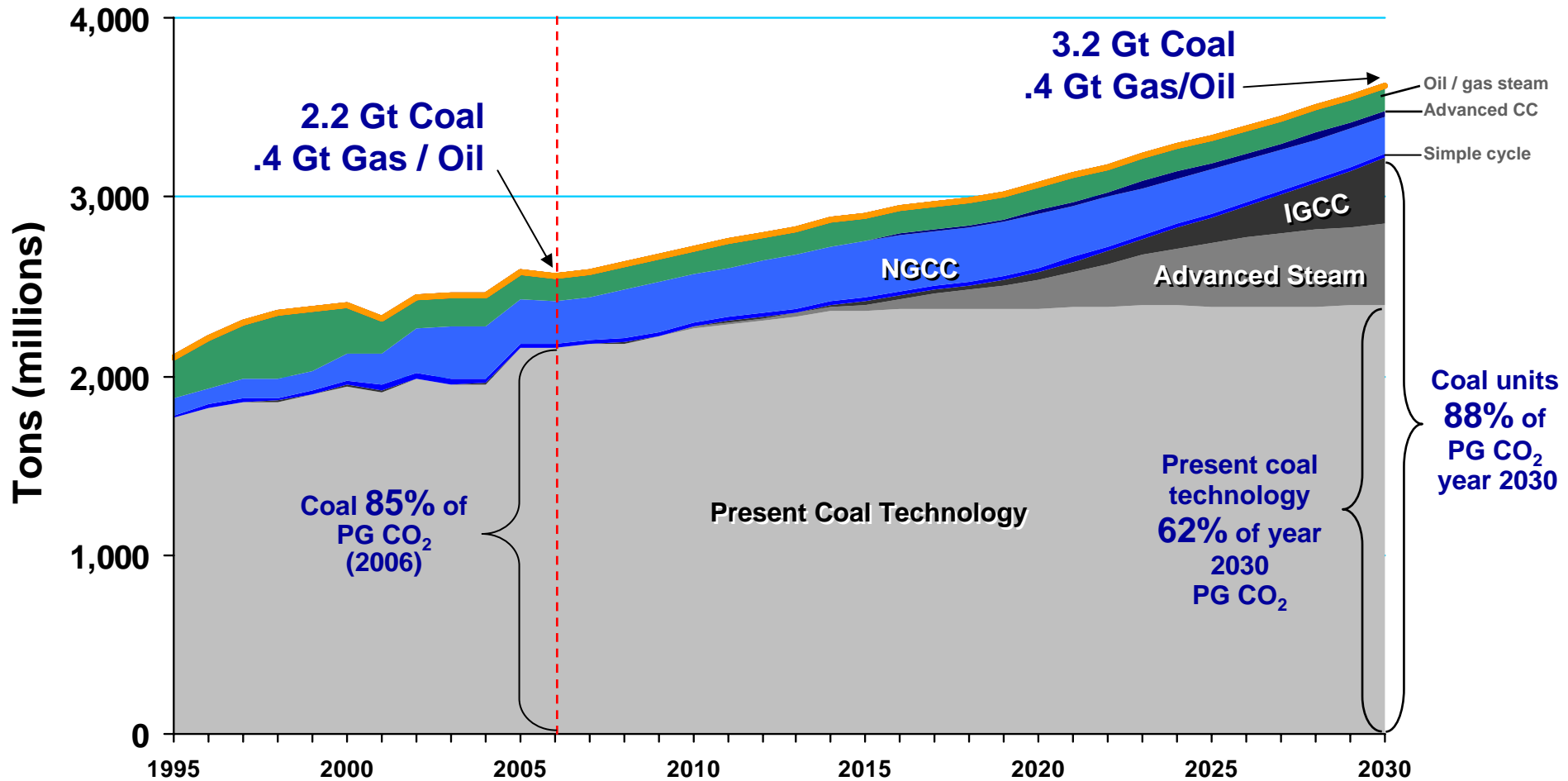
National Energy Technology Laboratory

Office of Fossil Energy



Total Fossil Generation Mix CO₂ Forecast

AEO'07 Reference Case



Coal Dominates CO₂ Emissions from Fossil Power Generation
Existing Coal Units Contribute 3 / 4 Cumulative PG CO₂ Through 2030



Carbon Capture Challenges

Pre-combustion (Synthesis Gas)



- Loss of CO₂ pressure due to flash regeneration
- Cooling / refrigeration of syngas to accommodate low operating temperatures; reheating prior to combustion
- H₂ losses, particularly in membranes
- Sulfur-tolerant materials / membranes

Post-combustion (Flue Gas)



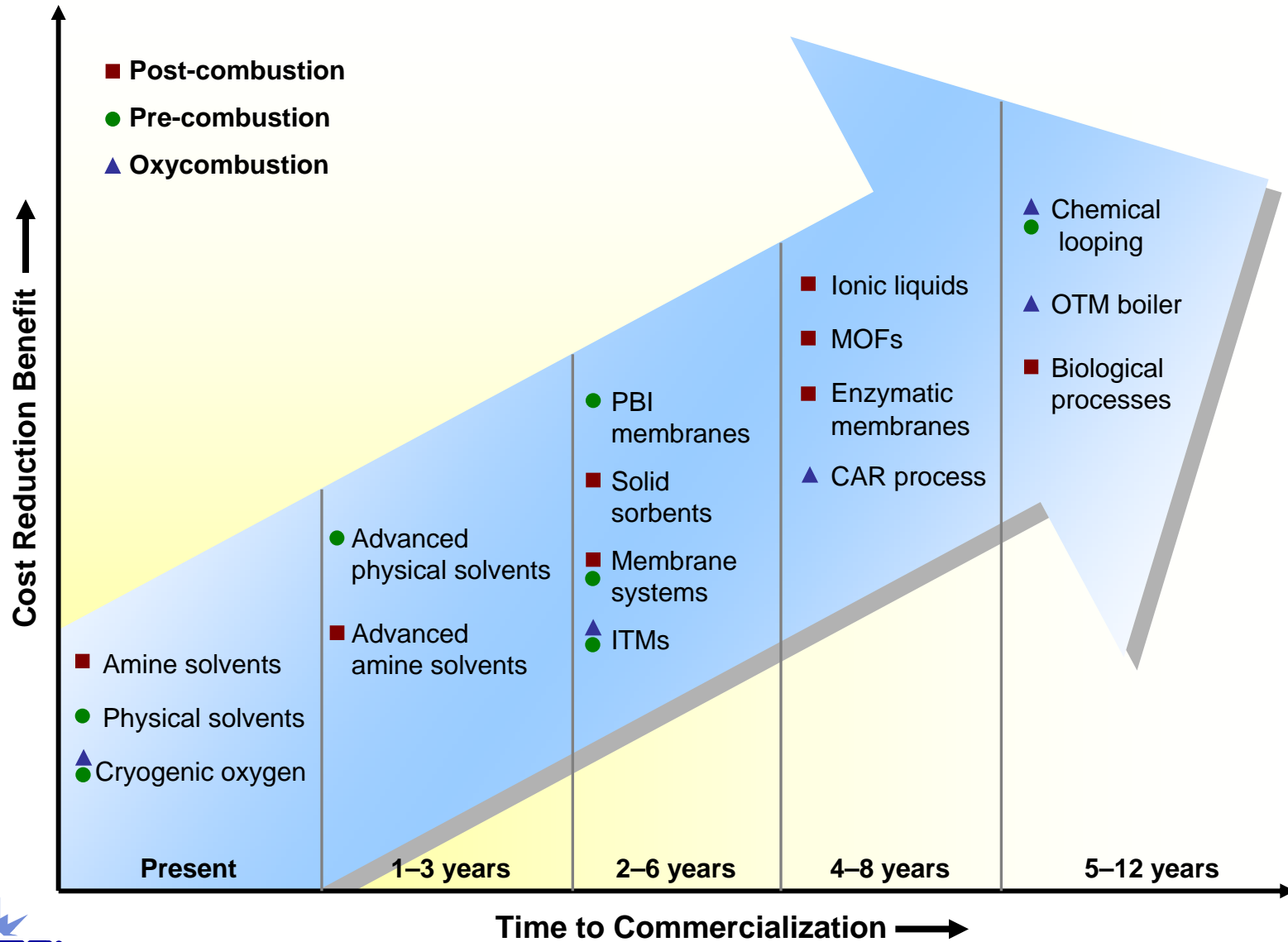
- Low-pressure flue gas dilute in CO₂
- Steam requirement for thermal regeneration (amines)
- High compression costs and large loads due to CO₂ produced at low pressure
- Flue gas contaminants

Oxycombustion

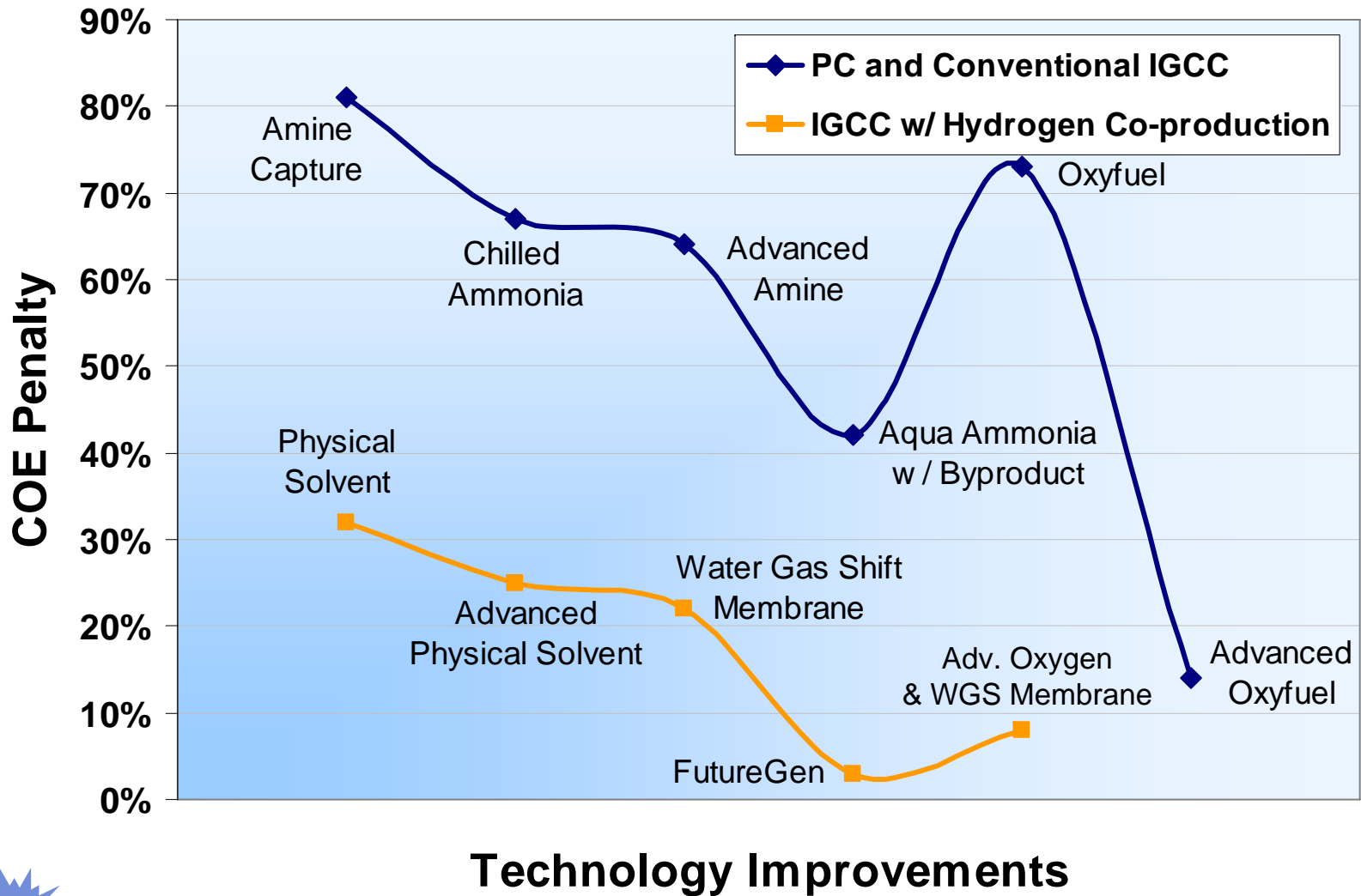


- Cost of O₂ production and materials
- Cooled CO₂ recycled to mitigate combustion temperatures

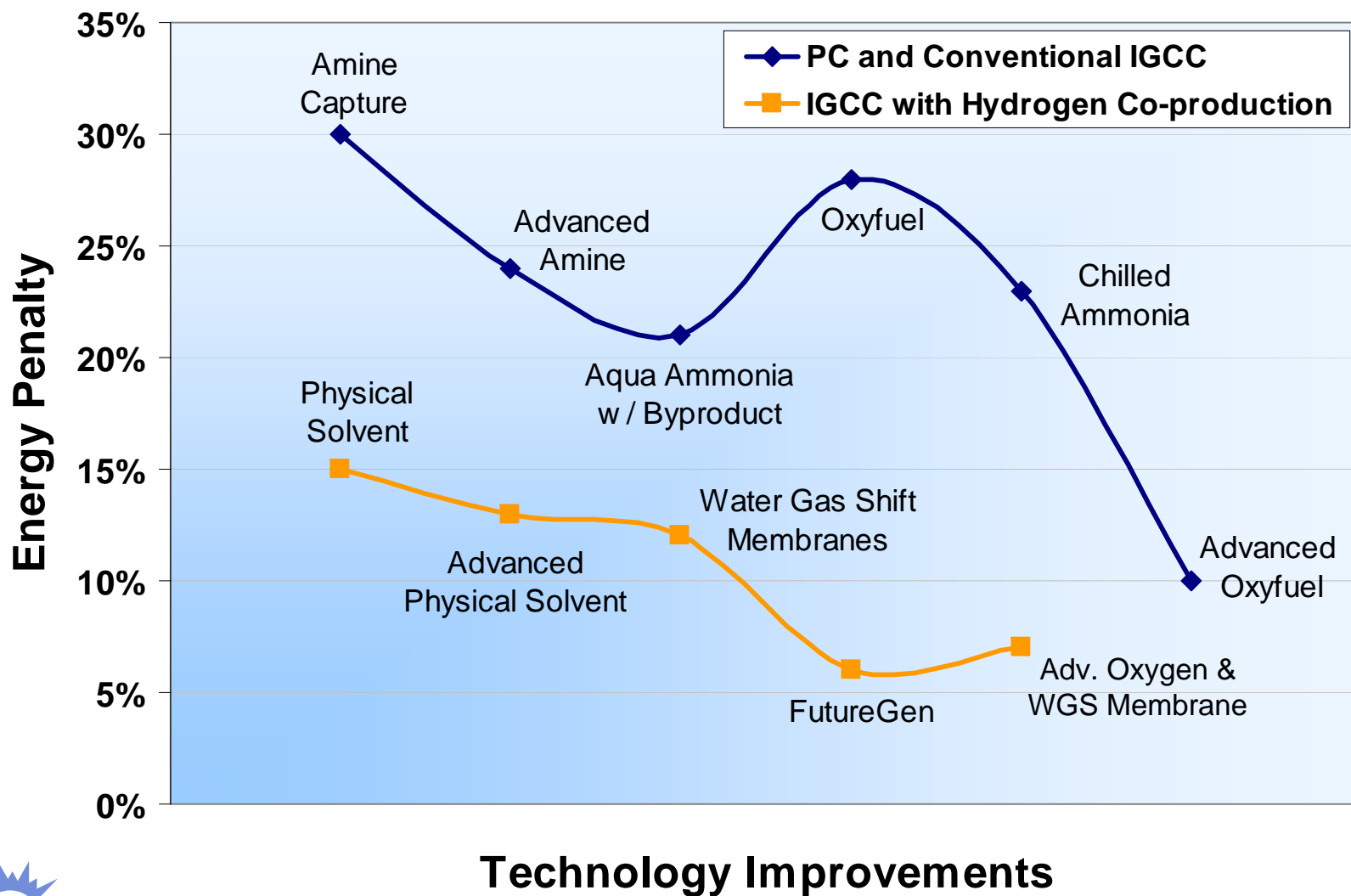
Innovation Advances



Cost of Electricity Penalty of Carbon Capture



Energy Penalty of Carbon Capture



For Additional Information

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