

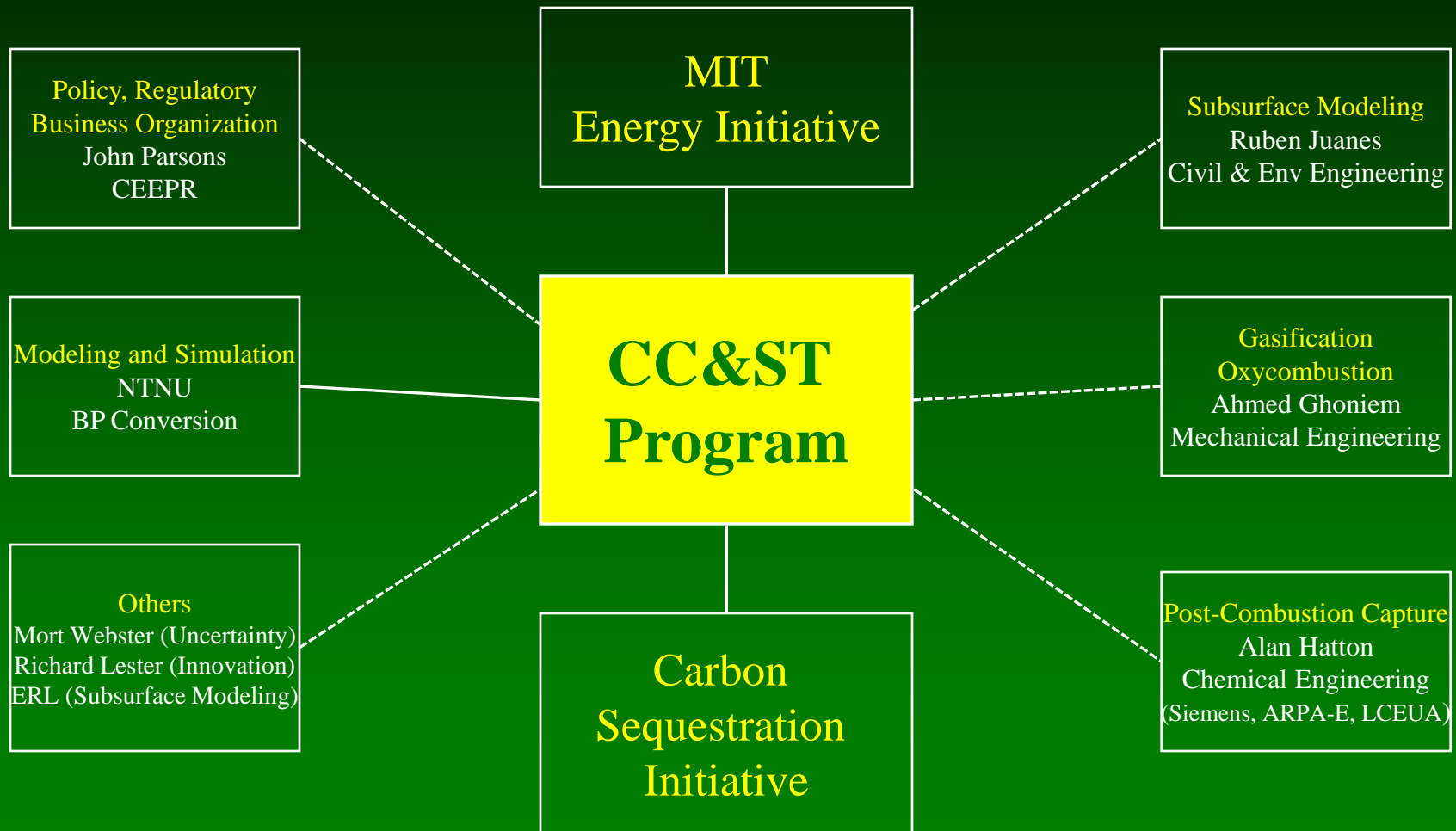
Presentation to the UK-US CCS R&D Workshop

Howard Herzog

MIT

May 10, 2010

Carbon Capture & Sequestration Technologies @MIT



Recent CC&ST Theses

May 2009 to present

Hildebrand, A.N., "Strategies for Demonstration and Early Deployment of Carbon Capture and Storage: A Technical and Economic Assessment of Capture Percentage," May (2009).

Raza, Y., "Uncertainty Analysis of Capacity Estimates and Leakage Potential for Geologic Storage of Carbon Dioxide in Saline Aquifers," May (2009).

Hamilton, M., "An Analytical Framework for Long Term Policy for Commercial Deployment and Innovation in Carbon Capture and Sequestration Technology in the United States," December (2009).

Kothandaraman, A., "Dioxide Capture by Chemical Absorption: A Solvent Comparison Study," December (2009).

Recent CC&ST Theses (continued)

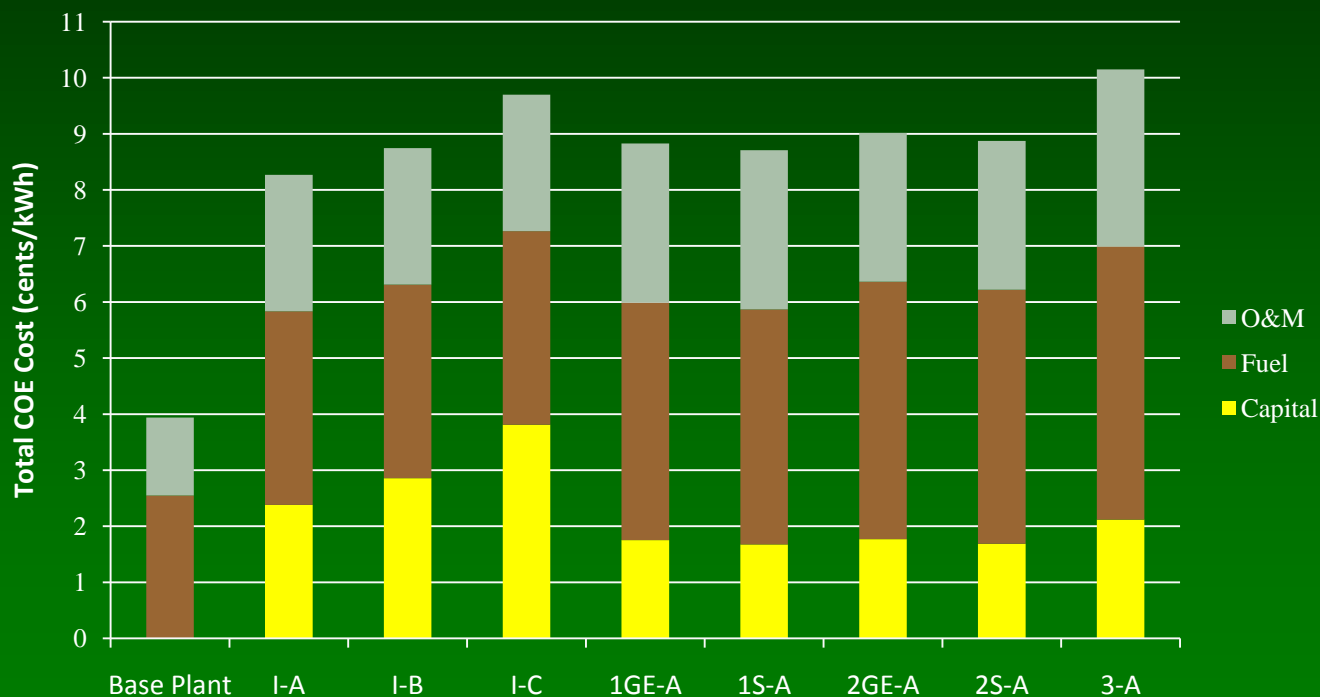
May 2009 to present

- Shu, G., "Economics and Policies for Carbon Capture and Sequestration in the Western United States: A Marginal Cost Analysis of Potential Power Plant Deployment," January (2010).
- Berkelmans, I., "Development and Application of a Framework for Technology and Model Selection Under Uncertainty," March (2010).
- Bashadi, S., "Using Auxiliary Gas Power for CCS Energy Needs in Retrofitted Coal Power Plants," May (2010).
- Ereira, E., "Assessing Early Investments in Low Carbon Technologies under Uncertainty: The Case of Carbon Capture and Storage," May (2010).
- Ranjan, M., "Feasibility of Air Capture," May (2010).

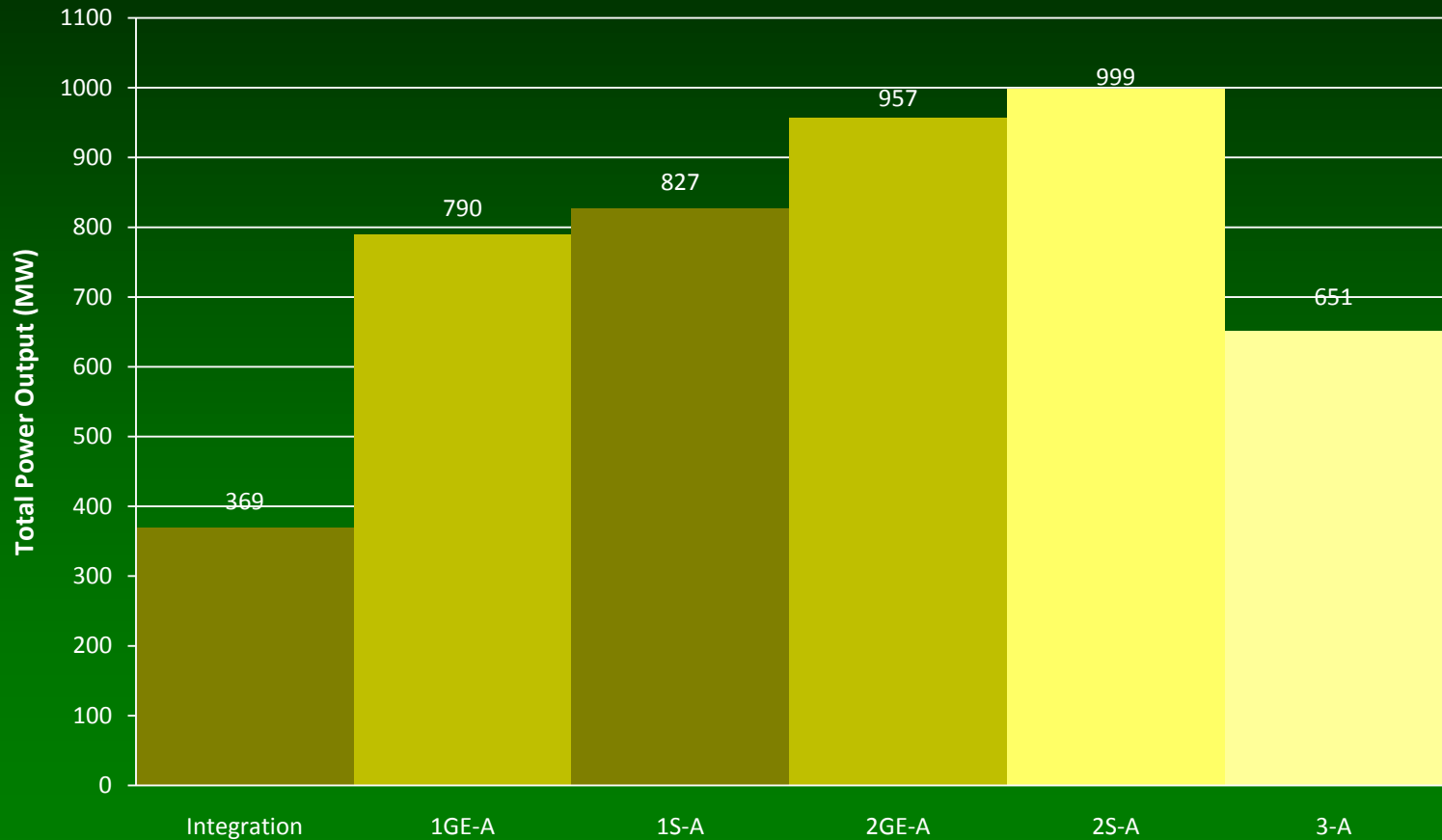
Using Auxiliary Gas Power for CCS Energy Needs in Retrofitted Coal Power Plants

- Detailed Amine process model (Aspen Plus)
- Costing using ICARUS
- GTPro/SteamPro for power/steam systems
- Cases
 - Integration
 - Gas Turbine
 - Gas Turbine/ Backpressure Turbine
 - Gas Boiler/ Backpressure Turbine

Using Auxiliary Gas Power for CCS Energy Needs in Retrofitted Coal Power Plants



Using Auxiliary Gas Power for CCS Energy Needs in Retrofitted Coal Power Plants



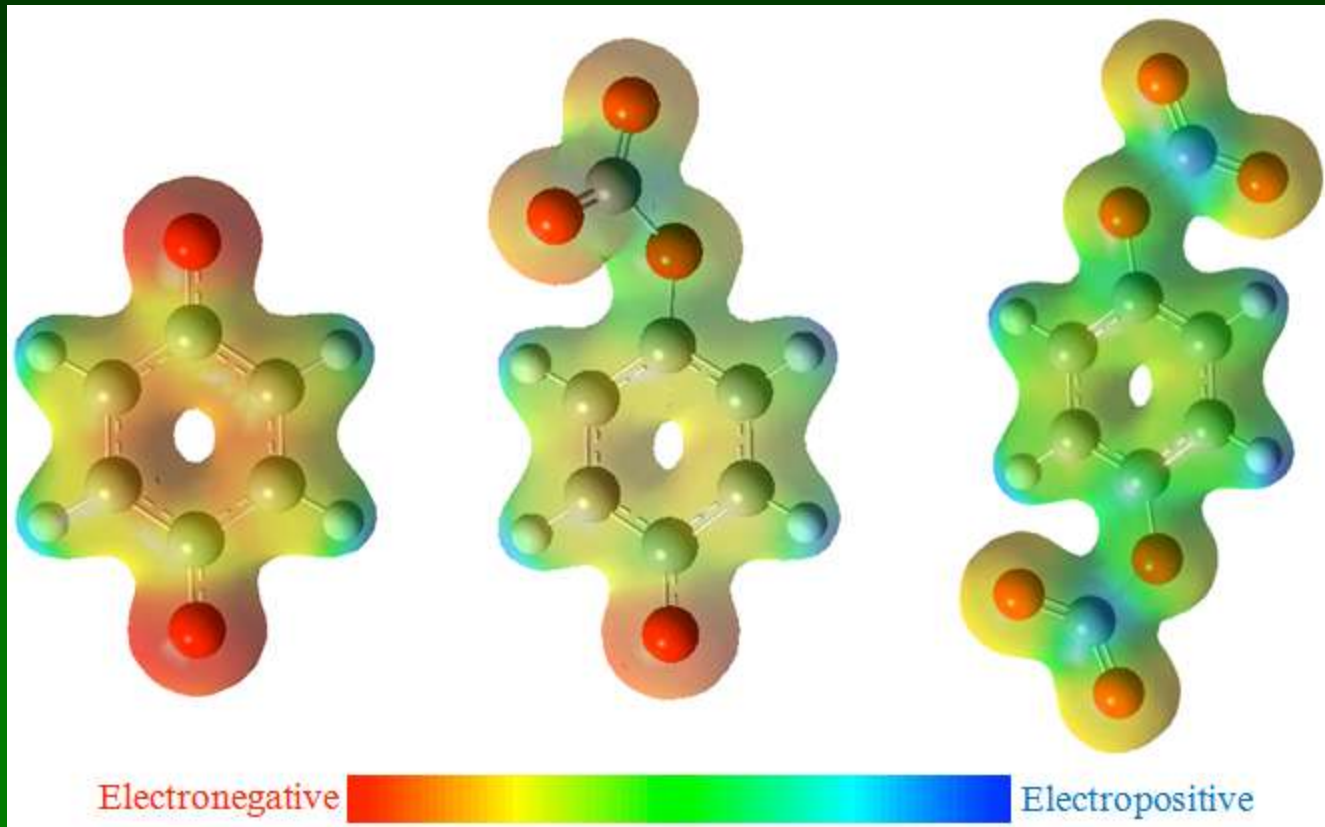
Using Auxiliary Gas Power for CCS Energy Needs in Retrofitted Coal Power Plants



Electrochemically Mediated Separation for Carbon Capture

- We are developing novel responsive sorbents and processes for the capture of CO₂ using electrochemical changes in molecular affinity for CO₂
- Collaboration with Siemens
- Just received ARPA-E Award

Electrochemically Mediated Separation for Carbon Capture



Biphasic Sorbents for Carbon Capture

- We are working with Tsinghua University in Beijing to develop composite solvent systems and new process concepts to exploit the unique characteristics of these solvents.
- Funded by LCEUA (Low Carbon Energy University Alliance)

CO₂ Post-Combustion Capture Workshop

- Talloires, France, July 11-13, 2010
- Objective: To better understand what (if any) emerging technologies look promising to replace today's amine processes
- Sessions
 - Absorption
 - Adsorption
 - Membranes and Ionic Liquids
- Attendees
 - Technology experts – “sellers”
 - Government and industry – “buyers”
- Results to be published in a special issue of the Chemical Engineering Journal

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