CLEAN COAL:
OXYMORON, OR A PATH TO SUSTAINABILITY?

Presented by: Edward S. Rubin
Professor of Engineering and Public Policy,
and Mechanical Engineering

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What is “Clean Coal”? 

“Clean coal is a term pollsters came up with because it polls higher than regular coal. What we want are real cleaner-burning fuels . . .”

– President Jeb Bartlet, The West Wing (TV series), March 27, 2002

“[part of a] strategy to take control of our energy future …invested substantially in [cost-effective] carbon capture and sequestration”

– President Barack Obama (website), September 2012

“Clean coal refers to technologies that improve the environmental performance of coal-based electricity plants.”

– American Coalition for Clean Coal Electricity, September 2012
Research Questions (1)

• What options are available to reduce environmental emissions and impacts of coal-fired power plants, especially greenhouse gases like CO₂? How effective are different options? What do they cost?

• What is the outlook for new or improved technologies with lower costs? How can we spur the technology innovations that are needed?

• What policies, regulations, and incentives (if any) are needed to achieve low emissions?
Research Products:
Tools to Evaluate Clean Coal Technologies

• The **IECM computer model** analyzes the **performance, emissions, costs, and uncertainties** of a wide range of power plants and environmental control technologies, including systems for CO$_2$ capture and storage (CCS).

• It is used worldwide for:
  - Process design
  - Technology evaluation
  - Cost estimation
  - R&D management
  - Risk analysis
  - Environmental compliance
  - Marketing studies
  - Strategic planning
  - Teaching & education

• Free and publicly available at: [www.iecm-online.com](http://www.iecm-online.com)
Recent studies have examined legal and regulatory issues related to carbon capture and geological sequestration, as well as...

Options for financing large-scale CCS demo projects
Research Findings

• Currently available technologies can reduce environmental impacts of coal-based power plants by varying degrees:
  – **Emission control systems** can reduce water and air emissions by about 90 to 99+% (depending on the pollutant)
  – **More efficient plant designs** can reduce fuel use, chemicals, and solid wastes by roughly 10 to 30%

• Large-scale demonstrations of CCS technologies, and reductions in their cost, are needed to advance GHG reductions from coal and gas used for power generation

• Widespread deployment of CCS requires sufficiently strong energy and environmental policy drivers that are lacking at the present time
Research Questions (2)

• Given our current reliance on fossil fuels, what is the potential role of “clean coal” technologies in moving toward a sustainable, low-carbon energy system?

How do we get there from here?
Insights from Energy Models

- **Coal with CCS** is a critical component of cost-effective strategies for sustainable low-carbon energy systems.

- **CCS on gas-fired plants** also is important, especially as natural gas gains a larger share of power generation markets.

![Graph showing energy production and reduction](image)
Clean Coal / Clean Gas: Bridge to a Sustainable Energy Future
Thank You

rubin@cmu.edu