



Energy Economic Models & Assessments:

Addressing Energy Technology through Policy-Based Analysis

Peter H. Kobos, Ph.D. Economist

Thomas E. Drennen, Ph.D. Economist

Ray E. Finley, Manager of the Earth Systems Department

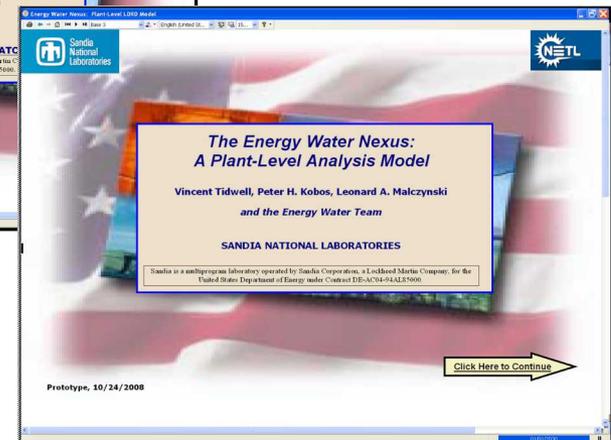
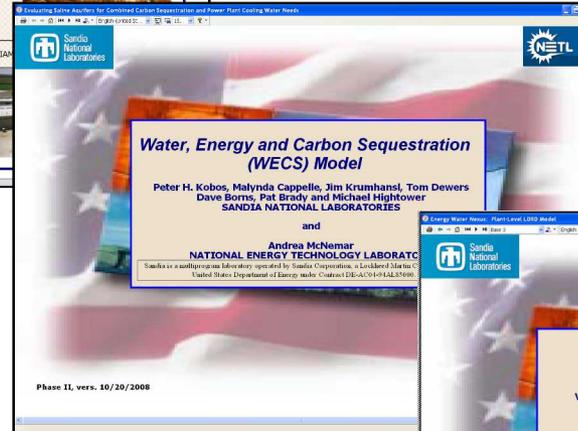
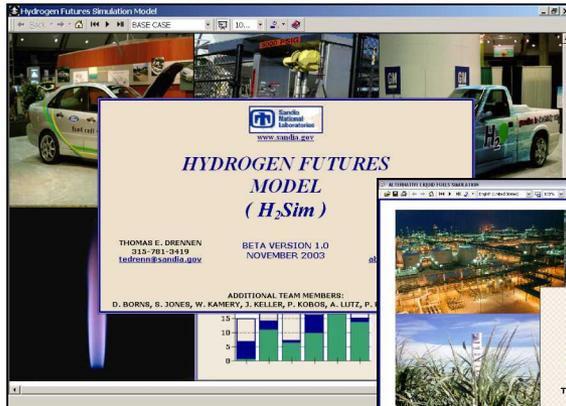
Sandia National Laboratories



Integrated Assessment Models: Addressing Technological Progress and Policy Assessment

Pilot Scale to Country Wide Technology Adoption & Assessment

- Electric Power and Efficiency
- CO₂ Sequestration
- Energy & Water Issues



Fuel-Specific Technologies

- Hydrogen
- Alternative Liquid Fuels



Memorandum of Understanding: *Select Energy, Water, and CO₂ Sequestration projects associated with NETL*

- 1. Energy-Water Project Management Research**
 - NETL / SNL, Direct collaboration on coupling CO₂ sequestration, produced water and power plants
 - Began in 2007.

- 2. Energy-Water Project Management Research 2**
 - NETL / SNL, Direct collaboration, Phase II of the Field Work Proposal listed in #1
 - Began in June 2008.

- 3. Regional Water Stress**
 - NETL / SNL, Direct collaboration, New Field Work Proposal
 - Began June 2008

- 4. Nanofiltration Treatment Options for Thermoelectric Power Plant Water Treatment Demands**
 - NETL / SNL, Direct collaboration, New Field Work Proposal
 - Began in Fall 2008

- 5. The Energy Water Nexus: A Plant-level Analysis Model**
 - SNL internal research, Ongoing



Mathematical Modeling Approaches for Energy Policy Planning

- **Top-down**
 - Energy sector, economy-wide, Computable General Equilibrium (CGE)
 - Useful for simulating taxes and externalities for economic costs
 - e.g., Input-Output Analysis, Jorgenson-Wilcoxon Model (CGE)
- **Bottom-up**
 - Simulation / optimization, technology descriptive
 - Useful for selecting fuel and technology choices
 - e.g., Least-Cost optimization models, MARKAL, MESSAGE, NEMS
- **Hybrid / Integrated Assessment Models**
 - Builds on the strengths of both Top-down and Bottom-up methods (economic tools, technology, builds the systems view from several sets of detailed components)
 - Useful to develop technology rich analysis modules combined with economic/policy insight



Questions, Thoughts?

Thank You

