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Does cost optimization approximate the real-world energy transition?

Modeling for energy policy analysis is often grounded in an assumption that economic rationale is the key driver of the future energy transition. For example, widely-used bottom-up energy system models optimize total system costs to produce energy scenarios for decades ahead. Using ex-post UK electricity system modeling in 1990-2014, I will show that cost optimization does not necessarily approximate the real-world energy transition. The deviation in cumulative total system costs from the optimal solution is 9-23% in 25 years under various technology, cost, demand, and discount rate assumptions. Cost-optimal scenarios, in fact, gloss over a large share of uncertainty that arises due to deviations from cost optimality. I will then demonstrate that exploration of large ensembles of near-optimal scenarios under parametric uncertainty can give indication of the envelope of predictability for the real-world transition. I will close with a reflective discussion about the tension between predictive and exploratory use of energy system models.

Bio

Dr. Evelina Trutnevyte is a Senior Researcher at ETH Zurich, Department of Environmental Systems Science and Swiss Competence Center for Energy Research-Supply of Electricity (SCCER-SoE), and an Honorary Senior Research Associate at University College London, Bartlett School of Environment, Energy & Resources. She holds the Swiss National Science Foundation Ambizione Energy fellowship for analysis of cross-technology and spatial risk trade-offs in electricity generation portfolios (RIGOROuS project). She is an energy systems analyst and modeler, specializing in socio-technical systems and energy decision making under uncertainty and at science-society interface. She is an engineer by training and completed her PhD studies at the Institute for Environmental Decisions, ETH Zurich.

Carnegie Mellon University

Center for Climate and Energy Decision Making Seminars

CEDM

12 October 2015
12:00-1:30pm EDT

Wean Hall 3701
Carnegie Mellon University

Lunch will be served at 11:50am. Seminar is presented under the auspices of CEDM and the department of Engineering and Public Policy.

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