Climate and Eneregy Decision Making

Sponsored Seminar

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Presenting on:

Modeling for Insight with an Energy Economy

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Department of Enginering and Public Policy

Seminar Abstract: Energy economy optimization (EEO) models have emerged as key tools for the analysis of energy and climate policy at the regional, national, and international scale. While cost reductions in computer hardware have facilitated the development of increasingly complex EEO models, such model complexity has also highlighted two critical shortcomings. First, with a couple exceptions, EEO models are not open source, so it is impossible to externally verify the results published in the peer-reviewed literature. Second, the treatment of uncertainty is often absent or cursory because large, complex models are difficult to iterate. This talk describes a new open source framework called Temoa—Tools for Energy Model Optimization and Analysis—that aims to address these shortcomings. Temoa utilizes a revision control system to publicly archive model source and data, which enables third party verification of all published modeling work. In addition, Temoa represents the first technology explicit EEO model to be designed, from initial conceptualization, for operation within a high performance computing environment. Once complete, Temoa will utilize sensitivity analysis, multi-stage stochastic optimization, and modeling-to-generate alternatives (MGA) to rigorously account for future uncertainty. These methods can be linked in series to develop robust strategies for future energy system development that account for both parametric and structural uncertainty.

Speaker Bio: Joseph DeCarolis is an assistant professor in the Department of Civil, Construction, and Environmental Engineering at NC State University. Before joining NC State in 2008, he was an environmental scientist at the U.S. Environmental Protection Agency in the Office of Research and Development. He received his PhD in Engineering and Public Policy from Carnegie Mellon University in 2004, where his dissertation focused on the economic feasibility and environmental impacts of large-scale wind power.

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