EPP and Center for Climate and Energy Decision Making

Sponsored Seminar

Eric Williams

Associate Professor
Golisano Institute of Sustainability at the Rochester Institute of Technology

Presenting on:

"Using experience and market curves to inform energy technology subsidy policy"

September 16, 2013
12 noon
(Lunch served at 11:50am)
129 Baker Conference Room
Department of Engineering and Public Policy

Seminar Abstract: The seminar explores methods and case studies aimed at better understanding how to subsidize emerging energy technologies to reach market competitiveness. One avenue pursued combines market curves that indicate willingness-to-pay and scale for different sub-markets with expected cost reductions. The notion of cascading diffusion is that sub-markets with favorable economic conditions serve as the basis to build scale and reduce costs so that the technology becomes attractive in new markets. Cascading diffusion could potentially be driven by geographic variability in energy prices and climate. The model is developed for residential solid oxide fuel cells (SOFCs) for combined heating and power. Combining market and cost results, we find that for rapid cost reductions (learning rate =25%), a modest public subsidy can bring make investment in an SOFC profitable for 20-160 million households. If cost reductions are slow however (learning rate =15%), residential SOFCs may not become economically competitive. Due to higher energy prices in some countries, international diffusion is more favorable than domestic, mitigating much of the uncertainty in the learning rate. The second issue explored is the scheduling of subsidy reductions. A minimum cost subsidy continuously tracks cost reduction, but is not practical to administer. The simplest subsidy is constant until competitiveness is reached, but significantly overuses public funds. We explore the effect of staircase type planned reductions in subsidies on required public investment. The case study explored is lithium ion batteries for electric vehicles. Empirical learning rates for lithium batteries range from 9-22%. A sample result is that with a learning rate of 9.5%, a subsidy plan tapered annually would cost a total of $27 billion over the life of the program, compared to $134 billion for a flat subsidy of $6,000 per vehicle, or $6 billion for a continuously declining subsidy.

Speaker Bio: Originally trained in theoretical physics, Eric Williams began work on sustainability related systems assessment of technology at the United Nations University in Tokyo. Returning to the U.S. first to Carnegie Mellon and then to Arizona State University, he is now Associate Professor at the Golisano Institute of Sustainability at the Rochester Institute of Technology. After a decade of mostly working on the sustainability implications of information technology via the lenses of life cycle assessment and materials flow analysis, Eric's recent research focuses on understanding progress and diffusion of emerging energy technologies.

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