FirstScience News

NSF grant to study national energy policy and technology impacts

- 14 Oct 2010
By Ohio Supercomputer Center

The Ohio State University, Ohio Supercomputer Center receive federal grant to create power grid computer model

The Ohio State University and Ohio Supercomputer Center have received a four-year, $1.675 million federal grant to develop a computer tool that researchers, government leaders and the public can use to study and understand changes in energy-related technology, policy and pricing.

Researchers will develop a computational system called the Integrated Computational System for Energy Pricing and Policy (ICS-EPP), which models the national power grid. The ICS-EPP will enable analysis of various scenarios including the cost of adding electric vehicles to the grid, the effect of various pricing and incentive structures for users, changes in the demand on the system and resulting environmental impacts.

"Concerns about our country's reliance on fossil fuels have increased the incentive to reduce our dependence with solutions including increased renewable energy, energy storage, and plug-in hybrid and battery electric vehicles," said Ramteen Sioshansi, assistant professor of integrated systems engineering and the leader of the project. "However, it is important to understand economic and policy questions regarding these new solutions, as well as resulting trade-offs in initial cost, local air quality, climate change, technology and energy independence. Other factors, such as locational differences in the benefits of certain technologies, need to be considered as well."

The project is funded by a National Science Foundation program that aims to increase the understanding of science and engineering phenomena and socio-technical innovations in order to enhance the national quality of life. The federal grant will be shared by Ohio State's College of Engineering and College of Food, Agricultural and Environmental Sciences as well as the Ohio Supercomputer Center.

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"This award exemplifies Ohio's leadership in linking higher education research to measurable and long-lasting economic and environmental results," said Eric Fingerhut, chancellor of the Ohio Board of Regents. "Getting NSF recognition is a validation of the state's approach to excellence as outlined in the 10-year Strategic Plan for Higher Education."

In addition to using the ICS-EPP to examine various policy and technology scenarios, the researchers aim to make the model scalable and available for others. This will allow users to determine how various energy policies will affect the costs of investments in the energy grid and the costs to consumers. The model could also be used to analyze the environmental impacts of policy decisions, by measuring greenhouse gas and other emissions associated with energy production and use, for example.

"This program builds on collaboration between the Ohio State Center for Automotive Research and the electric utility and automotive industries," said Giorgio Rizzoni, director of the Center for Automotive Research. "Our SMART@CAR consortium, consisting of 20 industry partners, will provide motivation and guidance for the program and will be early users of this model."

Similarly, consumers could use the model to examine the potential benefits of different energy technologies. The model will also be scalable and flexible, in that a user can examine custom-tailored energy technologies and policies, as opposed to selecting from a pre-defined "list" of options.

By developing and making the ICS-EPP widely available, policy makers, local government leaders and citizens will be able to understand how all of these variables will direct the energy future of our country.

"This modeling tool will provide utility regulators with a sophisticated and unbiased analysis of the economics and feasibility of choices that will inevitably arise," said Alan Schriber,