

## Smart Grid

For 29 years, ACEEE's energy efficiency experts have helped to shape our nation's energy efficiency research and policy agenda. We achieve our success through...

- conducting in-depth technical & policy analyses
- advising policymakers, energy professionals & utilities
- working collaboratively with businesses & other organizations
- organizing conferences
- publishing conference proceedings and reports
- educating consumers & businesses

Collaboration is key to ACEEE's success. We work with organizations around the globe including federal, state, and local government agencies, utilities, research institutions, businesses, and public interest groups. Our focus is on 6 primary program areas:

- Energy Policy
- Economic Analysis
- Buildings, Appliances, & Equipment
- Utilities
- Industry & Agriculture
- Transportation
- ACEEE is leading the development of technology and policy solutions that ensure the security of our energy systems. As energy leaders, we promote the vibrancy of the American economy and the sustainability of the environment world-wide.

### ACEEE PRIORITIES

Congress should...

- Keep in mind that customer awareness of energy use is key to the energy efficiency of a "smart grid." A well-designed smart grid will make energy use more visible to residential, commercial, and industrial customers through improved metering, billing, and rate design. It will offer customers new opportunities to monitor, control, and manage their energy use.
- Include distributed resources, such as CHP and locally generated solar and wind energy, as part of any plans for a national smart grid.
- Support regulatory models that allow both customers and utilities to benefit from the smart grid.
- Support research on the potential benefits of a national smart grid and ways to maximize the benefits. These benefits may include:
  - transforming customer energy efficiency
  - avoiding costly blackouts
  - improving the security and reliability of our electricity
  - reducing the production of greenhouse gases
  - facilitating renewable energy development
  - reducing the need for new power plant construction<sup>1</sup>
- When discussing smart grid legislation, support technologies that have been thoroughly tested and evaluated. We especially encourage research on the impacts of smart grid technologies on customer behavior and energy use.

### THE ISSUE

"Smart grid" is an umbrella term describing an electrical transmission and distribution system that employs a full array of advanced electronic metering, communications, and control technologies. The grid would provide detailed feedback to customers and system operators on energy use and allow precise control of the energy flow in the grid. Smart grid proponents claim significant energy efficiency and energy savings benefits; experience and results to date are promising, but research and evaluation supporting these claims is still limited. We recommend that smart grid design be based on behavioral research as well as technological advances and that utilities match their technologies to the needs of their customers.

### SUMMARY

The advanced metering, communications, and control technologies of a "smart grid" could allow system operators to optimize the delivery of electricity to their customers both accurately and efficiently. These technologies give customers and utilities detailed feedback that can be used for tracking and managing energy use.

Advocates of smart grid use offer compelling arguments in favor of updating our national electricity systems. U.S. transmission and distribution systems have not evolved to match the development of computer technology and are becoming antiquated. As concern grows about the costs of blackouts, the risks of climate change, and the importance of secure and reliable energy resources, smart grid systems are an increasingly attractive option.<sup>2</sup>

Widespread deployment of a smart grid would provide new tools for energy efficiency. Utilities and customers could optimize their own energy use for greater savings, leading to

financial and environmental benefits. Advanced metering, improved controls, and innovative rate structures would empower customers to manage their own energy use. Some pilot programs are exploring these opportunities. Researching customer behavior and choosing technologies that suit customer needs are essential steps in designing an energy-efficient smart grid.

Transitioning to a smart grid requires financial resources. However, the alternative — using a system that may be less stable, less flexible, and less efficient — may not be sustainable. Also, creating a smart grid could provide “green jobs” by supporting the integration of renewable energy technologies, the use of plug-in vehicles, and the integration of “local” resources such as energy storage and distributed generation.<sup>3</sup> KEMA estimates that building a smart grid would create 278,600 jobs while the grid is being developed and 139,700 jobs during the first five years that the grid is in place.<sup>4</sup> Utilities could also monitor the smart grid at multiple levels for improved reliability and security.

Like the technologies that it can include, the concept of a “smart grid” is flexible. Its design depends upon the goals of the stakeholders who agree to build it. We encourage further research into smart grid development and its potential benefits to the nation. We especially encourage thorough testing and evaluation of how customers respond to implementation of various smart grid technologies and services. Although smart grid proponents often mention the grid’s potential energy savings, building a strong foundation for their claims will require more research.

While the smart grid is often seen as a technological advance, its efficiency will depend on how customers respond to it. Smart grid technology will not necessarily save energy unless utilities base their rate design, education, and programs on research and evaluation. If utilities empower customers to make smart choices about their electricity use and to take advantage of renewable energy sources, creating a smart grid may also change how we use and generate electricity.

FOR MORE INFORMATION:

[http://www.oe.energy.gov/DocumentsandMedia/DOE\\_SG\\_Book\\_Single\\_Pages\(1\).pdf](http://www.oe.energy.gov/DocumentsandMedia/DOE_SG_Book_Single_Pages(1).pdf)

<http://www.kema.com/services/consulting/utility-future/job-report.aspx>

<http://www.ferc.gov/legal/staff-reports/demand-response.pdf>

[http://www.utilitiesproject.com/documents.asp?d\\_ID=4602](http://www.utilitiesproject.com/documents.asp?d_ID=4602)

[http://www.smartgridnews.com/artman/uploads/1/SGNR\\_2009\\_EPRI\\_Green\\_Grid\\_June\\_2008.pdf](http://www.smartgridnews.com/artman/uploads/1/SGNR_2009_EPRI_Green_Grid_June_2008.pdf)

[http://www.oe.energy.gov/DocumentsandMedia/Electric\\_Vision\\_Document.pdf](http://www.oe.energy.gov/DocumentsandMedia/Electric_Vision_Document.pdf)

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<sup>1</sup> U.S. Department of Energy, *The Smart Grid: An Introduction*, [http://www.oe.energy.gov/DocumentsandMedia/DOE\\_SG\\_Book\\_Single\\_Pages\(1\).pdf](http://www.oe.energy.gov/DocumentsandMedia/DOE_SG_Book_Single_Pages(1).pdf) (accessed April 7, 2009).

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> KEMA, *The U.S. Smart Grid Revolution: KEMA’s Perspectives for Job Creation*, <http://www.kema.com/services/consulting/utility-future/job-report.aspx> (accessed August 25, 2009).