

Standards Today

A Journal of News, Ideas and Analysis

A publication of
**CONSORTIUM
INFO.ORG**
GesmerUpdegrove^{LLP}

April–May 2009

Vol. VIII, No. 3

EDITORIAL:

Energy Conservation From Zero to Sixty

Andrew Updegrove

Throughout the 20th century, the U.S. electric power delivery infrastructure served our nation well,... This once state-of-the-art system brought a level of prosperity to the United States unmatched by any other nation in the world. But a 21st-century U.S. economy cannot be built on a 20th-century electric grid.

A Vision for the Modern Grid, National Energy Technology Laboratory, for the DOE, March 2007

For decades utility companies and environmentalists alike have known that the most dramatic and economical advances in energy policy could be achieved through energy conservation than by any other means. By utilizing techniques as simple as buying more efficient appliances and better insulating our homes we can lower our dependence on foreign oil, release fewer greenhouse gases, and save money as well, all at the same time. For almost as long, utilities have promoted the concept of “demand side management,” and sought to enlist the aid of consumers and businesses to shift electricity usage to low-demand times of the day, with the potential benefit of avoiding the need to build expensive new power plants.

Sadly, conservation efforts that depend on consumer cooperation have been only marginally successful at best, gaining traction primarily during energy price peaks, and as quickly subsiding as gas prices recede. Where gains have been made, this has occurred slowly and through regulatory means, as old appliances fail and are replaced by those that are built to the higher efficiency ratings that are now required by law,

and as older buildings are rebuilt or replaced according to new, more energy-aware building codes. But where regulations have not applied, progress has been less satisfying. Few homeowners have opted to install inexpensive energy conservation tools, such as timer-based thermostats and water heaters, that could save them money every month, while slowing the rise of utility rates as well.

Sadly, conservation efforts that depend on consumer cooperation have been only marginally successful at best, gaining traction primarily during energy price peaks, and as quickly subsiding as gas prices recede.

Today, through the use of new technologies and standards, and as a product of a new administration in Washington, there is the very real potential to advance energy conservation by an order of magnitude in a surprisingly short period of time. The name that has been given to *über* design concept that its proponents believe can result in such a quantum leap in policy realization is the "Smart Grid."

One way to grasp what a transition to a Smart Grid can do for energy is by way of analogy: In many ways, the Smart Grid would be to the existing utility network what the Internet and the Web have become to the traditional telecommunications system. Before the Internet, that system was a privately owned, government regulated technology backbone that delivered and accepted a limited range of transmissions (largely voice and fax data) from homes and businesses that could create and accept those signals, and nothing more. In other words, although the network was smart, the nodes (us) were dumb.

Today, of course, the telecommunications backbone comprises the connective tissue between that links an exploding cloud of very smart nodes that feed many data formats (voice, graphic, video) into the system in order to serve virtually all of society's needs, from supporting financial transactions to delivering content of all kinds to supporting global supply chains. Even a

"In the modernized grid, well-informed consumers will modify consumption based on the balancing of their demands and the electric system's capability to meet those demands" - NETL

humble laptop can play a vital role in creating, managing and utilizing many of the most complex functions that the Internet now supports. The result is that the telecommunications system has become a vastly more valuable network than it ever was before – not one, but several orders of magnitude more valuable and essential to the moment by moment existence and operation of society, commerce, science, education and government.

To close the analogy, as every home WiFi enabled network can become an intelligent node in the global telecommunications network, so can the electrical system of every home or business become an intelligent, interactive node in the national electric grid network. Much as a home or business router can tie a host of two-way services and capabilities into the telephone and cable system, so can a home or business electrical network become an interactive part of the power grid in ways that can dramatically lower costs to the user and demand on utilities, thereby helping achieve all of the environmental, social, and national benefits noted above.

How? By enabling end users to cost-effectively install alternative energy sources, such as wind generators and solar panels that can not only provide immediate power, but that will automatically and intelligently become part of the Smart Grid upon installation. An ever expanding number of the these highly distributed generating units will be able to sell excess power back into the grid at the highest price in real time to distant users, including those that may be willing to pay a premium for "green" power.

A Smart Grid-enabled home system will both decrease central generating requirements as well as lower home owner utility bills by monitoring electrical prices as they fluctuate during the day, and shifting consumption to lower-cost, off-peak times of day while selling back stored energy during high peak, high cost hours, all in real time and on a transactional basis. The owner of a hybrid automobile will also be able to treat that vehicle as a plug and play node in the Smart Grid, able to sell power into the grid at night when the owner is asleep as well as to “fuel up” on electricity at a remote location, all the while resulting in up and down adjustments to the owner’s home utility bill.

The technology to do this all of this is available now, or will be in the near future. The government is counting on users to not only accept that technology in their homes, but to pay attention to it as well. In the words of the Vision document quoted above:

In the modernized grid, well-informed consumers will modify consumption based on the balancing of their demands and the electric system’s capability to meet those demands. Demand for new cost-saving and energy-saving products will benefit both the consumer and the power system.

But will consumers in fact play their part?

The answer to that question will almost surely be both yes and no. No, if consumers, and to a lesser extent businesses, must hire expensive contractors to undertake otherwise unnecessary upgrades, configure and maintain complex new systems, and opt into confusing billing arrangements. But yes if electrical products of all appropriate types are made to “plug and play” with the Smart Grid out of the box, without complex configuration requirements and able to query customers in plain English in easy to understand displays. And yes again if all utility companies use the same formats and conventions to create, transmit, and report Smart Grid information back to consumers in ways that they can readily understand.

That is where standards will play a vital behaviorist as well as technical role, because without standards, nothing can plug and play, no information can be shared, and no network effects can be felt. Nor will prices drop to the point where government subsidies will become unnecessary, or competition arise to provide ever greater efficiencies and more valuable efficiencies.

For this to happen, hundreds of existing and non-existent standards will be needed, and a great deal of determination and cooperation must be demonstrated by thousands of competitors. The good news is that such a challenge has been met before (at least on the technical level), when AT&T brought the nation’s telecommunications system forward into the future. And the better news is that the U.S. government, empowered by a national economic crisis, has committed to provide the economic and agency support to make it happen again.

If we wish to seize this golden opportunity to dramatically accelerate our ability to conserve energy, lower energy costs, and meet our global obligations to curtail greenhouse gases, private industry and utilities need to act swiftly. In order to do

so, they must dedicate themselves to collaborating swiftly and effectively to develop and then implement the hundreds of standards that will be needed to make the Smart Grid a reality.

Everyone will be a winner if they do. The most obvious beneficiaries will be the utilities themselves, as they avoid the costs, complexities and uncertainties of permitting and building new power generation facilities. Vendors will also reap huge profits, as they provision the hardware and software that will make the Smart Grid work.

But the greatest benefits will be felt by the citizens that do their part and climb aboard, doing well through lower energy costs as they do good by helping the nation achieve greater energy independence and a greener future.

For far too long, energy customers have failed to do their part by taking advantage of the conservation opportunities that governments and utilities have provided in the past. This time around, citizens need to quit idling on the sidelines and make their homes part of the Smart Grid their hard-earned tax dollars will be creating. If they do, America's progress towards a more responsible future will accelerate dramatically.

Gentlemen - and Ladies - clearly it is time to start your engines.

Copyright 2009 Andrew Updegrave

Sign up for a [free subscription](#) to **Standards Today** at

<http://www.consortiuminfo.org/subscribe/2.php?addentry=1>
