

Stimulating Smart Grid

RECOVERY ACT REPORT CARD // BY DARRELL DELAMAIDE

➤ **WHEN THE GREAT DEPRESSION** hit the United States, Herbert Hoover followed by Franklin Roosevelt eagerly channeled government funds into the country's biggest shovel-ready project of the era – the mammoth hydroelectric facility we know today as the Hoover Dam.

The immediate goal was to put people back to work and to jump-start an economic recovery, but the means chosen was a long-term infrastructure project that transformed electric power in the western United States.

Today's Department of Energy hopes to achieve some of the same objectives with a relatively small sliver of the \$831 billion in stimulus funds made available by the 2009 American Recovery and Reinvestment Act to counter the recession brought on by the 2008 financial crisis.

Nearly \$4 billion of that stimulus money is going into projects to develop smart grid technology and help train workforces at utilities to benefit from it.

"Our hope is that these projects will help reduce market risk and technology risk when making decisions about smart grid," says Hank Kenchington, the deputy assistant secretary who is coordinating the effort through the department's Office of Electricity Delivery and Energy Reliability. "We would like to help this technology reach escape velocity."

Smart grid technology is designed to optimize distribution and consumption of electricity with the goal of moderating the rise in overall demand and making more effective use of all sources of energy, including alternative sources like wind and solar.

The bulk of the ARRA funds, about \$3.4 billion, are going to 99 projects in the Smart Grid Investment Grant program, where the federal government supplies up to 50 percent of the funding. These projects are running now through 2015.

The remaining funds are going to 32 projects in regional demonstration of smart grid viability and energy storage, as well as for workforce training.

The smart grid grants are going to utilities, equipment suppliers, regional transmission organizations, states and research organizations to support such objectives as increasing the number and percentage of customers using smart grid-enabled energy management systems, distribution system feeders with distribution automation, and transmission lines instrumented with networked sensors used to assess and respond to real-time grid disturbances.

One of the biggest projects in the transmission category, for instance, is the \$108 million effort – with the government supplying \$54 million – by the Western Electricity Coordinating Council to install an extensive network of synchrophasor technology throughout the Western Interconnection, covering more than 1.8 million square miles across the entire western United States.

A main objective of the new technology is to give the 18 partners taking part in the program a better picture of what is actually going on in real time so that they can spot potential problems more quickly.

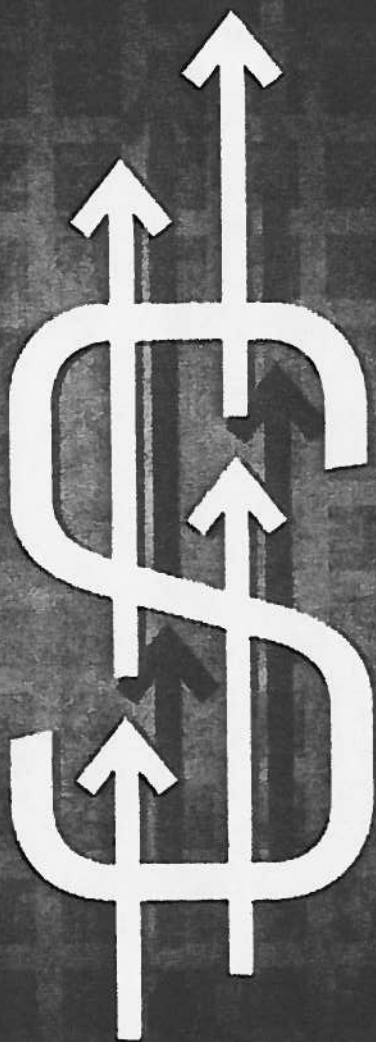
"It's a significant step up," says Vickie VanZandt, program manager for the project. "It's like having an MRI instead of an X-ray."

With only partial deployment of the synchrophasor technology, project participants have already seen instances of issues that could lead to the cascading failures such a widespread and interdependent system is prone to.

Among the efficiencies WECC hopes to realize from the project is better management of the California-Oregon Inter-tie, a key pathway channeling hydroelectric resources from the northwest to California's energy-hungry consumers. The expectation is that increased efficiency from the smart grid technology will improve operational capacity by 100 megawatts, enough to power 100,000 homes.

The synchrophasor project was already in the works when the stimulus bill was passed, and the federal funds led to a vast acceleration of the project, VanZandt says, from installing only three phasor

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measurement units a year to getting all 350 installed within the space of three years.

WECC officials credit the stimulus funds for being able to get a fully implemented smart grid functionality for the network's 78 million customers in a much shorter time frame.

At the other end of the spectrum is the smart-meter project at Talquin Electric Cooperative in Florida, where until recently the 50,000 member/customers read their own meters to determine their bills.

"We were one of the few and certainly the biggest systems still using such antiquated methods," says Jeremy Nelms, director of engineering at the cooperative. "It is quite a leap forward for Talquin."

Nelms says that nearly 95 percent of the smart meters have been installed in the \$16 million project. The meters not only allow much more accurate and timely billing but also include remote shutoffs that obviates the need to send out a truck to turn off electricity for nonpayment.

"We estimate that we will save \$600,000 this year just on truck rolls," says Nelms. The cooperative expects further benefits from reduced consumption as new services enabled by the smart meters are added.

For the time being, however, Talquin's customers, who are also part owners of the cooperative, are happy that everyone is paying their fair share for consumption of electricity.

The Department of Energy is still collating data to measure progress on the projects and will publish a report in the fall. But officials already sense that they are having an impact.

"I have a gut feeling that there are significant changes not only in the technology but in the utilities engaging with customers," says DOE's Kenchington.

Nor does the department believe that the benefits of the program are confined to utilities involved in the projects or to the time the stimulus funds are actually being disbursed.

Regional workshops hosted by the fund recipients are sharing results as the projects are being implemented, and these are helping educate both utilities and consumers about the benefits of the smart grid technology.

Likewise, says Kenchington, the data assembled by the department on the basis of the projects will help utilities, regulators and consumers make smart grid decisions for years to come.

Talquin's Nelms sees another long-term benefit for the industry from the jump-start on smart grids.

"These projects make the utility industry fun again," says Nelms. Industry pioneers doubtless found it exciting when power lines were first being strung through the countryside decades ago, Nelms says, but the industry has been something of a backwater since then.

"Smart grid technology has made it exciting for a young engineer coming out of college," he said. ☐

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