

# The Benefits of Residential Smart Meters

By Lisa V. Wood, executive director, and Adam Cooper, manager of electric efficiency, at the Institute for Electric Efficiency

**W**hile the nation’s utilities deploy smart meters as the basic building block to the smart grid, a question lingers among regulators, consumer advocates, and utilities themselves: “What are the smart meter’s benefits and how do we engage customers to reap them?” To address some of the issues surrounding advanced metering infrastructure (AMI), the Institute for Electric Efficiency (IEE) developed a framework to quantify the costs and benefits of smart meters for residential customers and estimated the net benefits for a range of utility and customer types.

## What’s Your Type?

In the United States, utilities vary as do their customer bases—and so the benefits of smart meters vary as well. Utilities have different load shapes, metering technologies, supply mixes, energy costs, and customer willingness to use technologies that take advantage of smart meter data



streams. Using a representative set of four utilities (Pioneer, Committed, Exploratory, and Cautious) and four customer types (Basic, Saver, Green, and Comfort), the study

investigates the significant energy management potential that is unleashed via customer engagement in home energy management technologies, information, and pricing plans.

The framework has a 20-year horizon. In that time, most customers migrate from passive engagement in energy management to much more active strategies. This holds true for all utility types. By using conservative assumptions about customer interest and engagement and by mapping those things across a variety of technology types and rate plans, IEE envisions that utilities will support a host of technology choices and rate plans to fit the current and future lifestyle demands of their residential customers.

## Customer Engagement

A presumption of the IEE analysis is that customers will increasingly manage their energy use by adopting technolo-

gies, joining programs, or choosing rate plans that fit their habits and preferences. The two-way communicating smart meter paves the way for customers to benefit from home energy management systems, real-time energy price displays, measurable and verifiable direct load control, no risk peak-time rebates, heat wave critical-peak pricing plans, and electric vehicles (EVs). As these technologies and rate plans emerge as options for all customers—fully deployed smart meters will provide the platform for widespread customer engagement in energy management.

In developing the technology, program, and rate plan adoption timelines, IEE took a conservative approach: The study plotted the migration from being a passive customer to an active energy manager along a “slow and steady” course. Even at the end of the 20-year forecast period, a sizeable group of customers (from 12 to 20 percent) is

projected to remain unengaged and disinterested in managing energy use.



## Positive Net Benefits

The results show positive net benefits for all four utility types. Assuming a service territory of 1 million households, the total

costs of investing in AMI and associated technologies for home energy management vary across the four utility prototypes (based on utility and customer characteristics) from a low of \$198 million for the Pioneer utility to a high of \$272 million for the Committed one. Similarly, the benefits vary across the four prototypes.

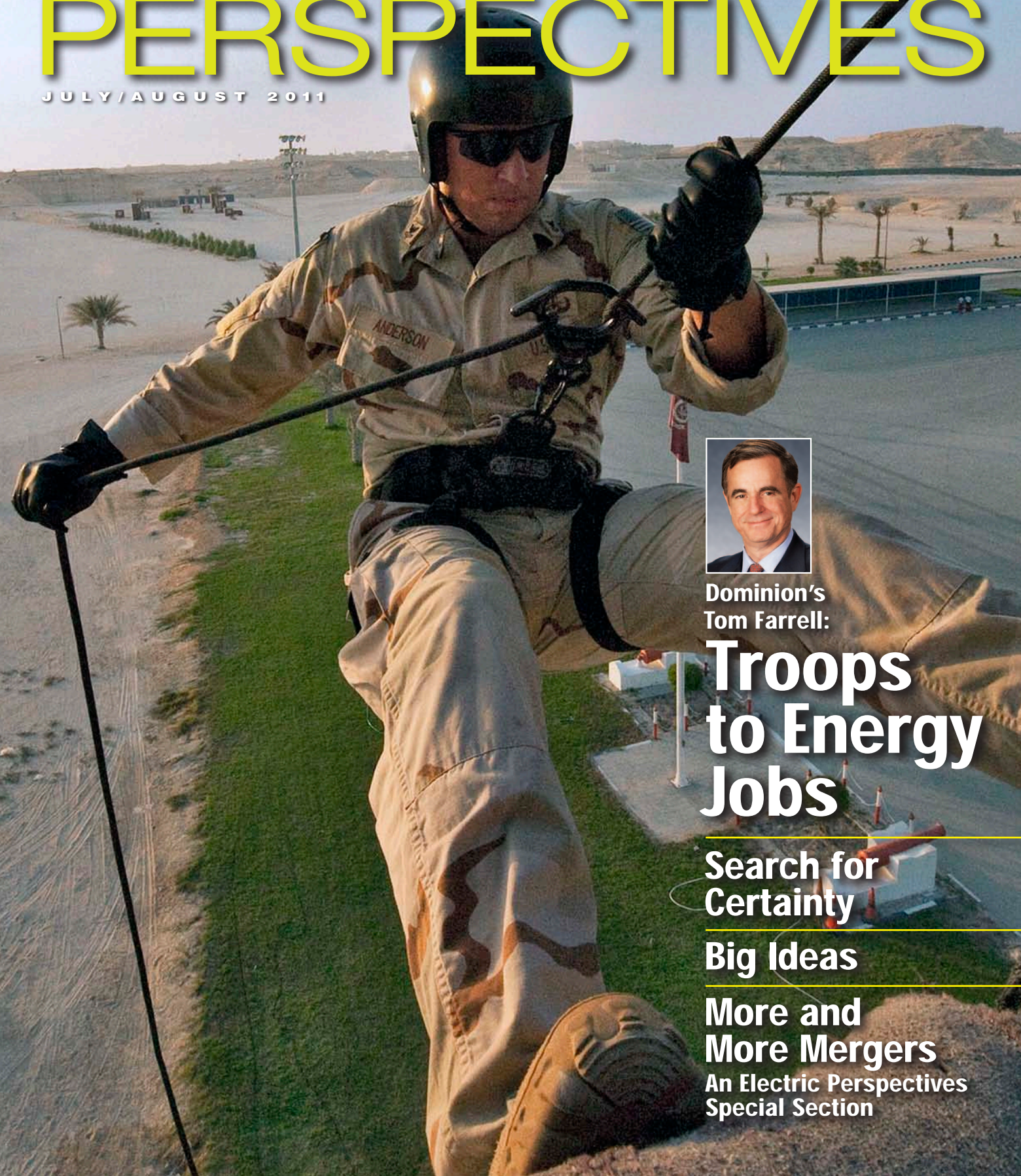
- The operational savings vary from \$77 million for the Pioneer utility (which has already deployed automatic meter reading) to \$208 million for the Cautious one.
- The customer-driven savings vary from \$100 million for the Cautious utility to \$150 million for the Pioneer.
- The net benefits vary from \$21 million for the Committed utility to \$64 million for the Exploratory utility.

The results demonstrate that the benefits of smart meters exceed the costs under a variety of assumptions. In addition, although the net benefits are positive for each utility in this analysis, signifying that investments in smart meters make economic sense, IEE contends that the customer-driven benefits could be much greater with more investment in and focus on customer education and engagement. An area for further study is how to accelerate this process so that a broad array of customers are ready to engage in energy management soon after smart meters are deployed.

One way to accelerate engagement and increase customer savings is to focus on EV adoption. The study shows that the benefits of EVs are disproportionately high indicating that even modest increases in EV adoption could have a large impact on overall benefits. A copy of “The Costs and Benefits of Smart Meters for Residential Customers” is available at [www.edisonfoundation.net/IEE](http://www.edisonfoundation.net/IEE). ♦

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