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Gauging the pros and cons of smart meters

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California has grand plans for saving energy, improving the electricity grid and cutting the number of power plants built in the state.

And many of those plans depend, at least in part, on the smart meter.

The advanced meter is a basic building block for the energy future that state officials are trying to create. The meter will change when and how people use electricity, proponents say. It will pave the way for the widespread use of solar panels and electric cars as well as help reduce air pollution and greenhouse gas emissions.

"It's kind of baked into the state policy that smart meters need to be in place," said Andrew Tang, senior director of demand-side management at Pacific Gas and Electric Co. The utility, California's largest, is installing the meters on every home and business it serves.

But the accuracy of smart meters - in particular, the ones used by PG&E's - has been called into question. Angry homeowners have complained that their utility bills soared after the new meters were installed. The California Public Utilities Commission started an investigation. And San Francisco's city attorney has asked the commission to halt PG&E's meter installations program until the investigation wraps up.

Widespread global use

The uproar troubles state officials and energy experts who say the meters could offer great benefits down the road. But those benefits depend on homeowners trusting the meters and using the information they provide.

"We need to have people believe that the meters give them accurate information," said PUC Commissioner Nancy Ryan. "When they have access to information packaged in a way they can use it, people will use it, whether the motivation is saving money or saving the planet."

Advanced meters have been used in other countries for years and are now being deployed by utilities throughout the United States. In general, they are known as smart meters. The models deployed by PG&E use the trademarked name SmartMeter.

Helping to conserve

Unlike old gas and electric meters, smart meters transmit data to the utility via wireless communication, eliminating the need for meter readers. The utility can also send instructions to

the meter - for example, telling the meter to turn a home's power on or off. The meters can also measure energy use by the hour or at even shorter intervals, giving customers detailed information about their energy use patterns.

Therein lies their appeal. State officials charged with meeting California's future energy needs try to avoid building power plants whenever possible, to save money, cut pollution and reduce greenhouse gas emissions. One way to do that is to cut the amount of electricity the state uses during peak hours, typically in the mid- to late afternoon when air conditioners are cranking.

Right now, the price California homeowners pay for electricity is based on the amount they use. But with smart meters, homeowners could pay different prices based on when they use power. Electricity would be most expensive during peak hours and least expensive at night.

That would give them an incentive to run many of their appliances, such as dishwashers or clothes dryers, in the morning or the evening, when the demands on the state's electricity grid aren't as great. Big businesses in California already pay based on this system. So do the utilities themselves, which pay power plants more for electricity generated during peak hours.

Reducing peak usage

Many small power plants, called peakers, operate only during those hours, when they can fetch the highest price. So reducing the need for peakers can cut air pollution.

"The main purpose is to send that price signal to folks - that not all kilowatt hours are created equal," said Laura Wisland, an energy analyst for the Union of Concerned Scientists. "There's a bigger price and more environmental impact when you use power at the same time as everyone else."

The utilities and the utilities commission have been exploring residential "time of use" electricity rates for years, and are widely expected to adopt some version of them in the near future. Although many energy experts love the idea, consumer advocates have been wary. Mark Toney, executive director of The Utility Reform Network, said such rates work better for the middle class than they do for the poor, who often have fewer appliances and less opportunity to change their electricity use than wealthier homeowners do.

"The lower income you are, the less energy use you actually have to shift to a different time," he said.

Smart meter fans say the devices also could help the state's goal of using more renewable power.

The amount of electricity coming from large solar power plants and wind farms can change dramatically from hour to hour. Smart meters could help the power grid adjust to those rapid

changes, Ryan said. If a wind farm's output suddenly drops, for example, the meters could be used to dim the lights slightly in hundreds or thousands of buildings, cushioning the blow without anyone noticing.

"What they're pumping into the system goes up and down, so there's the ability to make tiny adjustments in thousands of buildings to compensate," she said.

Managing appliances

Many smart meter proponents say the devices will usher in an age when appliances throughout a home or business will automatically adjust to changing power prices or emergencies on the grid. Air conditioners, for example, would raise temperatures slightly if they learned, through the meters, that the state's power supplies were running low. Charging stations for electric cars would run at times staggered throughout the night, so that not every car in the neighborhood would be charging at the same time and creating another strain on the grid.

"I liken smart meters today to when we deregulated telephone service," said Jeffrey Byron, a member of the California Energy Commission. "We had no idea, back in the '70s, what would evolve in telephone service. We really don't fully understand the opportunities that could be available with the smart meter."

But the meters' critics say that many of the state's goals can be accomplished through means that are less expensive than installing new meters in every home. Toney points to devices that allow utilities to cycle customers' air conditioners on and off during times of heavy energy use. Customers must volunteer to have the cycling devices installed.

"In many cases, there are existing technologies that can do what we need much, much more cheaply," he said.

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