



STRAIGHT TALK ABOUT THE SMART GRID

Introduction

It's no secret that we depend on electricity for nearly everything we do. Today, our homes are larger and have more appliances and electronic equipment than ever before. As a result—despite continued energy-efficiency improvements—electricity demand continues to grow and is expected to increase 31 percent by 2035, according to the U.S. Energy Information Administration.¹

The electric power industry is modernizing the electric grid to meet the growing demands of our digital society. By incorporating telecommunications and information technology infrastructure into utility operations, this “smart grid” provides a platform for new technologies to deliver a more reliable and efficient supply of electricity. Modernizing the nation’s grid—which was first built in the early 20th century—will allow technologies to be implemented that will enhance electric reliability, benefit customers, and protect our national security.

These frequently asked questions will help you to learn more about the smart grid and what it means for you and your electric company. You also can visit the Edison Electric Institute’s Smart Grid Web site, SmartGrid.eei.org, for additional information.

¹ U.S. Department of Energy, Energy Information Administration, 2011 Annual Energy Outlook, April 2011.

■ Why does the electric grid need to be updated?

The nation's electric grid is an interconnected network of power plants, transmission lines, substations, transformers, and other equipment that delivers electricity to homes and businesses. It was first built in the early 20th century and—despite its strong record of reliability—was not created to handle the on-demand needs of our digital economy, when even a momentary interruption of power can affect the country's banking, communications, transportation, and security systems. While the grid continues to meet our country's growing demand for electricity, the system's aging infrastructure must be modernized with digital technology.

■ What is the smart grid?

Electric companies are modernizing the nation's power grid and transforming it into a digital network that will deliver more reliable power to homes and businesses across the country. The modern grid will utilize telecommunications and information technology infrastructure to enhance the reliability and efficiency of the electric delivery system. The smart grid will more effectively meet the growing electricity needs of our digital economy.

The added intelligence of the modern grid will help to make it more reliable by automatically taking actions to help reduce service disruptions—or to minimize the effect of disruptions when they do occur. A more efficient grid also reduces the need for electric companies to build more power plants.

Together with new digital smart meters—which provide two-way communication between customers and their electric companies—the modern grid will allow customers to better understand their electricity usage and to manage their electric bills more effectively.

■ How will customers benefit from the smart grid?

The modern grid will provide customers with many valuable benefits, including:

- **More reliable electric service.** The smart grid will provide electric companies with near real-time information about the electricity flowing across the system. This will help companies to identify and correct potential problems before they occur, providing more reliable service to homes and businesses across the country. In some cases, the grid itself—with its intelligent technology systems—will determine how best to respond to a situation and automatically reroute power when needed. Some outages may be so brief that customers do not even notice a service disruption.
- **Faster power restoration following an outage.** By utilizing digital technology, electric companies will know automatically when their customers lose power. Companies will no longer be dependent on customers calling them to report an outage. This will help electric companies to understand more precisely the extent of an outage and to send crews for power restoration more efficiently.
- **More information about power usage to better manage electric bills.** The two-way communication of smart meters will enable electric companies to provide customers with more information about their electricity usage and its cost. With this information, customers will be empowered to make wise energy choices and better manage their electric bills.

■ What are smart meters?

Smart meters are an important component of the new smart grid. Smart meters use advanced technology to communicate the electricity usage of your home or business to your electric company. This means that your electric company no longer will need to send someone to read your meter on a regular monthly basis.

The meter's digital technology also enables two-way communication between you and your electric company. This two-way communication allows your electric company to identify and respond more quickly to potential problems, like power outages. Your electric company also may have the ability to communicate current electricity prices to you—empowering you to better manage your electric bills.

Smart meters look similar to traditional mechanical meters, but the digital technology inside the meter makes them more efficient. Just as computers and cell phones are upgraded continuously as technology improves, the digital smart meter is a standard technology upgrade to the decades-old mechanical meter. Electric companies currently are installing smart meters in homes and businesses across the country.

■ How do smart meters differ from conventional meters?

Electricity customers traditionally have been served by mechanical meters, which record cumulative energy usage and are usually read by a utility employee once a month at the end of a billing cycle. Shortly after, a customer receives a bill for the energy consumed in the prior month. Until customers receive their bills, however, they generally have no way of knowing how much electricity they have used or the cost of their usage. Smart meters help to bridge this information and communications gap between electric companies and their customers.

■ What are some additional benefits of smart meters?

Smart meters provide many important benefits to electricity customers, including:

- **Promoting electric reliability.** Smart meters will help to modernize our nation's electricity delivery system, allowing it to provide the reliable supply of digital-quality power demanded by today's digital economy. Power outages can be detected more precisely and can be corrected more quickly. In fact, some outages actually may be avoided by giving electric companies more options to reduce demand when the system is under stress.
- **Managing electricity usage.** Customers can better manage their electric bills if they understand how much their electricity costs and can change when or how they use electricity. By receiving information on current electricity prices and usage, customers can make cost-conscious decisions about their electricity use.
- **Improving customer service.** Replacing mechanical meters with digital smart meters will open a new information portal that provides two-way communication between electric companies and their customers. This improved communications capability will extend to, and enhance, customer services—such as billing inquiries, service calls, and outage and emergency services.

- **Helping the environment.** The ability of electric companies and their customers to work together to manage electricity generation and usage can significantly improve the efficiency of the entire electric grid. This will reduce the amount of generation, and related emissions, needed to meet customer demand. The grid's improved efficiency saves natural resources and defers—or even reduces—the need for electric companies to build more power plants.

■ When will I receive a smart meter?

That depends on where you live. Millions of smart meters already have been installed in homes and businesses across the country. Electric companies make decisions on whether to install smart meters based upon comprehensive studies that identify the benefits and the costs to that company and its customers. Electric companies also must have their smart meter plans approved by state regulators. Your electric company will contact you when it has plans to install smart meters in your area.

■ How do I know that the electricity usage data being sent to my electric company is accurate?

The technology systems that support smart meter systems have extensive data validation processes to protect the accuracy of your billing records. In addition, smart meters must meet rigorous requirements for accuracy, which were developed by the American National Standards Institute (ANSI). Test equipment—certified by the National Institute of Standards and Technology (NIST)—also is required to verify initial and continuing smart meter accuracy.

A recent study by an independent testing group found that 99.91 percent of smart meters were accurate within 0.5 percent.² In fact, the study found that smart meters were more accurate than the mechanical meters they replaced. In addition, smart meter groups are continuously tested and monitored by your electric company to ensure they are operating correctly.

Electric companies constantly monitor the data transmitted from smart meters to verify that electricity usage is within expected ranges. If readings show a significant difference from normal levels of use, technicians will inspect the meter. Your electric company takes these steps to ensure that your electric bill is accurate.

■ Does the radio frequency (RF) generated by smart meters cause any health effects?

No.

Some smart meters use technologies that transmit RF to enable communication between electric companies and their customers. While concerns have been raised about the potential impact of the RF generated by these smart meters, numerous studies have shown that smart meters using RF technologies pose no health risk.

² Edison Electric Institute, "Smart Meters and Smart Meter Systems: A Metering Industry Perspective," March 2011.

A smart meter with RF technology uses a low-power radio to communicate the electricity usage of a home or business to the electric company through remote communication technologies. RF exposure from a smart meter is far below—and more infrequent—than other common electric devices, including cell phones, baby monitors, and microwave ovens.

As with any electric device that utilizes RF, smart meters have been monitored, tested, and certified to ensure they meet certain safety standards. The RF exposure levels from smart meters are far below the levels permitted by the Federal Communications Commission (FCC), which sets health standards for RF exposure, based on extensive reviews of the biological and health literature. The U.S. standards for radio waves are similar to those of the European Union and Canada.

According to research by the Electric Power Research Institute, the “relatively weak” strength of the RF signals generated by smart meters means that any impact of RF exposure would be minimal—similar to the levels of the exposure from televisions and radios.³

What’s more, RF exposure depends partly on the proximity of the RF source to a person. Smart meters usually are located on the outside of your house in a metal box, away from your daily routine activity. The electric panel and wall behind the meter actually block much of the radio signal. Due to the extremely brief exposure to the radio waves that smart meters produce, there have been no long-term health effects identified as a result of the installation of smart meters, according to a study conducted by the California Council on Science and Technology.⁴

■ How do electric companies protect the privacy of customers’ data?

America’s electric companies work hard to protect the privacy of their customers’ data—and have always done so. In fact, protecting the security of the grid and the privacy of customer data is a key component to the grid modernization effort. Electric companies use advanced encryption technologies to protect the privacy of the data transmitted by smart meters. Electric companies also comply with the data privacy guidelines and regulations set by state public utility commissions.

Since protecting customer data is a top priority in modernizing the grid, electric companies are working with federal agencies, such as the Department of Homeland Security, the Department of Energy, and NIST to adapt existing privacy and security standards to meet the new data requirements that accompany smart grid technology. NIST guidelines are being applied to remote access, authentication, encryption, and the privacy of metered data and customer information.

In addition, before an electric company can implement a smart meter program, it must submit to its state regulatory commission detailed plans that describe how the data security systems will protect customer data. State regulators closely monitor the privacy safeguards that are being developed for the new smart grid technology systems.

³ “An Investigation of Radiofrequency Fields Associated with the Itron Smart Meter,” Electric Power Research Institute, December 2010.

⁴ “Health Impacts of Radio Frequency Exposure from Smart Meters,” California Council on Science and Technology, March 31, 2011.

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