



## Office of the Ohio Consumers' Counsel

Your Residential Utility Consumer Advocate

# CONSUMERS' FACT SHEET

Office of the Ohio Consumers' Counsel  
10 West Broad Street  
Suite 1800, Columbus, OH  
43215-3485

E-MAIL:  
[occ@occ.state.oh.us](mailto:occ@occ.state.oh.us)

WEBSITE:  
[www.pickocc.org](http://www.pickocc.org)

# AN INTRODUCTION TO SMART GRID



It's likely many utility consumers in Ohio have heard the term "smart grid" in news reports about upgrading the nation's aging electric transmission and distribution systems, commonly referred to as the electric grid. In this fact sheet, the Office of the Ohio Consumers' Counsel (OCC) will give a basic overview of what the smart grid is, what it can do and what a smarter electric grid means for you.

### When will the smart grid be in Ohio?

Parts of the smart grid are already a reality in Ohio. Duke Energy Ohio has installed 139,000 smart meters and American Electric Power has outfitted 134,000 customers with smart meters. FirstEnergy plans to roll out a 5,000-smart meter pilot in 2011.

### What is the smart grid?

A smart grid is not a single upgrade to the electric transmission and distribution systems but a complete overhaul with 21st century infrastructure, metering and communications technologies. Smart grid technologies take advantage of many advancements used today, including geographical information systems and wireless communication. Each part of the smart grid brings its own system and societal benefits with the goal of improving how electricity is delivered and used.

The smart grid includes four main components: advanced metering infrastructure, advanced distribution operations, advanced transmission operations and advanced asset management. With these technology improvements, the electrical needs of Ohioans can be met with greater efficiency and reliability and will allow more widespread use of renewable energy to help offset carbon emissions. Of these four, the advanced metering infrastructure will most directly include consumers.

The advanced metering infrastructure will enable direct two-way communication between a utility and the customer that will provide a variety of information, such as real-time pricing and usage information over certain time periods. The advanced meters will enable customers to respond to real-time electricity prices and allow better management, monitoring and control of energy use in their homes.



Continued on next page

## AN INTRODUCTION TO SMART GRID

# CONSUMERS' FACT SHEET



Office of the Ohio  
Consumers'  
Counsel

Your Residential Utility  
Consumer Advocate

Another common term associated with advanced metering is smart meters. These meters allow real-time pricing tied to customers' electric use, but also have the capability of net metering. Net metering lets customers sell excess electricity back to the utility for a payment, provided they are generating their own power, for example, by using a rooftop solar installation.

### Why is a smarter grid needed?

The U.S. Energy Information Administration predicts electricity demand will increase 30 percent over 2008 levels by 2035. The electric grid we use today – built in the early 20th century – will not be able to handle the electricity needs of the future. The infrastructure to deliver electricity is already fragmented and outdated, in part because many utilities have failed to upgrade their systems. Without improvements, electrical brownouts and blackouts could become common occurrences.

Today, the electronics age is requiring much more electricity for everyday conveniences. High-definition televisions,

computers and video game systems all use electricity at levels unheard of in the first half of the 20th century. There's a laundry list of items Americans have become aware of and concerned with when it comes to electricity. Affordability, reliability, security, environmental impact and progress are just a few of the areas where grid updates will be needed to meet the demands of tomorrow.

### What benefits will consumers see with a smarter grid?

The smart grid will allow consumers to better control their consumption which can result in lower energy costs. As more consumers take control of their consumption and costs, improved electric reliability and environmental sustainability will bring more savings to the electricity system. These savings can further reduce electric costs. Electric utilities also will receive operational savings that, in some cases, can make up more than half of the smart meter investment that should be used to help defray the costs passed onto consumers. These are significant and include savings for meter reading, call centers and outage management.

Advanced meters also will help utilities and competitive suppliers offer many voluntary rate options that customers can choose to lower their electric costs. The meters will be able to tell consumers how energy is used, what

it costs them and what kind of impact that usage has on the environment. To take advantage of lower electricity costs, consumers will need to make adjustments to their electric use or set preferences that will tell the utility to automatically make changes based on those settings. In the near future, consumers will be able to remotely communicate with appliances, thermostats and electronics which will encourage energy efficient decisions that will save money.





The interactivity allowed with the smart grid also will help consumers make decisions about when they use energy to save money. By making the choice to use electricity during times of the day when others are not, consumers can take advantage of hours with cheaper energy costs, and avoid hours with higher energy costs. Consumers who chose not to change their usage patterns and continue using electricity during high-cost hours could see their energy costs increase.

Consumers also will benefit from increased reliability through a smarter grid. Because a smart grid has the ability to self-heal, momentary outages may occur less frequently and outages related to powerful storms can be significantly reduced. The OCC will be vigilant in its review of each utility's smart grid proposal so that when all the benefits of the smart grid are tallied, they should exceed the costs of implementation.

### **What makes a smart grid so much "smarter"?**

Imagine using a personal computer from the 1980s while everyone else is using the latest in computing technology. The speed, ease of use, price, storage capabilities and software available in today's computers put the early models to shame. The thought of using a 1980s era computer to accomplish tasks when superior technology is available does not make sense. To a degree, this is what the electric grid is like today.

By using the information technologies available to us today, the smart grid will keep us up to date with the world around us. Incorporating these technologies will help create an electrical grid that will be able to heal itself in the event of an outage or other event that may disrupt the normal flow of electricity. The smart grid will be allowed to automatically reroute electricity to reduce outages, isolate the damaged areas and notify utilities exactly where repairs need to be made.

With these technologies incorporated into an upgraded grid, electric utilities will have an easier time adapting to

## **OTHER ELEMENTS OF A SMART GRID**

### **Advanced distribution operations**

Improves the distribution system with automated devices designed to increase the efficiency and reliability of electricity and its delivery to consumers. These technologies will give the distribution system self-healing abilities, including automatically avoiding or reducing power outages and service disruptions, speed up restoration efforts and improve the process of connecting and disconnecting customers. Utilities will have more precise information about where failures and problems occur so they can take steps to avoid unnecessary outages.

### **Advanced transmission operations**

Links large regional operations that transmit electricity from power plants to local distribution operations that send electricity to consumers' homes. Upgrades will reduce congestion on the lines that can lead to brownouts and blackouts, reduce transmission line losses and allow for the integration of renewable energy power sources with traditional sources.

### **Advanced asset management**

Helps utilities acquire more data in real-time about their operations of the electric grid and to focus on preventing outages. This will minimize the impact of outages on consumers and improve electric usage forecasts with more timely and accurate information. By combining new advanced asset management with other smart grid improvements, utilities can reduce the costs associated with operations and maintenance and improve customer service.

## AN INTRODUCTION TO SMART GRID

# CONSUMERS' FACT SHEET

The Office of the Ohio Consumers' Counsel (OCC), the residential utility consumer advocate, represents the interests of 4.5 million households in proceedings before state and federal regulators and in the courts.

The state agency also educates consumers about electric, natural gas, telephone and water issues.

For more information, please visit the OCC website at [www.pickocc.org](http://www.pickocc.org).



*The Office of the Ohio Consumers' Counsel is an equal opportunity employer and provider of services.*

changes and utilizing future technologies as they become available. The quicker new technology can be applied to the electric grid, the sooner it will help improve efficiency and keep consumers' electricity costs at reasonable levels.

Care will have to be exercised when developing these systems to prevent breaches of customer information.

Moreover, security protocols are under development to prevent hacking or other attacks on the new systems.

### How will a smart grid affect your electric bills?

When the smart grid becomes a part of our everyday lives, control of how consumers use electricity will be at their

fingertips. Up-to-the-minute price signals will be sent to smart meters allowing consumers to decide when it is best for them to use a dishwasher, clothes dryer or other items that require electricity.



With a smart grid that is more efficient, savings may be realized on consumers' bills. These savings come in the form of reduced maintenance costs, opportunities to

control individual costs and increased energy efficiency.

However, improvements to the electric grid will require an investment before it can provide consumers observable benefits. Experts have estimated a smart grid from start to finish could cost about \$1 billion for a city of one million people. At the urging of the OCC, electric utilities were instructed by the Public Utilities Commission of Ohio (PUCO) to apply for federal stimulus money to pay for half of their smart grid projects. American Electric Power, Duke Energy Ohio and FirstEnergy each were awarded grant dollars that will help offset smart grid upgrades.

The impact of building a smart grid could bring significant contributions to the U.S. economy. According to the Galvin Electricity Initiative – a campaign to perfect the power system – a smart grid would reduce costs to the U.S. economy related to power outages and other power quality issues by \$49 billion per year. “Smart grids would also reduce the need for massive infrastructure investments by between \$46 billion and \$117 billion over the next 20 years,” the campaign says. Galvin also says widespread development of smart grid technology could add \$5 billion to \$7 billion per year to the national economy by 2015 and \$15 billion to \$20 billion per year by 2020.

