



Office of the Ohio Consumers' Counsel

Your Residential Utility Consumer Advocate

CONSUMERS' FACT SHEET

Office of the Ohio Consumers' Counsel

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INTRODUCTION TO OHIO'S SMART GRID



Electric utility companies in Ohio have begun updating their aging infrastructures with new “smart grid” technology. The goal of the smart grid is to increase electricity service reliability, reduce the overall cost of electricity service, and allow customers to better control their energy usage. The Office of the Ohio Consumers' Counsel has developed this fact sheet to provide an overview of the smart grid and how the upgrades could affect your household.

What is the smart grid?

The smart grid uses modern infrastructure, metering, and communications technologies to upgrade electric transmission and distribution systems. The smart grid is designed to take advantage of technological innovation.

What are the components of the smart grid?

The term “smart grid” is a broad term that includes many types of modern upgrades to the electric system. It can include, among other things:

1. **Smart meters**, also known as “advanced metering infrastructure,” are digital meters that replace old analog meters. Unlike analog meters, many smart meters can be

read remotely (that is, without a person visiting the home to physically look at the meter) and can provide electric usage information to the utility and the consumer on an hour-by-hour or even minute-by-minute basis.

2. **Distribution automation systems** are devices designed to increase the efficiency and reliability of electric distribution and delivery to your home. These advanced operations allow the utility to more easily identify the cause and location of outages and to restore service to consumers more quickly.
3. **Integrated Volt/VAR Control** technology can reduce the total electricity that consumers use in two ways. First, it can regulate the voltage along electric lines more efficiently so that all consumers use slightly less electricity. Think of voltage as analogous to water pressure in water line. Second, it can reduce the amount of “line losses.” When electricity travels through transmission and distribution lines, some is lost along the way through friction. VAR control technology can reduce the amount that is lost. That way,

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more of what is generated makes its way to consumers' homes.

4. **Distributed generation** is electricity that consumers generate on their own. For residential consumers, this means solar panels, but it can also include wind turbines, microgrids, and battery storage, among other things.

What are the possible benefits of the smart grid?

Reduced costs. Smart grid technologies can reduce utilities' operations and maintenance costs, including costs for meter reading, call centers, and outage management. The OCC advocates for these savings to be passed along to consumers to reduce the overall cost of electricity. Consumers can also lower their bills through dynamic pricing, demand response, energy efficiency, and by generating their own electricity.

Reliability. The smart grid is meant to enable electricity to be automatically rerouted during outages. Momentary outages may occur less frequently and outages related to powerful storms can be reduced because the smart grid has the ability to automatically restore minor outages. This could reduce the duration of outages, isolate the damaged areas, and notify utilities exactly where repairs need to be made.



Dynamic pricing. One feature of the smart grid that can benefit consumers is known as dynamic pricing. As opposed to paying a standard flat rate for electricity, dynamic pricing allows for electricity prices to increase or decrease throughout the day as demand changes. In other words, customers can save money by limiting their usage during times when the demand and price for electricity is high, and instead using electricity when the demand and price is low. To take advantage of dynamic pricing, customers must have a smart meter capable of reading electricity usage during frequent intervals throughout the day.

There are five types of pricing programs available: time-of-use pricing, critical peak pricing, direct load control, peak time rebates, and real-time pricing. Critical peak pricing, direct load control, peak time rebates and real-time pricing are examples of dynamic pricing programs because the price customers pay is responsive to the price of electricity on the market. Utilities can create variations of these programs to provide customers with additional options.

Time-of-use pricing. Electricity prices under a time-of-use model are set at predefined rates during different times of the day. The cheapest prices are available when electricity is used the least (off-peak) and most expensive when many customers are using electricity at the same time (average or on-peak). Customers know in advance how much they will pay for electricity during different time periods throughout the day. This allows customers to plan the bulk of their energy usage for off-peak periods and save money.

Critical peak pricing. When utilities observe or anticipate high wholesale market prices or power system emergency conditions, they can call for a critical peak period where the price for electricity is significantly increased. Customers can then choose to either reduce their usage during the peak period or pay rates that can be several

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times higher than the standard flat rate. A utility usually predetermines the maximum number of times it can call a critical peak event (usually up to 15 times per year) and the number of hours (usually 4-6 hours) each will last. Customers are given advanced notice of when these peak events will occur.

Direct load control. This type of dynamic pricing program gives customers monthly credits or rebates during the summer months for allowing the electric utility to remotely increase the temperature of their air conditioners a few degrees when the utility's distribution systems experiences high demand. These credits should be listed on customers' bills and applied automatically.

Customers stay on a flat standard rate throughout the year, and the utility has a set number of times and hours it can remotely increase the air conditioner temperature (usually up to 15 times per year). Customers who participate in direct load control programs have a communicating programmable thermostat installed. They can opt-out or override an event, but any potential credit would be reduced or eliminated

for the month. Because electric utilities most frequently experience high-demand during the summer, credits are less likely to be earned during the winter when demand is lower.

Peak time rebates. Customers that enroll in a peak time rebate program have a standard flat rate but receive rebates for using less electricity when a utility calls for a peak time event. When an event is called, these customers can reduce their usage and receive a utility incentive. Customers will not see their rates increase for maintaining their normal usage pattern should a utility call for a peak time event.

Real-time pricing. Electricity prices in a real-time pricing model can change as often as every 15 minutes. This program provides customers with the cost of electricity as it changes throughout the day, allowing customers to adjust their energy consumption accordingly. Individual savings in a real-time pricing model will likely vary month to month based on weather, market conditions, and personal usage habits.

The summer months are when the cost of electricity in a real-time pricing model



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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.occ.ohio.gov.



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will vary the most. Electricity prices in the fall, spring, and winter months are typically lower and more stable. Next-day hourly price estimates, real-time price displays, and other tools may be used to help customers plan for periods when electricity prices are predicted to be high. Customers may be able to participate in multiple dynamic or time-of-use pricing programs to maximize potential savings.

Net metering. Smart meters have the capability for net metering. Net metering is a program offered by utilities for consumers who install renewable energy systems, like rooftop solar panels or wind turbines, and generate their own electricity. Essentially, consumers who produce their own electricity sell it back to the utility. The utility will then typically credit the net-metering consumer for the electricity they generated with a credit on their bill.

What are the possible drawbacks of the smart grid?

Cost. The smart grid is expensive: more than \$1 billion has already been committed to the smart grid in Ohio. Consumers are typically required to pay the costs of smart grid upgrades through their utility bills.

Disconnection. With traditional meters, your utility must send someone to your home to disconnect your service. But if your home has a smart meter, the utility can simply press a button

remotely to turn off your service. These “remote disconnections” can reduce the utilities’ costs, but at the same time, there is concern that smart meters will lead to wider-scale disconnections. The OCC continues to advocate that consumers facing disconnection should be adequately notified that their service is about to be disconnected and given all opportunities to avoid disconnection.

Opt-out fees. You are permitted to opt-out of receiving a smart meter for a price. Utilities in Ohio have received approval from the Public Utilities Commission of Ohio to charge both one-time fees and recurring monthly fees to consumers who opt-out. Before you make a decision, review the fees your utility may charge. The OCC has advocated against excessive opt-out fees for smart meter consumers.

Consumer privacy and cyber-security threats. The smart grid enables collection and sharing of consumers’ electric consumption and billing data between a third-party communications company and the utility. To prevent a breach of consumer information by hacking or other attacks on the new systems, security protocols are under development.

As utilities in Ohio begin to install smart meters and make smart grid upgrades, the OCC will be vigilant in its review of each utility’s smart grid proposal. To learn more about how Ohio utilities are upgrading the electric power system with smart grid technologies, visit OCC’s website www.occ.ohio.gov.