

# HOW THE SMART GRID WORKS

## 1 ENERGY GENERATION

Electricity is produced, or generated, in several ways. Sometimes it comes from a nuclear reaction called fission, which creates heat that boils water, creates pressure and spins turbines. Electricity is also generated in the same way from fossil fuels such as coal, oil and natural gas. In other cases, electricity is generated from the sun, wind or water, all of which are referred to as renewable generation.

## 2 STATION TRANSFORMERS

When electricity is generated, it often must travel long distances to homes and business where it is eventually used. To do this efficiently, step-up transformers increase the voltage of the electricity produced (typically to 138,000 volts or higher) so it can make the journey to homes and businesses where it is ultimately used.

## 3 TRANSMISSION LINES

Electricity travels to neighborhoods along high-voltage transmission lines (and underground cables). In some instances, transmission lines interconnect with other transmission lines and power plants to always ensure there is enough electricity for everyone to use.

## 4 SUBSTATION TRANSFORMERS

Electricity traveling on transmission lines is lowered (typically to 4,000 to 34,000 volts) using step-down transformers in substations so it can be delivered safely through neighborhoods or used by large industrial customers.

## SMART GRID

ComEd has helped ensure fewer and shorter power outages by updating the energy grid with smart substations, smart switches, smart meters, and other investments and technology.

## SMART SUBSTATIONS

Smart substations detect potential problems before they occur to help avoid power outages.

## 5 DISTRIBUTION LINES

Electricity leaving a substation travels through neighborhoods to homes and businesses along overhead distribution lines (and underground cables).

## SMART SWITCHES

Smart switches located on distribution lines automatically respond to problems on the smart grid by isolating the affected area and rerouting power to greatly reduce the number of people impacted by power outages.

## SMART METER

Smart meters automatically send meter readings to ComEd, so they help eliminate estimated bills and the need for a meter reader to visit homes or businesses. They can also notify ComEd if an outage occurs after a storm so electric service is restored more quickly. Smart meters also provide customers with more information about their energy use and enable more tools and programs to help customers save.

## 7 CUSTOMERS

After electricity travels through service transformers, it is delivered to homes and businesses through an overhead or underground service. From there, it passes through a smart meter. The smart meter communicates wirelessly measuring how much energy you use. Electricity then travels through a service panel in homes and businesses where breakers or fuses protect the wires inside from being overloaded. Finally, electricity travels through wires inside homes and businesses to devices where it is ultimately used.

## 6 SERVICE TRANSFORMERS

Prior to being used at homes and businesses, electricity from distribution lines is lowered (typically to 120 to 480 volts) through service transformers located along distribution lines so it can be used safely at homes and businesses.

