

SMART GRID

ComEd is changing the way we operate to provide customers with better service, more choices and greater control over the cost of electricity. We are modernizing the electric system to build a stronger, more reliable infrastructure. We also plan to deploy new technologies to create a smart grid that supports the 21st century economy. Just like today's "smart phone" technology merged the power of computers with cellular phones, smart grid technology merges the power of computers with the electric grid.

BETTER SERVICE, GREATER CONTROL AND MORE CHOICES

A smarter infrastructure includes the eventual installation of more than 4 million smart meters across our service territory. A smart meter is a digital electric meter that collects usage information and sends it to ComEd through a wireless connection. This helps eliminate estimated bills and the need for a meter reader to come to your property. You can access usage information securely through the Internet to develop smarter energy habits that give you greater control over your monthly energy bills. Later, you can take advantage of special pricing options that reward you for voluntarily reducing consumption during designated peak usage times.

For information, visit ComEd.com/SmartGrid



A STRONGER, MORE RELIABLE POWER GRID

ComEd also will upgrade infrastructure throughout the service territory, replacing thousands of miles of underground cable and thousands of utility poles to improve power reliability. We also will add digital sensors and two-way communications that can alert us to what's happening throughout the system and respond to changing conditions. When sensors detect problems, smart control devices will automatically reroute power around the trouble spot to minimize the number of customers impacted.

Altogether, these improvements will create thousands of full-time equivalent jobs at the peak investment period. It also will make it easier for us to integrate electricity from renewable energy sources, such as wind and solar power, into the system.

BRINGING A SMARTER GRID TO NORTHERN ILLINOIS

ComEd is modernizing the electric system to build a stronger, more reliable infrastructure. We also plan to install new technologies to create a smart grid that ultimately provides customers with better service, more choices and greater control over their electricity usage.

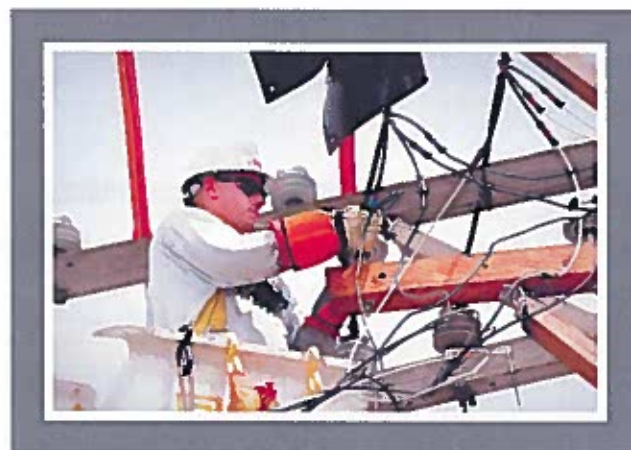
In the same way that today's "smart phone" technology merged the power of computers with cellular phones, smart grid technology merges the power of computers with the electric utility grid.

In total, our efforts to modernize the grid will create thousands of full-time equivalent jobs at the peak investment period, help prepare Illinois to meet the growing energy demands of the 21st century economy and help attract companies that place a high priority on a modern electric system. We also will partially fund the \$22 million Illinois Science and Energy Innovation Foundation trust. This trust will underwrite grants for projects that foster energy innovation and support high-growth, energy-related Illinois companies.

IMPROVED RELIABILITY AND BETTER SERVICE

ComEd's grid modernization will enhance overall system reliability, reduce the number of outages and improve power restoration. To accomplish these tasks, we will:

- Replace or refurbish thousands of miles of underground cable
- Replace or reinforce thousands of utility poles
- Strengthen equipment in areas historically vulnerable to weather-related damage



As part of our commitment to improve the electric system, we pledge to meet a set of specific performance standards that include a 20-percent reduction in the number of customer interruptions and a 15-percent reduction in the length of outages. These goals are filed with the Illinois Commerce Commission, which can assess financial penalties if ComEd does not meet these standards.

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ComEd Grid Modernization

BRINGING A SMARTER GRID TO NORTHERN ILLINOIS

A SMARTER ELECTRIC SYSTEM

To create a smart grid, we will install thousands of distribution automation devices, doubling the amount of devices on the grid. These devices will help us to monitor the flow of power over the lines and automatically reroute power during an outage to minimize the number of customers impacted.

A smarter grid also includes the eventual installation of more than 4 million smart meters across our service territory. Once installed, a smart meter will provide customers with more control over their energy use by providing access to more information about energy consumption. Smart meters also will provide access to special pricing options that reward customers for voluntarily reducing consumption during designated peak usage times.

ComEd's grid modernization work is already underway.

INFRASTRUCTURE MODERNIZATION WORK

UNDERGROUND RESIDENTIAL DISTRIBUTION (URD) CABLE

- ✓ Refurbish or replace more than 4,100 total miles of URD cable

MAINLINE UNDERGROUND CABLE

- ✓ Assess, refurbish or rebuild all manholes as necessary

INSIDE CHICAGO: more than 23,000 manholes

OUTSIDE CHICAGO: more than 5,000 manholes

- ✓ Test more than 3,250 miles of mainline cable and replace more than 500 miles

WOOD POLE PROGRAM

- ✓ Inspect an average of 133,400 poles per year
- ✓ Replace or reinforce an average of 3,000 poles per year

STORM HARDENING

- ✓ Utilize engineered solutions to "harden" circuits against storms

DISTRIBUTION AUTOMATION

- ✓ 2,500 12-kV system automation switch installations
- ✓ 100 34-kV system automation switch installations

SMART SUBSTATION UPGRADES

- ✓ 10 stations, analog to digital upgrades

SMART METERS

- ✓ Install approximately 4 million meters in all homes and businesses over a 10-year period

For information, visit ComEd.com/SmartGrid or e-mail ComEd's Economic Development department at Edward.Sitar@ComEd.com.

progress update

EIMA PROGRESS UPDATE

Under the Energy Infrastructure Modernization Act (EIMA), also known as the Smart Grid law, ComEd is investing \$2.6 billion over 10 years to build a stronger, more reliable electric system by strengthening existing equipment and installing smart grid technology, including approximately 4 million smart meters at all homes and businesses across northern Illinois. This technology will improve reliability, provide better customer service and give customers greater control over their electricity use. A modernized energy grid supports the needs of today's economy, attracts new businesses to the area and creates new jobs, while making northern Illinois an economic and technological hub. Below is a summary of ComEd's EIMA-related efforts through March 2014:

- Replaced or treated approximately 1,000 miles of underground residential distribution (URD) cable, which benefits approximately 186,000 customers.
- Replaced nearly 170 miles of mainline cable, which benefits approximately 334,000 customers.
- Completed inspection and treatment of more than 287,800 wood utility poles and repaired or replaced more than 7,400 wood utility poles.
- Assessed more than 17,200 manholes and completed refurbishment of more than 11,800 manholes.
- Installed more than 1,150 distribution automation (DA) devices, also known as smart switches, which benefits approximately 678,000 customers.
- Replaced five miles of high-voltage Ridgeland 69-kilovolt cable, which benefits 99,000 customers.



- Installed nearly 31 miles of tree-resistant spacer cable to strengthen existing equipment against severe weather. These efforts benefit more than 81,000 customers:
 - converted nearly 26,000 feet of overhead, high-voltage power lines to high-voltage underground cable
 - completed more than 390 miles of enhanced vegetation management trimming
 - removed nearly 24,000 trees and trimmed an additional 27,000 trees

As a result of these efforts, ComEd created more than 2,800 jobs to provide a boost to many local and regional companies. These include jobs at ComEd as well as contractor and supplier positions involving a broad range of functions required to build a 21st-century electric grid, from construction and engineering to consulting and administration.

For more information on ComEd's grid modernization efforts, visit ComEd.com/SmartGrid

SMART METER INSTALLATION

ComEd is investing in a modernized electric system to build a smart grid that will improve reliability, provide better customer service and give customers greater control over their electricity use. Smart meters are important building blocks of the smart grid and will be installed in all homes and businesses across northern Illinois by the end of 2018.

A smart meter is a digital electric meter that collects energy-usage information and securely sends it to ComEd. Smart meters provide access to more information about energy use through online energy-management tools that can help you manage your electric bills. Residential customers with smart meters can also enroll in Peak Time Savings (available in fall 2014) and Residential Real-Time Pricing and save money by voluntarily shifting energy use to times when there is less demand for electricity.

Because smart meters automatically send meter readings to ComEd, they also help eliminate estimated bills and the need for meter readers to visit your home and business.

Prior to a smart meter being installed at your home or business, you will receive a letter from ComEd with details on when the installation will take place. On the day of installation, a uniformed meter installer with appropriate identification from ComEd or a ComEd-authorized contractor, Corix or MZI Group, will attempt a knock on your door. The installation of smart meters takes about 10 minutes and will occur at no cost to you. Expect a brief interruption to your electric service. You may need to reset digital clocks on your appliances and electronics. For larger commercial installations, there typically is no service interruption.

For information, visit ComEd.com/SmartMeter



**INSTALLATION
TAKES ABOUT
10 MINUTES**



SAFEGUARDING DATA THROUGH SMARTER TECHNOLOGY

ComEd is modernizing its electric infrastructure to provide customers with a stronger, more reliable electric system. ComEd also plans to introduce new, state-of-the-art technologies to create a smart grid that supports the 21st century economy.

To protect both our electric system and customer-related energy-usage data, these technologies include the latest in security features:

- Security is evaluated in all project areas and built into the infrastructure as required.
- Vulnerabilities are reduced by employing a defense in depth approach to security encompassing physical security, prevention and response policies and procedures, education, software and hardware controls.
- Customer data is encrypted and only made available to authorized systems and personnel. Customer data is encrypted similar to the way that ATM's and online transactions are encrypted.
- Systems and personnel must go through a multi factor authentication process each time, they connect to secured data sources making sure that customer data privacy is maintained at all times.



SMART METER SECURITY

Securing our customers' energy-usage data is absolutely central to our commitment to provide you with the best service possible.

Energy-use data transmitted by our smart meters is encrypted using methods similar to those used for online banking and ATMs.

Information systems are tested regularly to deter hackers, identify potential weaknesses and ensure that the highest standards of cyber-security are maintained.

More 

Security

SAFEGUARDING DATA THROUGH SMARTER TECHNOLOGY

AS SECURE AS ATMs

Smart meters are a key component of the smart grid. From physical restrictions to layered security approaches to unique identities, ComEd implements multiple levels of cyber-security to protect smart meters, our customers' energy-usage data and our electric system.

- We use state-of-the-art cryptographic technologies, similar to those used by global financial institutions and the U.S. Department of Defense to protect against unauthorized access to your personal information. We encrypt all customer-related, energy-use data transmitted by smart meters using methods similar to those used for online banking and ATMs.
- We regularly test our information systems to deter hackers, identify potential weaknesses and ensure that the highest standards of cyber-security are maintained.
- ComEd, the industry at-large, state regulators and our technology partners continue to monitor security issues and evolve our standards and technology to safeguard against potential threats.

Securing our customers' energy-usage data is absolutely central to our commitment to provide you with the best service possible.

The confidence of our customers is what has enabled ComEd to serve northern Illinois for more than a century.



SMART METER BENEFITS

Once installed, smart meters will provide the following benefits:

Access to more information about your home's electricity usage, which you can access securely through the Internet, to give you greater control over your energy consumption.

Eventual access to special pricing options that reward you for voluntarily reducing consumption during designated peak usage times.

A reduction in utility operating costs by eliminating manual meter reading and manual meter service connections when customers move in and out.

Smart meters are an important part of a modernized electric grid that, when complete, can notify ComEd when an outage occurs and when power is restored.

For more information, visit ComEd.com/SmartGrid

PROTECTING THE PRIVACY OF OUR CUSTOMER-RELATED DATA. INCREASING YOUR CONTROL OVER ENERGY USE.

Over the past decade, information technologies, such as cell phones, ATMs and WiFi, have greatly improved how we live and work. These same technologies are now being used to modernize the nation's electric system and create a smart grid that supports the 21st century economy.

The benefits of a smart grid include:

- Fewer and shorter outages through devices that can automatically reroute power when problems occur, once the smart grid is complete.
- Operational efficiencies that will create savings which will be passed on to all customers.
- More information about your home's electricity usage, which you can access securely through the Internet to give you greater control over your monthly bills.
- Easier integration of renewable energy sources, such as wind and solar power.
- Creation of thousands of full-time equivalent jobs at the grid's peak investment period.



Just like standard meters, smart meters will measure the amount of electricity you use – not how you use it. They are not surveillance devices.

PROTECTING DATA ABOUT OUR CUSTOMERS' ENERGY USE

Making sure customer-related energy use information remains confidential and secure has always been a top priority for ComEd.

- In accordance with relevant laws and regulations, we will not disclose or sell any personally identifiable energy use information without approval, except when required by law.
- ComEd complies with the Illinois Consumer Fraud and Deceptive Business Practices Act, which provides that an electric service provider shall maintain customers' personal information "solely for the purpose of generating the bill for such services" and, in general, may not divulge the information except when required by law.

- The Energy Infrastructure Modernization Act, which authorizes ComEd's smart grid, also contains requirements for maintaining the privacy of customer-related data.

Even beyond these requirements, we are fully committed to maintaining not only the privacy of customer-related energy use information, but of all electronic information associated with our system. This is absolutely central to our mission, and our systems are designed to meet the highest standards of cyber-security.

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Privacy

PROTECTING THE PRIVACY OF OUR CUSTOMER-RELATED DATA

THE INFORMATION WE COLLECT

Modernizing the electric system includes replacing the standard analog meters our customers use today with new digital meters, called “smart meters.” Just like standard meters, smart meters will measure the amount of electricity you use – not how you use it. They are not surveillance devices. Smart meters only contain the meter identifier and total energy information. No customer-identifying information is stored in a smart meter, nor is customer-identifying information transmitted across the network.

Once installed, smart meters will:

- Electronically transmit interval usage data back to ComEd to eliminate the need to send meter readers onto your property.
- Monitor service voltage data information, which is important to verify that your service is delivered within required limits for operating household and business equipment.

This data will be encrypted before it is transferred across our secure network. Each new meter also will contain safeguards designed to prevent unapproved, outside parties from retrieving the data.

WHAT YOU GET IN RETURN

Once installed, smart meters transmit information to ComEd electronically so that:

- You receive more information about energy use, which will allow you to better understand and manage your home’s energy use and your energy bill.
- Once the smart grid is complete, smart meters will signal to us when power has been lost, which helps us respond to outages more quickly and efficiently.

Your confidence in our ability to protect the privacy of our customer-related data is important to us. After all, earning the confidence of our customers is what has enabled us to serve northern Illinois for more than a century.

PRIVACY OF OUR CUSTOMER ENERGY-USE DATA

We are dedicated to maintaining the highest level of security to ensure that customer-related energy usage data remains confidential and secure at all times.

Smart meters contain safeguards to prevent unapproved, outside parties from retrieving data.



For more information, visit ComEd.com/SmartGrid

ComEd

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powering lives

ENSURING SAFE TECHNOLOGY IS PART OF A STRONGER, MORE RELIABLE GRID

ComEd is modernizing its electric infrastructure to provide you with a stronger, more reliable electric system. ComEd also plans to introduce new, state-of-the-art technologies to create a smart grid that supports the 21st century economy. Smart meters are a key component of this effort.

Some customers have asked us about potential health risks associated with smart meters, including the effects of radio frequencies (RF) emitted from these meters. Although smart meters use radio technology, under typical circumstances a person would receive significantly less RF exposure from a smart meter than from many other electronic devices that are used daily, including cordless phones, cell phones, microwave ovens and baby monitors.

The bottom line:

- Numerous studies conducted on the effects of RF on human health found no evidence that RF emissions from smart meters pose any specific health risk.
- Smart meters comply fully with Federal Communications Commission (FCC) health and safety standards and emit RF signals far weaker than levels permitted by the FCC.

Our smart meters comply fully with Federal Communications Commission (FCC) health and safety standards and emit RF signals far weaker than the levels permitted by the FCC. There is no evidence to suggest that RF emissions from smart meters pose any specific health risk.

The RF exposure a person might encounter from a smart meter in a typical household setting can be significantly less than the RF signals they are exposed to from common, electronic devices found within the home.



HOW SMART METERS WORK

ComEd's smart meters will eventually replace standard meters that most customers have today, and will be installed in the same meter socket as the current meter.

Smart meters contain two, low-power radios:

- One low-power radio transmits electricity-use information back to the utility for billing purposes; the same job that meter readers now perform. Transmissions are intermittent, which means this low-power radio does not continuously broadcast all day long.
- The other low-power radio allows energy-usage data to be sent to an in-home device, such as an energy display or a "smart thermostat" that the customer would elect to purchase and install within their home. This radio is neither turned on nor used unless the customer requests that the smart meter be connected to one of these in-home devices.

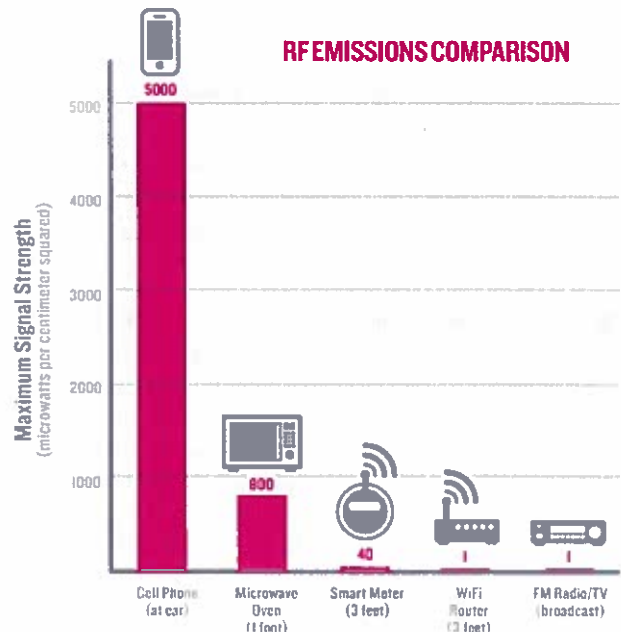
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ENSURING SAFE TECHNOLOGY IS PART OF A STRONGER, MORE RELIABLE GRID

UNDERSTANDING RADIO FREQUENCY

Radio frequency (RF) describes the energy associated with electromagnetic waves. Any device that utilizes wireless technology produces RF emissions, so we encounter RF emissions daily from many sources. The RF exposure a person might encounter from a smart meter in a typical household setting can be of significantly less strength than RF signals a person may be exposed to from many common, electronic devices found within the home. Because of their proximity in the home, the following list of home electronics can subject people to far stronger RF emissions than a smart meter:

- Cell phones
- Microwave ovens
- Wireless computer networks (Wi-Fi)



Adapted from the California Council on Science and Technology smart meter study published in April 2011.

As the chart in the upper right shows, the exposure from a cell phone is hundreds of times greater than exposure from a smart meter. The chart shows RF levels for smart meters based on the meter always being in “transmit” mode (smart meters do not continuously broadcast). Lastly, the strength of the RF signal originating from a smart meter diminishes rapidly the further a person moves away from it; and objects between a smart meter and a person, such as a brick wall, further reduce the amount of RF signal to which that person might be exposed.

RF AND YOUR HEALTH

The safety of ComEd’s electric infrastructure for its customers and employees is the top priority for ComEd. The company continues to monitor scientific research conducted on RF emissions and, to date, finds no evidence that RF emissions from smart meters pose any specific health risk. In addition, the FCC sets limits on the maximum permissible exposure for emissions of RF-emitting devices. The type of smart meter used to help build the smart grid operates at levels that are hundreds of times lower than the FCC limit.

For more information, visit ComEd.com/SmartGrid

Q. WHAT IS RADIO FREQUENCY (RF) ENERGY?

A. RF emission describes the energy associated with electromagnetic waves. We are surrounded by everyday conveniences that produce radio frequency emissions such as cordless phones, cell phones, microwave ovens and baby monitors.

Q. DO SMART METERS EMIT DANGEROUS LEVELS OF RF?

A. Smart meters do not emit dangerous levels of RF. In fact, RF emissions from a typical smart meter fall far below federal limits. The RF exposure a person might encounter from a smart meter in a typical household setting can be of significantly less strength than the RF signals they are exposed to from common, electronic devices found within the home, such as cell phones, microwave ovens, Wi-Fi networks and radio and television broadcasts.

Source: Electric Power Research Institute (EPRI), Radio Frequency Exposure Levels from Smart Meters, November 2010.

Q. WHAT DETERMINES A PERSON'S EXPOSURE TO RF?

A. Exposure levels depend on signal strength, transmission duration and distance. A report published by the California Council of Science and Technology (CCST) in 2011 included findings from the Electric Power Research Institute (EPRI) that the estimated maximum exposure level at one foot from a smart meter is far below the FCC guidelines; at a distance of about 10 feet, the power-density exposure lessens significantly.

Source: California Council of Science and Technology, "Health Impacts of Radio Frequency from Smart Meters," January 2011.

The exposure a person receives from a smart meter's RF signal is determined by the person's distance from the meter, the length of time the meter transmits and the power level of the meter.

RF SOURCE	RF OUTPUT COMPARED TO STANDING TWO FEET FROM AN UNOBSTRUCTED SMART METER*
Standing in front of an active microwave oven, two inches from door	550x more
Holding a live walkie-talkie to your head	Up to 4,600x more
Holding an active cell phone to your ear	Up to 1,100x more
Using a laptop computer	1.1 to 2.2x more
Sitting in a WiFi café	1.1 to 2.2x more

* Source: Silver Springs Networks, "Radio Frequency Networks Whitepaper: An Analysis of Radio Frequency Exposure Associated with Silver Spring Networks' Advanced Metering Devices," Rev. 11/1/11, page 2.

Q. WHAT ARE THE HEALTH IMPACTS OF RF AND SMART METERS?

A. Scientific panels and government authorities throughout the world have conducted numerous studies about the effects of RF on human health and found no evidence to suggest that RF emissions from smart meters pose any specific health risk.

Q. ARE THERE GOVERNMENT HEALTH-BASED STANDARDS FOR EXPOSURE TO RF EMISSIONS?

A. Yes. The National Environmental Policy Act of 1969, among other rulings, requires the Federal Communications Commission (FCC) to evaluate the effect of emissions from FCC-regulated transmitters on the quality of the human environment. In 1996, the FCC adopted the National Council on Radiation Protection and Measurements' recommended "maximum permissible exposures limits" for field strength and power density for transmitters operating at frequencies of 300 kHz to 100 GHz—where smart meters operate.

Q. DO SMART METERS USE RADIO FREQUENCIES REGULATED BY THE FCC?

A. Yes. These frequencies are called industrial, scientific and medical (ISM) radio bands. The FCC designates the ISM frequency bands for equipment and appliances that generate and use RF energy. The FCC opened these frequency ranges for wireless communications in 1985 and, since then, experienced a steadily increasing stream of devices occupying the bands. Their exact ranges are as follows:

	FREQUENCY RANGE (MHZ)	CENTER FREQUENCY (MHZ)
ISM900	902-928 MHz	915 MHz
ISM2400	2400-2500 MHz	2450 MHz

More 

Radio Frequency

Q. DO SMART METERS INTERFERE WITH MEDICAL DEVICES LIKE PACEMAKERS?

A. No. The Food and Drug Administration requires pacemaker manufacturers to test their devices for susceptibility to electromagnetic interference over a wide range of frequencies. Electromagnetic shielding is incorporated into the design of modern pacemakers to prevent RF signals from interfering with the electronic circuitry in the pacemaker. However, RF emitted from smart meters may interact with some electronic devices. This is called electromagnetic interference.

Q. DO SMART METERS PRODUCE THE SAME KIND OF RADIATION AS X-RAYS?

A. No. X-rays and gamma rays are types of ionizing radiation. Ionization is a process by which electrons are stripped from atoms and molecules. This process, which is associated with X-rays but not with RF transmissions, can produce molecular changes that can lead to damage in biological tissue, including effects on DNA, the genetic material of living organisms. The process requires interaction with high levels of electromagnetic energy. The energy levels associated with RF are not great enough to cause the ionization of atoms and molecules.

Q. DO SMART METERS TRANSMIT MICROWAVE ENERGY?

A. No. Smart meters do not use microwave frequencies to communicate with the network. They use a low-power 900 MHz radio to communicate to ComEd's computers. While a typical smart meter also has a 2.4 GHz radio, it is not used for network communications. This radio is designed to communicate meter usage data with in-home devices that a customer may choose to purchase. Additionally, the radios in smart meters are low power (1 Watt or less) and, unlike many other devices that transmit RF, operate intermittently and do not continuously transmit.

Q. ISN'T RF FROM SMART METERS A TYPE OF CARCINOGEN?

A. In spring of 2011, the International Agency for Research on Cancer (IARC) released the results of its expert panel's evaluation on potential radio frequency exposures for cell phones. A June 2011 update stated, "A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use."

The update also stated, "To date, research does not suggest any consistent evidence of adverse health effects from exposure to radiofrequency fields at levels below those that cause tissue heating. Further, research has not been able to provide support for a causal relationship between exposure to electromagnetic fields and self-reported symptoms, or 'electromagnetic hypersensitivity.'" However, based on limited epidemiologic evidence in studies of cell phones and limited evidence from a small fraction of all reported animal experiments, the IARC classified electromagnetic fields as a "possible" or a group 2B carcinogen. Group 2B is a category used when a causal association is considered credible but when chance, bias or confounding cannot be ruled out with reasonable confidence. (Other Class 2B carcinogens include coffee and pickled vegetables.) This classification means more research information would be required for a more definitive statement in either direction.

Source: World Health Organization, "Electromagnetic Fields and Public Health: Mobile Phones," Fact Sheet No. 193, June 2011.

IARC CARCINOGEN GROUPS

GROUP 1	Carcinogenic to humans
GROUP 2A	Probably carcinogenic to humans
GROUP 2B	Possibly carcinogenic to humans
GROUP 3	Not classifiable as to its carcinogenicity to humans
GROUP 4	Probably not carcinogenic to humans

Source: <http://monographs.iarc.fr/ENG/Classification/index.php>

Q. WHO TESTS FOR THE SAFETY OF SMART METERS BEFORE INSTALLATION?

A. Manufacturers test their smart meters prior to installation to ensure they meet all FCC standards for safe levels of all emissions.

For more information, visit ComEd.com/SmartGrid

