



## Fact Sheet

### Smart Meters

# Proven, Secure Technology is Part of a Smarter, More Reliable Power Grid

Florida Power & Light Company is investing in smart grid technology as part of our commitment to modernize the electric grid. Smart meters are a key part of the system. Some customers have asked whether there are potential health effects of electronic and magnetic fields (EMF), or more specifically the radio frequencies (RF) emitted from smart meters. We want to assure our customers that FPL's smart meters comply fully with Federal Communications Commission (FCC) health and safety standards.

**How they work:** Most electricity meters in place today use old technology, with either moving mechanical parts or electronic recorders that lack the ability to communicate remotely. With these older meters, utility meter readers must visit customers' properties monthly to read the devices visually.

New smart meters record your electricity usage digitally and use small, low-power radios to send the information securely to FPL. This makes it possible for us to deliver a variety of benefits to you and all customers, including greater reliability and enabling you to take more control over your energy bills.

Unlike many other common household devices that transmit via RF, smart meter radios only transmit data in short bursts lasting just a few seconds. In fact, after the initial performance test is complete, the radios in smart meters are inactive as much as 99 percent of the time. That means they give off a fraction of RF emissions compared to cell phones or other common household devices. (Refer to Graph 1)

**Understanding Radio Frequency:** Radio frequency (RF) is a term used to describe both man-made and naturally occurring energy associated with electromagnetic waveforms in the range of about 30 kHz to 300 GHz. Ambient RF comes from many sources every day. Some common sources of RF are:

- » TV over-the-air broadcast
- » Cellular phone transmissions
- » Wireless computer networks
- » HAM radios
- » AM/FM radio stations
- » Over-the-air communication services (police, walkie-talkies, pagers, CB radios)

“You would have to be exposed to the RF from a smart meter for 375 years to get a dose equivalent to that of one year of 15-minutes-per-day cell phone use.”

- Dr. Peter A. Valberg, Human Health Assessment Expert

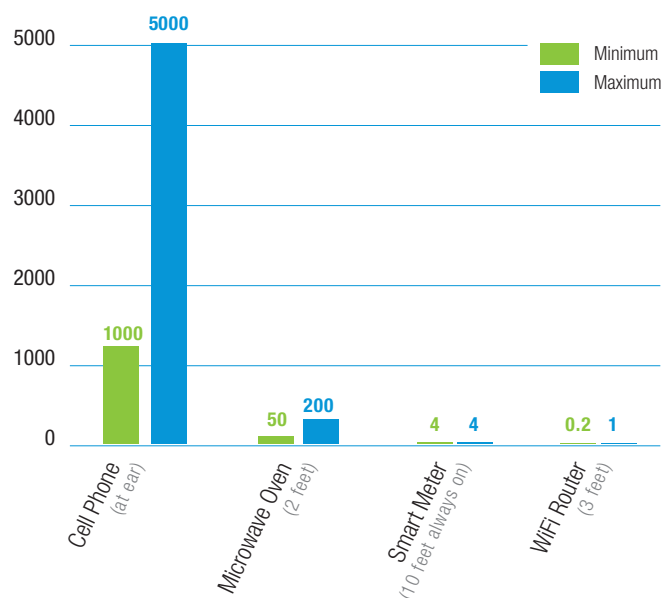
### Smart Grid: What's In It for You?

- » **Control:** After FPL completes the transition to smart meters in your area, you will be able to go online and see how much energy you are using by the hour, day or month – helping you make more informed choices about your energy use and saving money, if you choose. You can also see an estimate of your next electric bill based on your current usage.
- » **Reliability:** Smart grid technologies, including the smart meter, will help us see outages in the system so we can begin restoration more quickly.
- » **Convenience:** We'll be able to read your meter without visiting your property every month, though we'll still need occasional access for routine maintenance.
- » **Affordability:** Long term, our investments in smart grid will help us achieve efficiencies throughout the electrical system. By operating efficiently, we're keeping our customers' bills among the lowest in the state.
- » **Environment:** In the future, smart grid technologies will help us bring more renewable energy to the grid and help to encourage more widespread use of electric vehicles.

For more information: [www.FPL.com/energysmart](http://www.FPL.com/energysmart)

**RF and Health:** The Federal Communications Commission (FCC) has set limits on the maximum permissible exposure for emissions of RF-emitting devices. These limits are well below the point at which known biological impacts occur, and the smart meters being installed by FPL operate at levels that are hundreds of times lower than the FCC limit.

**Graph 1: Comparison of RF Exposure Levels from Various Sources**



Y axis: Power Density microwatts per square centimeter

This chart compares the RF levels from common electronics. Smart meters emit RF at much lower levels than other devices such as cell phones and microwave ovens. Note that the smart meter figures in this chart are based on an “always on” state to represent the hypothetical maximum case. However, the radios in smart meters are inactive as much as 99 percent of the time, so actual RF emissions would be a tiny fraction of what is shown here. Source: California Council on Science and Technology, January 2011

**Experts Agree – Smart meters emit far less RF than many existing household devices.**

**Maine Center for Disease Control:** This Maine state government agency concluded there is “no consistent or convincing evidence to support a concern for health effects related to the use of radio frequency in the range of frequencies and power used by smart meters.” Regarding a possible health condition called “electromagnetic hypersensitivity” (EHS), the study concluded that “well controlled and double-blind studies have shown that symptoms were not correlated” with electromagnetic frequency exposure.

**California Council on Science and Technology:** This independent organization, sponsored in part by the state’s major universities – including the University of California, California Institute of Technology, University of Southern California and others – and prestigious federal laboratories, conducted an extensive literature review and interviewed dozens of experts, concluding: “Wireless smart meters, when installed and properly maintained, result in much smaller levels of radio frequency (RF) exposure than many existing common household electronic devices, particularly cell phones and microwave ovens.”

Sources:

- » California Council on Science and Technology, “Health Impacts of Radio Frequency from Smart Meters,” January 2011, <http://www.ccst.us/publications/2011/2011smartA.pdf>
- » Maine Center for Disease Control, “Executive Summary of Review of Health Issues Related to Smart Meters,” November 8, 2010, [http://www.maine.gov/dhhs/boh/documents/Smart\\_Meters\\_Maine\\_CDC\\_Executive\\_Summary\\_11\\_08\\_10.pdf](http://www.maine.gov/dhhs/boh/documents/Smart_Meters_Maine_CDC_Executive_Summary_11_08_10.pdf)
- » Electric Power Research Institute, “Radio Frequency Exposure Levels from Smart Meters,” February 2011, [www.epri.com](http://www.epri.com)

**Many factors at work:** The following table summarizes the factors that affect one’s level of exposure to RF from smart meters:

Factor	Comment
<b>Signal frequency</b>	FPL’s smart meters operate on the same frequencies (the 900 megahertz ISM band) as many common household devices like mobile phones, cordless phones, baby monitors, remote controls and garage door openers.
<b>Signal strength (Power Density)</b>	Measured in microwatts per square centimeter (µW/cm²), smart meters’ signal strength is very small compared to the other devices listed in Graph 1. The signal strength is affected by other variables such as distance, and barriers such as walls.
<b>Distance from signal</b>	The signal strength becomes weaker as you move farther away from the device. For example, at 8 feet away from the meter, the signal strength would be 1/64th of that what it would be at 1 foot.
<b>Signal duration</b>	Smart meter radios transmit data in very short bursts lasting just a few seconds. In fact, on average they do not transmit data and could be idle – meaning they don’t emit any RF – as much as 99 percent of the time.
<b>Thermal effects on health</b>	“Thermal effects” refers to biological effects from an increase in body heat that can result from exposure to extremely high RF intensities. However, smart meters operate at a frequency and power level far below the level needed to produce these effects.
<b>Non-thermal effects</b>	Independent studies have shown there is no proven cause-and-effect relationship between non-thermal health effects and the low-power RF exposure in the frequency ranges used by FPL.

**Electric Power Research Institute (EPRI):** Responding to concerns that RF emissions could be too high if smart meters are grouped together in apartment buildings, EPRI tested RF levels at a distance of 1 foot from a bank of 10 smart meters operating continuously. The resulting exposures were 92 percent below the FCC limit.

**Bottom line:** Smart meters emit radio frequencies intermittently and at much lower levels than many other commonly used RF-emitting devices.

## Questions and Answers

### What are ISM bands?

The industrial, scientific and medical (ISM) radio bands are saturated with many different kinds of electronic devices from many different manufacturers. The Federal Communications Commission (FCC) has designated the ISM frequency bands for equipment or appliances that are designed to generate and use RF energy. The frequency ranges were opened by the FCC for wireless communications in 1985, and since then there has been 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	2450MHz

### Do smart meters produce the same kind of radiation as x-rays?

No. X-rays and gamma rays are types of ionizing radiation. Ionizing radiation should not be confused with the lower-energy, non-ionizing radiation with respect to possible biological effects. Ionization is a process by which electrons are stripped from atoms and molecules. Smart meters produce non-ionizing radiation in the form of RF energy. This process, which can be 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. This 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. Other types of non-ionizing radiation include visible and infrared light.

### Do smart meters transmit microwave energy?

No. FPL's smart meters do not use microwave frequencies to communicate with the network. They use a low-power 900 megahertz (MHz) radio. While the smart meter has a 2.4 gigahertz (GHz) radio, it is not used for network communications. It is currently turned off and would only be used for communications with customers who have volunteered to take part in a special pilot of in-home technologies. Additionally, the radios in the smart meters are low power, and unlike many other devices that transmit RF, they operate intermittently and transmit and receive data in very short pulses lasting just a few seconds.

### Do smart meters create electronic and magnetic fields (EMF)?

The use of electricity in our everyday lives creates power frequency (60Hz) EMF. It is present wherever there is electrical wiring.

Common sources:

- » Wiring in our homes, schools, hospitals and businesses
- » Power lines and utility facilities that deliver electricity
- » Electrical appliances and equipment we use at work and home

Some of the most prestigious U.S. and international scientific organizations have evaluated the EMF research. None of these organizations has found that exposure to power frequency EMF causes or contributes to cancer or any other disease or illness. Their reviews generally conclude that the scientific studies overall have not demonstrated that EMF causes or contributes to any type of cancer or other disease.