

SMARTENERGY >

EFFICIENCY
CHOICE
INNOVATION
SAVINGS
MANAGEMENT

Introduction to *smart* energy



BGE[®]

What is a smart meter?

A digital meter that allows **two-way communication** between the meter and BGE via a wireless network

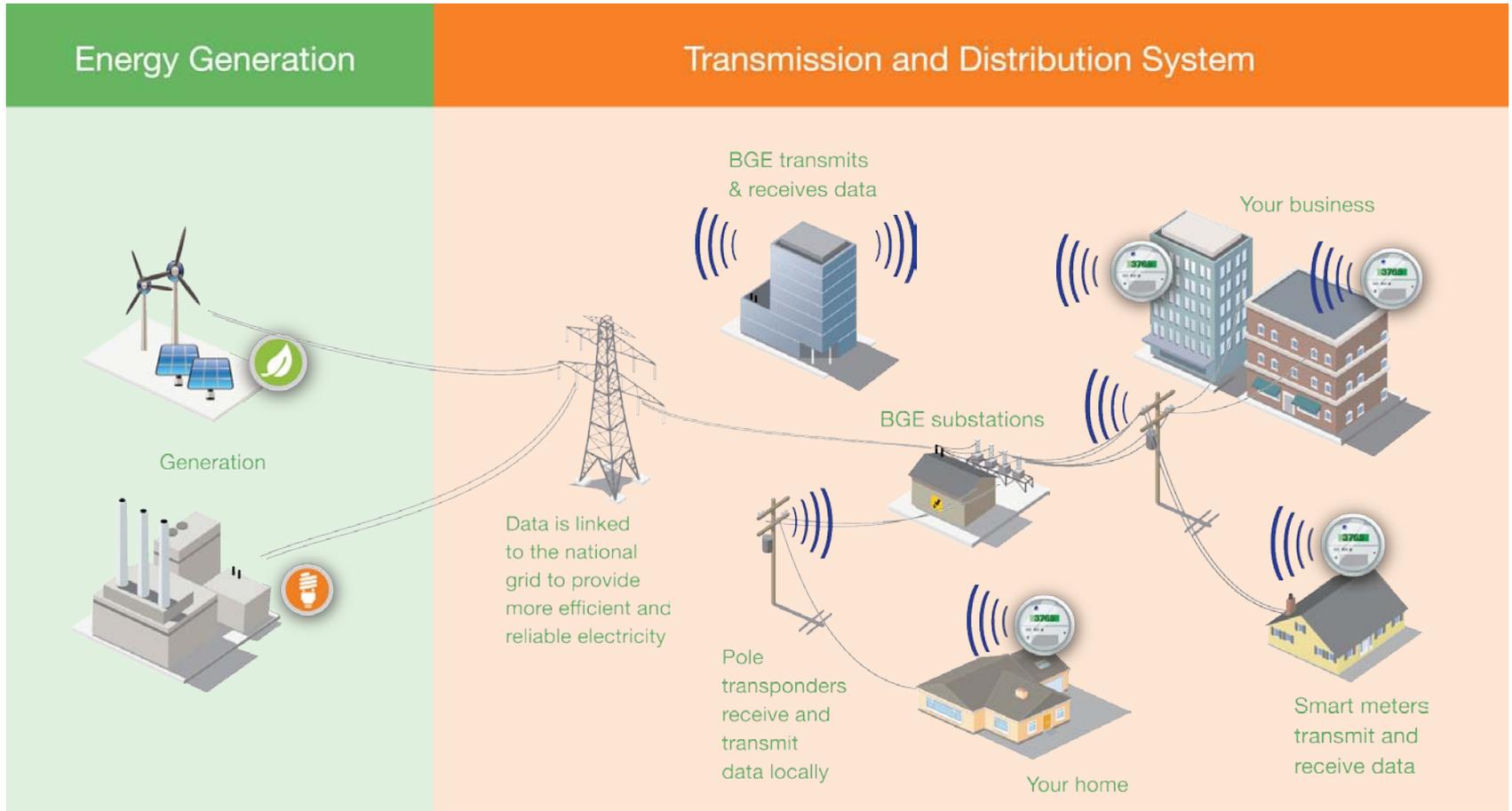
Receives information
from BGE



Transmits energy
usage information
to BGE



What is smart grid?



A gas and electric transmission and distribution system modernized with two-way communication and sensors to manage the system more efficiently.

BGE smart meters **facts**

- BGE is upgrading **all residential and small commercial meters** in our service area over next few years
- Smart meter related features will **not begin all at once**, they will roll out over the next few years
- Meters only transmit **energy usage information**
 - Usage information is kept **confidential** by BGE and all affiliated vendors
 - BGE and all affiliated organizations are **dedicated to keeping smart meters and smart grid secure**
 - Meters will **not** control how energy is used
- Smart meters are **ANSI*** approved, proven and ready



BGE smart meters **facts** *(continued)*

- Smart Meters

- Have been thoroughly tested by third parties for **safety and reliability**
- Produce **less radio frequency (RF) energy** than commonly used devices such as television remote controls, microwave ovens, wireless routers and cell phones
- Transmit for an average of **less than two minutes** a day
- Will **not** increase energy consumption costs



Comparing radio frequency
for a **smart** meter to
home appliances and other activities

50,000x
more

100x
more



Smart meter

Standing 3.28' from
a microwave oven

150x
more



Using a wi-fi wireless router or
laptop computer, or sitting in a cyber cafe



Holding a cell phone*

*Cell phones are evaluated for FCC compliance based on specific absorption rate, not power density (shown here).

Adapted from: Tell, Richard A. Summary Discussion of RF Fields and the PG&E SmartMeter™ System
(2005 Report and 2008 Supplemental Report) prepared for Pacific Gas and Electric, January 2010. Richard Tell Associates, Inc., Colville, WA.

Your smart meter **installation**

- You will not be required to do anything in order for your meter to operate
- BGE is partnering with Grid One Solutions, whose **uniformed technicians** with **proper identification** will replace your old electric meter with a smart meter
- Existing **gas meters** will also be updated with new communications capability
- If meter is **outdoors** and accessible, no need to be home
- If meter is **indoors**, BGE will schedule an appointment

Your smart meter **installation** (continued)

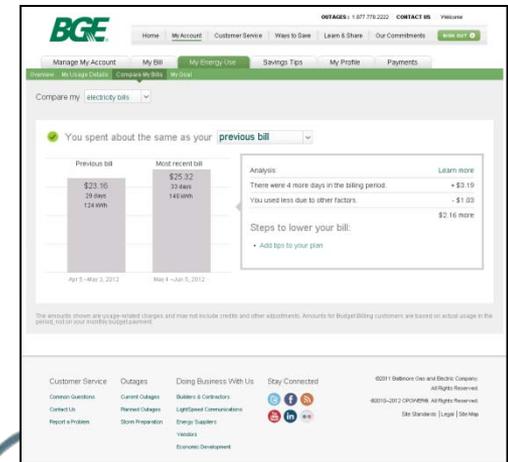
- There will be a **brief interruption** (a couple of minutes in most cases) of service while the new electric meter is installed
- For gas meters, in most cases there will be **no interruption** of service as installers are upgrading your existing meter.
- For **older gas meters** that need to be replaced, there will be an approximately 30 minute service interruption.
- Installers will leave a **door hanger** upon completion



Introducing **Smart Energy Manager**

Beginning in Fall 2012, BGE will offer a personalized web resource for smart meter customers featuring additional tools for managing your energy:

- View your **energy use** throughout a customizable time period
- Track your **energy costs**
- See how **weather** affects your energy use
- Compare your energy use to **similar homes**
- Create a **customized plan** to better control your energy use
- Receive **savings tips** that are tailored to your home
- Sign up for **Unusual Usage Alerts**, which will automatically alert you when you are approaching a higher than normal energy bill



Smart meter features: **In the next few years**

- In the next few years you can expect:
 - Opportunities to earn credits on your bill by reducing energy use during peak periods
 - Remote turn-on and remote turn-off service for customers moving within BGE's territory (electric service only)



Apr. 2012 → Dec. 2014



SMART METER INSTALLATIONS

- Begin installation of smart meters and gas devices for residential and small business customers (a three-year project)



Apr. 2012 → Dec. 2014

WHAT YOU WILL SEE

- Postcard 2 weeks before installation
- Phone message reminder 1 day before installation (for customers with special needs or indoor meters only)*
- Door hanger when installation is complete
- Outreach and education at community events, presentations, in media and BGE *Connections*

Customers with **medical needs should enroll in BGE's Special Needs Program by calling the customer contact center at 1.800.685.0123*



Customer Communications: Installation Postcard and Door hanger



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Your new *smart* meter is coming.

In the next few weeks BGE will be upgrading your existing electric and gas meters to new, smart meters that allow for two-way communication between the meter and BGE via a wireless network. This is the first step over the next several years as BGE works to upgrade and enhance our electric and gas infrastructure.

BGE

BGE.COM



We upgraded your equipment today.

Date: _____ Time: _____

Grid One Solutions, a BGE contractor, was here today and performed the service(s) indicated below:

- Replaced your electric meter with a new smart meter. There was a brief power outage during the installation and we apologize for any inconvenience this may have caused. Please check your clocks and other appliances that may need to be reset.
- Upgraded your existing gas meter.
- Replaced your old gas meter with a new, upgraded meter.

(over)



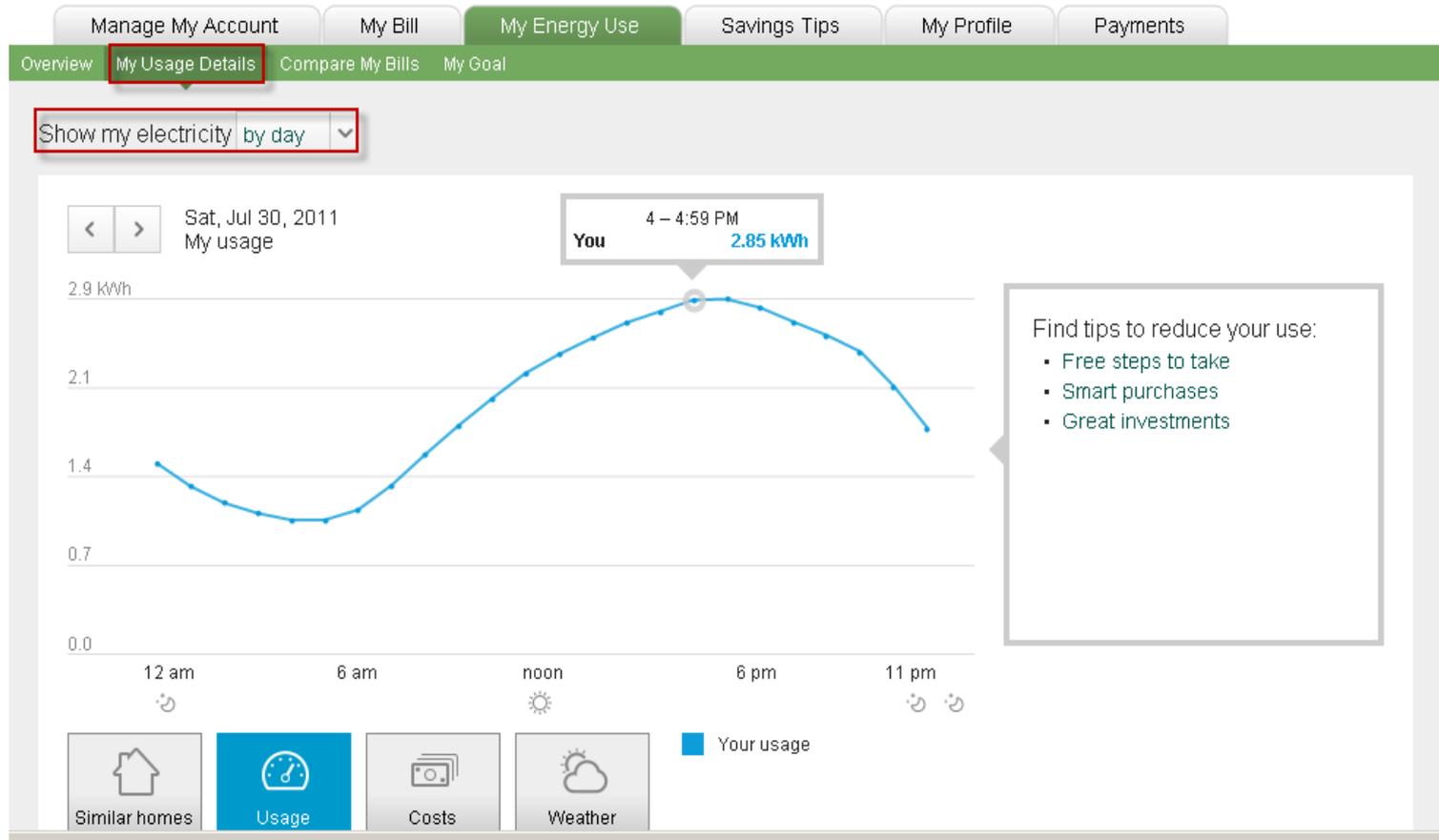
Beginning Oct. 2012

(For Certified Smart Meter Customers)

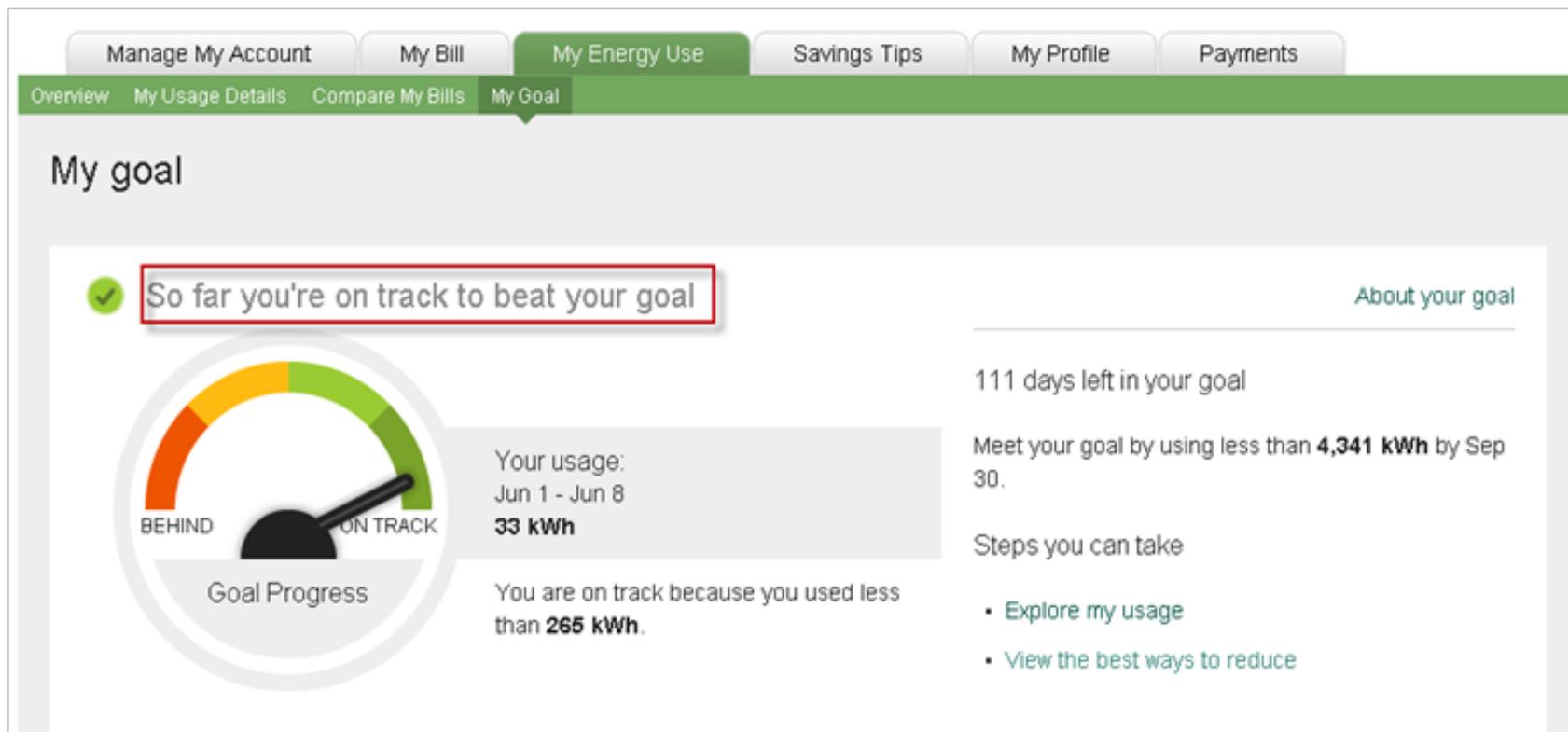
WHAT YOU WILL SEE

- First Home Energy Report providing you with more detailed information about your energy consumption and customized energy savings tips
- Welcome Insert providing instructions on how to log in and learn more about Smart Energy Manager

Daily Energy Use Reports



Set and track your **goals** for energy savings



For
more
information

- Visit **BGE.com/smartgrid**
- Look for **smart meter advertising** online, in your local paper and on billboards
- Call our customer contact center at **1.800.685.0123**

APPENDIX

Expert Testimony of Dr. Peter Valberg on Smart Meter Health Impacts

Expert Testimony of Dr. Peter Valberg on Smart Meter Health Impacts

The radio-waves from smart meters aren't dangerous to our health – our own bodies put out far more energy into the electromagnetic spectrum: Our bodies generate heat energy (in the infrared spectrum), that can be seen by a “night-vision” camera. These infrared waves are far more energetic than the radio waves used by smart meters, and the energy emitted continuously by our bodies (about 100 watts) is far greater than the intermittent signal from the smart meter at one watt or less.

**The Electromagnetic Spectrum: Examples of How Wave Properties Change with Frequency:
Each column shows wavelength, frequency, and photon energy for each portion of the spectrum**

AM Radio	Cell Phones, Smart Meters	Microwaves and Radar	Radiant Heating, Infrared	Sunlight, Yellow Light	Medical X-Rays	α -, β -, γ - Rays
30 m 0.001 GHz 4 neV	30 cm 1 GHz 4 μ eV	3 mm 100 GHz 0.0004 eV	6,000 nm 50 THz 0.2 eV	600 nm 500 THz 2 eV	0.3 nm 10 ¹⁸ Hz 4,000 eV	0.0003 nm 10 ²¹ Hz 4 MeV
	Smart meters, ~ 0.91 GHz (RF heating currents)		body heat	Vision		Cosmic rays
			← ← Non- ionizing ← ← (photo — chemistry)		→ <u>Ionizing</u> → → → → (molecular damage)	

nm = nanometers = 10⁻⁹ meter = one-billionth of a meter
 GHz = gigahertz = 10⁹ Hz = one thousand million cycles per second
 THz = terahertz = 10¹² Hz = 10¹² cycles per second

Expert Testimony of Dr. Peter Valberg on Smart Meter Health Impacts

RF waves are sometimes called “radiation,” which people may confuse with x-rays, CAT scans, and nuclear medicine. But, this is incorrect.

- The electromagnetic spectrum encompasses frequencies from, for example, AM radio at 1 million cycles per second, then into FM radio, up through microwaves, and on into infrared, visible light, ultraviolet, and X-rays.
- Smart meter radio waves have a frequency of about 900 million cycles per second. The "ionizing radiation" of x-rays has a frequency above 9,000,000,000 million cycles per second.

Visible light is the major source of electromagnetic energy in our environment

Electromagnetic energy in sunlight at the earth's surface (noon, summer day)	Applicable FCC standard for 910 MHz RF wave energy (public and residential areas)	RF levels measured in front of smart meters (@ 10 ft), when actually transmitting
150,000 $\mu\text{W}/\text{cm}^2$	610 $\mu\text{W}/\text{cm}^2$	$\sim 4 \mu\text{W}/\text{cm}^2$

Expert Testimony of Dr. Peter Valberg on Smart Meter Health Impacts

No public health agency has identified smart meters as harmful to health.

- Research studies on the biological effects of radio waves have been ongoing and published for many decades, including the portion of the RF spectrum where smart meters operate. Many independent scientific consensus groups, composed of research, engineering, medical, and public health scientists, have reviewed the data and produced “blue-ribbon” reports examining all aspects of RF safety. No agencies have suggested that operation of smart meters be prohibited.
- Radio waves have been used for communications in highly populated regions for more than a hundred years, and we've no indication that this use of RF has caused human disease.

Expert Testimony of Dr. Peter Valberg on Smart Meter Health Impacts

The IARC evaluation of radio-wave RF was not directed at smart meters, and the IARC "possible" cancer category includes a number of everyday exposures.

- In an abundance of precaution, on May 31, 2011, the International Agency for Research on Cancer (IARC, a part of the World Health Organization) classified RF electromagnetic fields as “possibly” carcinogenic to humans (Group 2B).
- The "Group 2B" category 2B includes substances that we all encounter, such as coconut oil, gasoline, diesel fuel, fuel oil, power-line EMF, “carpentry and joinery,” coffee, carbon black (car tires), car-engine exhaust, surgical implants, talc-based body powder, iron supplement pills, mothballs, nickels, pickled vegetables, and safrole tea. The WHO notes that no adverse health effects from low level, long-term exposure to RF fields have been confirmed.
- No ban has been called on other common devices that emit RF, such as iPods, TV sets, and radios

Expert Testimony of Dr. Peter Valberg on Smart Meter Health Impacts

Radio waves from smart meters are a tiny fraction of the many RF technologies we all rely on for a variety of purposes.

- Commercial radio (AM & FM) transmitting antennas
- Commercial TV (VHF & UHF & digital) transmitting antennas
- Radar for aviation, military, police, and weather monitoring
- Dispatch radio services: paging, medical, fire, police, marine, and aviation
- Amateur (ham) radio operators
- Microwave links for radio, television, Internet, telephones, and control systems
- Satellite radio / television / communications, global positioning system (GPS)
- Cell phones, Personal Communications Systems, Smartphones, iPhones
- Cordless telephones, baby monitors, wireless toys, walkie-talkies, Internet routers
- Computers (and game controllers), TV sets, Radios, CD players, DVD players
- Remote control devices, "Kindle" e-readers, iPods, iPads, Bluetooth connections
- Microwave ovens (RF leakage)
- Medical procedures such as diathermy, magnetic resonance imaging (MRI)

Expert Testimony of Dr. Peter Valberg on Smart Meter Health Impacts

- **The guidelines for safe levels of RF take into account all the scientific literature.**
 - The RF exposure limits were developed by the FCC specifically to protect against all known hazards of RF energy.
 - There are no regulations based on “non-thermal” effects, because these remain speculative and have not been demonstrated to lead to disease.
 - Society has used RF in the public environment beginning with Marconi’s commercialization of wireless telegraphy and the development of the radio in the late 1800s and early 20th century. If radio waves had health impacts we would have learned about them by now.
- **Smart meters transmit signals infrequently**
 - Typically, the smart meters transmit less than about 2 minutes a day on average.

Cyber-security

- BGE shares the industry-wide concern that the network could be exposed to malicious attacks; accordingly; therefore BGE has taken precautions to mitigate cybersecurity risks:
 - Smart meters are rigorously tested by the manufacturer and BGE, and have undergone extensive tests by other utilities and security specialists across the country
 - BGE hired a cyber-security firm with expertise in smart grid technologies to conduct an independent security assessment of the smart grid system that included an assessment of the smart meters, including having security penetration testers (commonly referred to as “white hat hackers”) attempt to identify vulnerabilities
 - As part of its core design, BGE is building its smart grid to meet the same stringent security standards developed by the National Institute of Standards and Technology and required by organizations with rigorous security needs, such as the Department of Defense, the Department of Energy (DOE), and many financial institutions
- Under BGE’s smart meter program, usage data to and from the meter that is coming over the network is encrypted using the latest technology and has no customer identifiable information associated to it
- Annually DOE requires a review of the cyber-security plan and artifacts that document consistency between the plan and field implementation. This is conducted during the annual BGE/DOE site visit

Data Privacy

- All data being sent to and from the meter will be encrypted to ensure security and accuracy
- There is no Personally Identifiable Information, such as name, address, bill account number, credit/collection information or social security number, being transmitted to or from the meter; thus, even if an unfortunate event occurs where there is unauthorized access to meter data, only electric and gas consumption will be known, and not information on home appliance use or other sensitive data
- The Commission-convened smart grid working group is addressing data privacy and cyber-security
- BGE will not sell customer data to third parties
- When BGE shares customer data with contractors pursuant to BGE business relationships, BGE will hold those third parties to the same standard of confidentiality and prohibition on sale of that data
- BGE will continue to adhere to applicable laws and regulations as they relate to data privacy

Expert Testimony of Jules Polonetsky on Data Privacy

Privacy and the Smart Grid

- The smart grid offers significant societal benefits.
- To fully realize the benefits of the smart grid, utilities need operational and analytical data from smart meters.
- Current rules restrict the uses of retail electric consumer information.
 - MD Public Utilities Code
- BGE's privacy practices include:
 - Not transmitting personal information from meters
 - Encryption
 - Limited to measurement of hourly, whole house energy consumption data

Consumer Choice

- The Fair Information Practice Principles, the basis of privacy laws in the U.S. and E.U., distinguish between primary and secondary uses of data.
 - Primary uses of data (i.e. operational and analytical uses) do not necessarily require consent.
 - Secondary uses do require consent.
- FTC Report reaffirms this distinction: “the Commission... continues to believe that the practices highlighted in the preliminary staff report – fulfillment, fraud prevention, internal operations, legal compliance and public purpose, and most first-party marketing provide illustrative guidance regarding the types of practices that would meet the revised standard and thus would not typically require consumer choice.”