



Smart Meter 2020 Vision

*New Options for Customers
to Save Money, Time and Energy*

*MLGW Neighborhood Leaders Conference
August 2, 2013*



What Type of Electric Meter Is It?

Common Residential Types



Traditional analog meter

*no longer manufactured;
replaced by digital meter*



Digital meter

empty ports in upper right indicate this is NOT a smart meter



**Smart meter
(Smart Grid Demo)**

components visible in upper right indicate this is a smart meter



MLGW's Journey to Smart Meters

- 10+ years of researching advanced meter technology, applicability to MLGW operations and customer benefits
 - Automated meter reading (one-way)
 - Automated metering infrastructure (two-way)
 - Smart Grid Demonstration, 2010-12
- 60,000-meter project, 2013
- Full smart meter deployment by 2020



Smart Grid Demonstration

- 1,000-meter Smart Grid Demo, 2010-2012
- Electric smart meters with cellular communications
- Volunteer homes throughout Shelby County
- Confirmed operational and customer benefits



Smart Grid Demo Impact Survey

- **95% are more aware of *when* their home uses electricity**
 - 70% say others in household are also more aware
- As a result of participating:
 - **77% installed more efficient light bulbs**
 - **76% changed thermostat setting to save energy**
 - 66% used fans for supplemental cooling
 - 57% considered time of day before doing laundry
 - 50% considered time of day before running dishwasher
 - 42% made minor home energy improvements
 - 27% made major home energy improvements
 - 25% changed electric water heater temp to save energy



Smart Grid Demo Impact Survey

- Benefits gained from participation:
 - **86% better understanding of home's electricity use**
 - **75% saved money by reducing use**
 - 56% learned about new technology
 - 54% able to teach self/family about electricity use
 - 45% reduce environmental impact/carbon footprint
 - 41% participate in TOU rate pilot
 - 27% challenge others to use less electricity
 - 21% leave gates locked on meter reading day
 - 11% leave pets outdoors on meter reading day
- **95% would recommend smart meter experience to a friend**



Customer Access to Meter Data

My Account Dashboard

Welcome R. This is your personalized My Account Dashboard for managing, understanding and controlling your MLGW bills. Use **Bill History** to see more details about your utility bills. Go to **Bill Analysis** to find out more about why your bills vary from month to month. Use the **Go** button (right) to access our newest feature—the Carbon Footprint Calculator, which shows the environmental impact of your energy, water, transportation and recycling actions.

Questions? Live Chat (M-F, 9am-5pm)

Memphis Light, Gas and Water

Bill Payment Express
Click Here to View/Pay Your Bill

Account Summary

Account status as of 1/9/2013
Last Payment \$200.43
Received 12/21/2012 - Thank you!
Account Balance **\$218.50** Pay Bill

Bill Summary ending 1/8/2013

Previous balance \$0.00
Total Current Charges \$218.50
Amount Due 1/25/2013 **\$218.50**

Bill Highlights

- Your energy charges were \$19.76 higher for this bill.
- Your gas usage increased for this bill.
- Your average electric usage per day of service increased for this bill.
- The weather increased your bill by \$6 - \$10.
- Your electric costs per unit increased this month.
- This Gas bill covers a longer billing period.
- This Electric bill covers a longer billing period.
- Other "non-energy" charges were \$1.69 lower in this bill.

Bill Analysis
Still have questions about this bill? Find out more about why your bill has changed.

How does my usage compare?

Usage Comparison
Electric (kWh)

495 December, 2012 601 January, 2013

Electric Gas Water

Bill History
View and graph up to 24 months of information from your bills.

live green. reduce your footprint

Rate Comparison Calculator for Time-of-Use option

When does my home use electricity?

Actual Daily Electricity Use & Average kWh
Average On Peak Off Peak

Meter: Electric - 809613

Meter Highlights

- Electric Cost-to-Date: \$21
- Electric Use-to-Date: 152 kWh
- Days of service so far: 1/9/2013 --This is 9 days into your current billing cycle.
- Average Daily Electric Cost: \$2.36/day
- Your projected electric cost for the current billing period is: \$35 - \$66. Note that this is a simplified projection based on current rates and the pace at which you have used electricity so far in your current billing period.
- Your current billing period will end on 1/23/2013.

Electricity Use Analysis
View your smart meter data for details on when you use electricity.

How does my home use energy?

Total Costs 12/1/2012 to 1/2/2013

- Other \$60
- Heating \$48
- Food Storage \$26
- Water Htg & Laundry \$17
- Cooking \$11
- Lighting \$11
- Outdoor Water \$2

Total Electricity Gas Water

Control my costs!
Other is your highest energy expense. Click **Find Ways to Save** to get specific recommendations for reducing your energy costs.

How does my home compare?

Total Costs 12/1/2012 to 1/2/2013

Uses Least Energy \$118 My Home \$137 Avg. Home Uses Most Energy

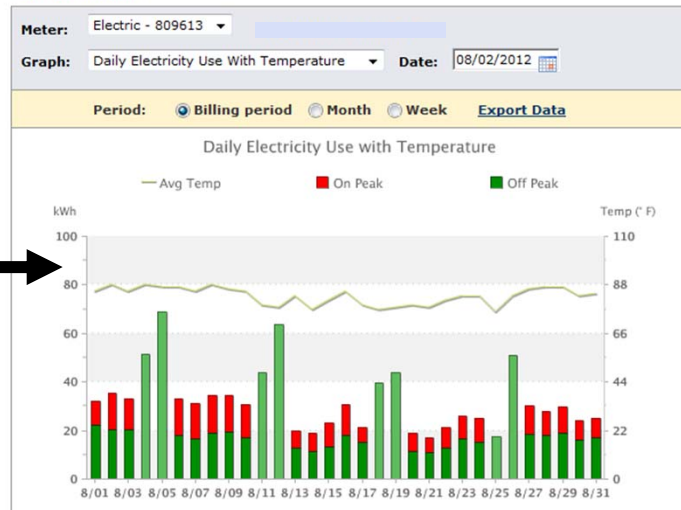
Total Electricity Gas Water

Congratulations! Your home used less energy than most of the similar homes in your area.

My Electricity Use

View your smart meter data and tips to analyze your usage. To change the view, make new selections in the Meter, Graph, Date and Period fields below. Learn more about MLGW's Smart Grid Demonstration.

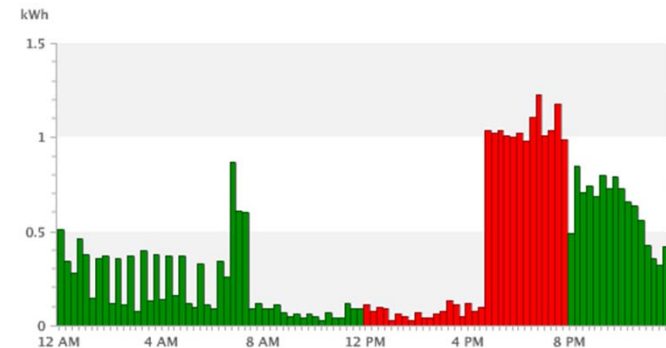
Rate Comparison Calculator for Time-of-Use option



8/2/2012:
highest weekday
usage (35 kWh),
highest average
temperature
(88°)

Electricity Consumption by Time-of-Use

On Peak Off Peak





Demo Results and Community Growth Potential

- Households in Shelby County use 36%+ more electricity than the national average (EIA 2011 data)
- Demo participants used an average **2.3% less electricity** than control group (without smart meters); participants on **TOU rate used an average 5.6% less**
- 2.5% reduction in electricity use, among all residential customers, yields more than **\$10 million in savings**
- \$10 million in utility savings among customers would **create 152 jobs** through increased discretionary spending in community (Younger Associates, May 2010)



Smart Meter 2020 Vision Benefits and Savings



MLGW Smart Meter 2020 Vision

- Do what is in the best interest of our customers as a whole
 - Lower the cost of utilities to our customers
 - Enhance the delivery and maintenance of MLGW-provided services
 - Improve environmental impact of our community
- Provide all customers the benefits of smart meter technology by 2020



Keeping pace with technology

Technology Evolves...



Meter manufacturers no longer make analog meters.
Let's keep pace with progress.

Smart meters are a measurement device—they measure your energy consumption. Because they have built-in communication, they can provide feedback on how your household uses energy, and that can help YOU save money by reducing your bill.



Get the facts at www.mlgw.com/smartgrid.



BENEFIT: Outage Management and System Monitoring

- Minimize or eliminate outage hotline contract (~\$250,000 annually)
- Expedite utility outage awareness and troubleshooting
- Reduce service restoration times (~24-36 hours)
- Increase customer satisfaction through fewer and shorter outages
- Increase operational knowledge of MLGW electric, gas and water systems



BENEFIT: Labor and Transportation

- Meter Reading stats
 - 12.3 million reads annually (E,G,W)
 - 92 Meter Readers
 - Average 24 vacancies per year; 26% annual attrition rate
- 150-200 net positions could be cut, through attrition—not layoffs—with full-scale smart meter deployment due to improved operating efficiencies and reduced service requests
 - Positions throughout Customer Care division, primarily Meter Reading and Field Operations
 - Reduction will be achieved through attrition, not layoffs
 - Associated vehicle, maintenance and fuel savings
 - Some new positions would be created



BENEFIT: Safety

- Meter Readers
 - Drive 500,000+ miles per year
 - 55 Meter Reader injuries in 2012
 - Vicious dog attacks (14)
 - Spider, bee and insect bites (10)
 - Slips, trips & falls (24)
 - Miscellaneous injuries (7)
 - Risk exposure to crime, hostility and severe weather



BENEFIT: Billing

- Reduce estimated reads/bills (~3%)
 - Meter access issues (locked gates, bad dogs)
 - Manpower (light duty, turnover, vacation)
 - Extreme weather (temps $>100^{\circ}$ or $<32^{\circ}$)
- Reduce meter reading errors ($<1\%$)
- Reduce billing inquiries and mistrust
- Identify and reduce utility theft
 - 11,000 resolved diversion cases last year



BENEFIT: Time-of-Use Electric Rate Option

- Completely voluntary
- Only available if you have an electric smart meter
- Provides financial incentive for customers to monitor and adjust electricity use during “on-peak” hours
 - **On-Peak:** Dec-Mar, weekdays, 4am-10am
Jun-Sept, weekdays, 12pm-8pm
 - **Off-Peak:** All other hours, including every weekend; every day in April, May, October and November; plus weekday observances of six designated holidays
- **87% of hours in the year are off-peak**
- Impact on electricity cost depends on customer’s willingness to modify use (conservation, energy efficiency and load shifting)



BENEFIT: Pre-Pay Service Option

- Voluntary option
- Pre-pay for utility service to avoid deposit, late fees and reconnect fees
- Similar to pre-pay cellphones
- Receive notification when balance is running low
- Add money to continue service



BENEFIT: Customer Awareness

- Average Annual Household Electric Use in Tennessee is 41% higher than national (2011 EIA data)
- MLGW customer average is 36% higher
- Viewing daily, hourly and even 15-minute data enables customers to better identify when and how home uses electricity
- Water leak alerts, consumption alerts and bill-to-date alerts provide added awareness
- Average customer will react by making decisions to reduce energy costs

Most Likely Savings Scenario

	Annual Savings	Notes/Assumptions
MLGW OPERATIONAL SAVINGS		
Labor and benefits	\$14 million	175 positions eliminated through attrition
Utility theft	\$ 3 million	11,000 known cases annually; actual theft is probably double the known cases
System losses	\$ 2 million	MLGW can reduce overall E, G, W system losses by 0.2%
Net write-offs	<u>\$ 2 million</u>	MLGW can reduce net write-offs by 18%
Total MLGW Operational Savings	\$21 million	
CUSTOMER RESPONSE SAVINGS		
Energy efficiency/conservation	\$16 million	Using demonstration results, customers can reduce consumption by average 2%
Load shifting	<u>\$ 4 million</u>	By shifting some usage to off-peak hours, customers can reduce MLGW wholesale demand charges by 1.7%
Total Customer Response Savings	\$20 million	
TOTAL SAVINGS	\$41 million	Savings from both MLGW actions and customer response activities



Smart Meter Adoption Rates among TVA Distributors

- **More than 37 million smart meters have been installed in the United States**
- TVA distributors with smart meter deployments:
 - Chattanooga 170,000 smart meters, 100% of total meters
 - Gibson County Electric 35,000, 100% of total meters
 - Clarksville 31,000+, 100% of total meters
 - Bolivar Energy Authority 11,000+, 100% of total meters
 - Volunteer 112,000 meters, 99% of total meters
 - North Georgia 99,000 meters, 99% of total meters
 - Nashville 30,000 smart meters
 - Knoxville 4,200 smart meters
 - Huntsville preparing for summer deployment
- **MLGW 1,200 smart meters, 0.2% of total meters**



60,000-Meter Phase



60,000-meter Installation

- Memphis City Council approved 60,000-meter project in MLGW's 2013 budget
- Council now must approve the vendor contract
- Equals 6% of MLGW's meter base
- Approximately 24,000 households will receive smart meters in this phase
 - ~24,000 electric meters
 - ~20,000 gas meters
 - ~15,000 water meters
- Announcement letters mailed in mid-June
- Customers may opt-out and decline smart meter



Smart Meter Distribution

ZIP	CUSTOMERS	METERS
38002	1309	3739
38017	805	1605
38103	1321	2850
38104	5199	12468
38105	453	1097
38106	1992	5316
38107	1445	3949
38111	197	575
38112	584	1520



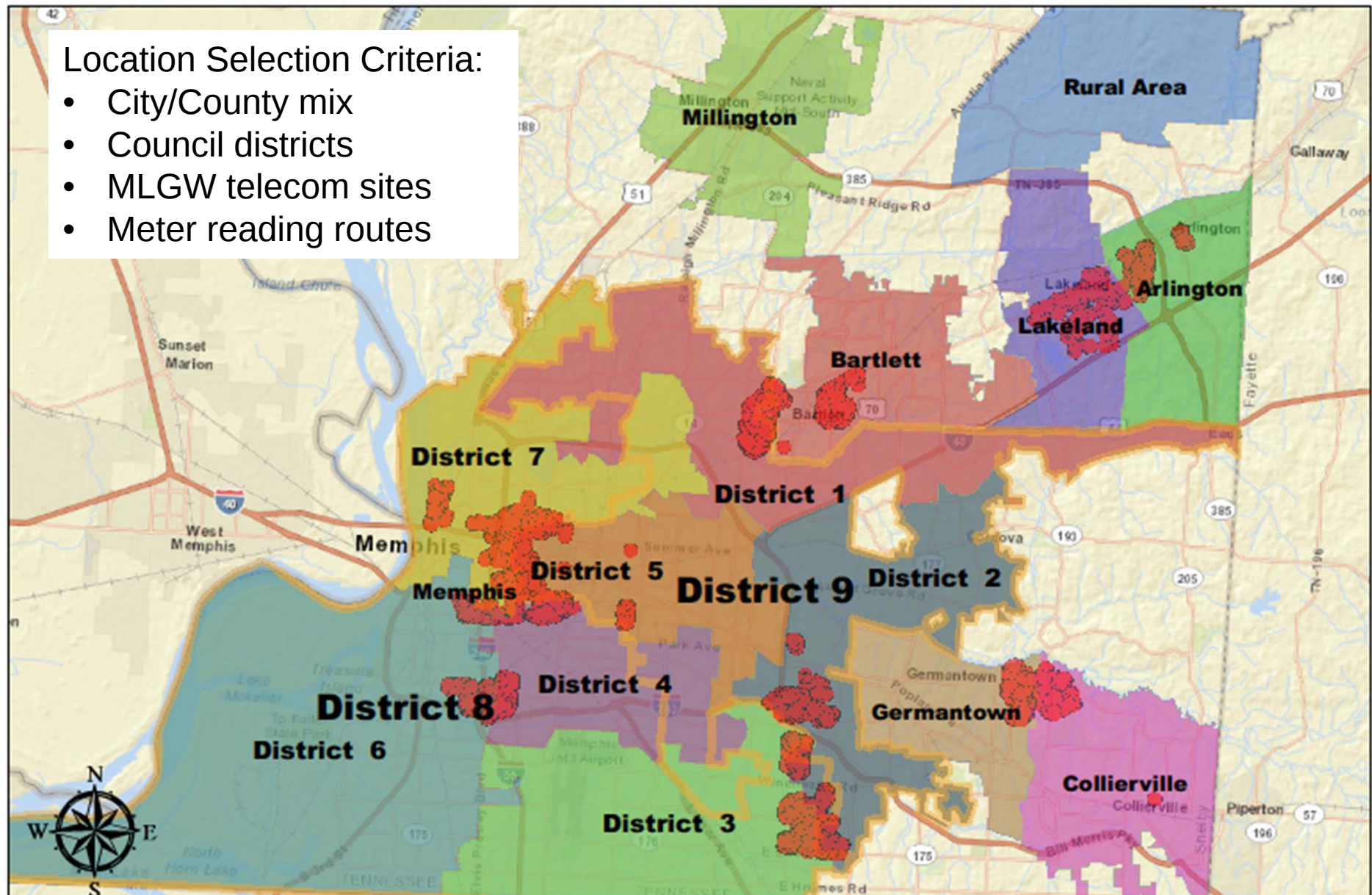
Smart Meter Distribution

ZIP	CUSTOMERS	METERS
38114	247	661
38115	4238	7910
38119	1140	3299
38120	63	108
38126	240	552
38134	2402	5724
38135	314	626
38139	988	1943
38141	1896	5390

Projected Sites for 60,000 - Meter Installation

Location Selection Criteria:

- City/County mix
- Council districts
- MLGW telecom sites
- Meter reading routes





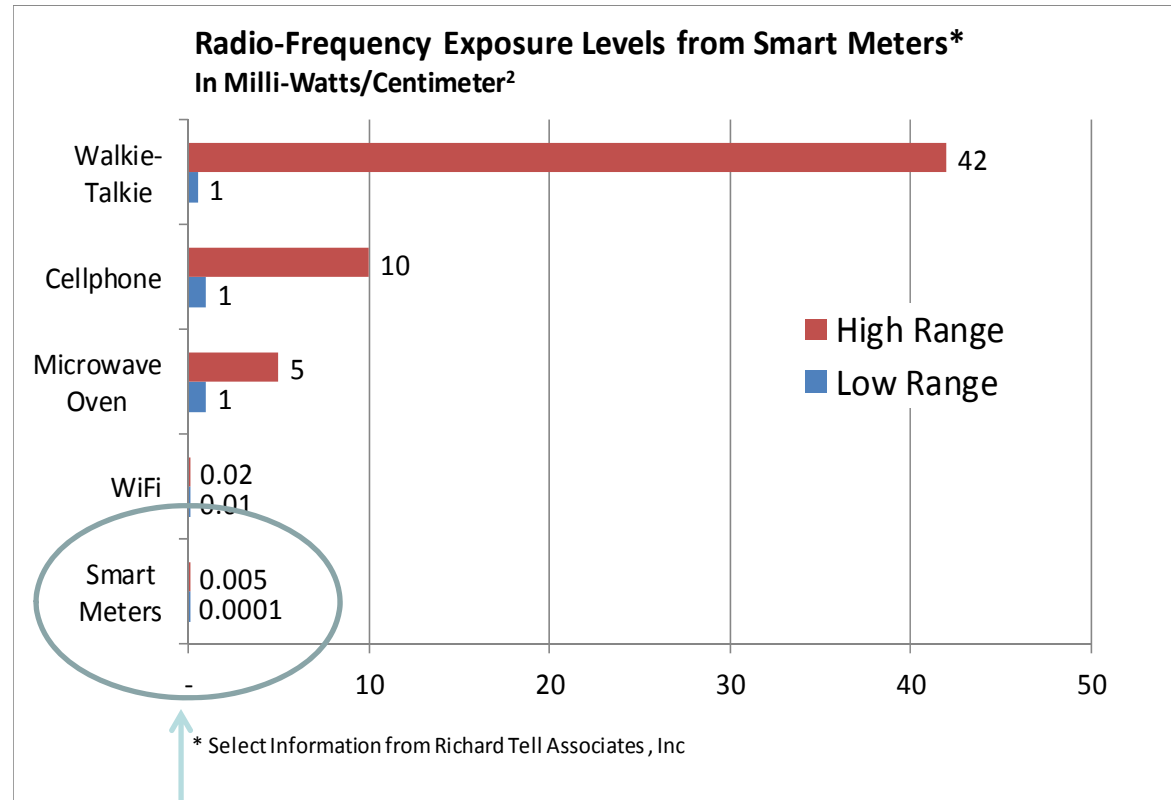
Smart Meter Myths & Realities



Myth: Smart Meters Emit Dangerous RF

Reality:

- Every day, people use and keep near to them many devices that utilize radio frequency (RF) waves, including microwave ovens, cellular telephones and wireless home networks.
- The Federal Communications Commission (FCC) sets RF limits and requires that all radio communicating devices be tested to ensure that they meet federal standards .
- Smart meters emit less radio frequency energy than many other commonly-used wireless devices which, like smart meters, are safe and FCC-approved.
- Learn more at www.mlgw.com/smartgrid



Exposure from Elster smart meter selected by MLGW if in constant communication mode (100% duty cycle). Normal smart meter duty cycle is near 1%, so actual exposure is far less than this value.



Myth: Smart Meters Cause Fires

Reality:

- **Smart meters do not cause fires**
 - As determined by Fire Marshal/Fire Department officials from around the world, including in Florida, Maryland, California, Canada and Australia
- **Conditions in the customer-owned electric meter socket and wiring within the home can cause fires**
 - Meter socket and electric wiring are installed by builder's electrical contractor at time of construction and are property of building owner
 - MLGW will fund the repair or replacement of problematic meter sockets during smart meter installation



Myth: TOU Rate Forces Customers to Do Laundry at 2:00am

Reality:

- Time-of-Use (TOU) electric rate is **optional**
- TOU rate gives customer the option of paying less for electricity use during off-peak periods (when electricity demand and generation costs are lower) and more for electricity use during on-peak periods (when demand and costs are higher)
- **Just 13% of hours in a year are on-peak**





Myth: Smart Meters Aren't Safe Because They Aren't UL-Listed

Reality:

- As industrial equipment purchased by utilities and installed by utility personnel, utility meters are not considered consumer products and are not/have never been subject to UL-listing
- Utility meters are subject to American National Standards Institute (ANSI) standards



Myth: Smart Meters Can Be Easily Hacked to Manipulate Operations

- Reality: Multiple layers of industry standard cyber-security processes are used by MLGW to maintain a protected smart meter system
 - **Passwords** assigned to authorized users; system access monitoring
 - 25-channel **spread spectrum** radio system (military grade)
 - **128-bit data encryption** (currently used by utility, banking, finance, insurance, retail and other industries. Familiar signs include the “https” in the website URL and gold lock/key on screen to indicate secure server)
 - Anti-replay mechanisms to prevent recording and re-playing data
 - Firmware is locked; cannot be reverse engineered to “back in”
 - Data can only be transmitted via **established commands**
 - Only **authenticated devices** are permitted to participate on the network
 - MLGW adheres to **NERC Critical Infrastructure Protection** specs
 - Multiple **firewalls** prevent access once data arrives in MLGW network
 - Smart meter system is **separate** from MLGW billing system and system operations



But what if someone had the resources,
skill, willpower and time to hack into
MLGW's smart meter system
and un-encrypt the data

What would they get?	YES	NO
Access to unidentified meter readings	X	
Access to control the smart meter		X
Access to control the utility system		X
Access to MLGW account information		X
Access to customers' financial info		X



Myth: Smart Meters Will Financially Hurt Impoverished Customers

Reality:

- 27% poverty rate in Memphis (2012 U of M study)
- Smart meters
 - Reduce connect and re-connect fees
 - Provide customers the opportunity to track usage and better control utility cost
- Smart meters with pre-pay service option (similar to cellphone offerings)
 - Eliminate need for deposit
 - Eliminates late fees and re-connect fees



Myth: Smart Meters Will Make My Costs Increase

Reality:

- Smart meters will actually help MLGW reduce costs for many services

	Analog or Digital Meter	Smart Meter	Smart Meter Customer Savings
New Service Connection, same day	\$54.00	\$25.21	\$28.79
New Service Connection, next day	\$44.00	\$25.21	\$18.79
Non-payment reconnect	\$25.00	\$11.44	\$13.56
Reconnect with exception	\$25.00	\$20.44	\$4.56
Additional deposits, per reconnect, beginning with second occurrence	\$50.00	\$0	\$50.00 per occurrence



Myth: MLGW Will Layoff Employees

Reality:

- MLGW expects a net reduction of 150-200 jobs, which will be eliminated through **attrition**
 - Meter Readers have ~ 26% annual attrition rate
 - Some new jobs will be created within MLGW to manage the system
- Economic development consultants project that 152 new jobs will be created in the community for every \$10 million that MLGW customers save on avoided utility costs



Myth: MLGW Is Already Secretly Installing Smart Meters

Reality:

- Smart meters have only been installed at the homes of demonstration volunteers
- MLGW replaces about 10,000 each of electric, gas and water meters every year for age
- As older analog electric meters are replaced, MLGW is installing digital meters—which some customers confuse with smart meters
- Digital meters lack the communications to make them smart meters.



Myth: MLGW Will Force You to Have Smart Meters

Reality:

- Locations are based on each phase of installation, so smart meters are not available to everyone immediately
- Opt-out available for those who decline
 - Keep existing meter until end of equipment life, then receive digital meter



Smart meters are **S.M.A.R.T.**

- Smart meters are **S**afe. They don't cause fires.
- Smart meters help customers **M**ake informed choices about their energy usage.
- Smart meters are **A**ccurate. Customers will not have estimated bills.
- Smart meters will **R**educe customer fees—more than 50 percent savings depending on the type of service.
- Smart meters are **T**echnologically-sound. There are more than 37 million smart meters installed across the country.



Questions?

Information, updates and customer testimonials:

www.mlgw.com/smartgrid