

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC JOINT APPLICATION OF)	
LOUISVILLE GAS AND ELECTRIC)	
COMPANY AND KENTUCKY UTILITIES)	
COMPANY FOR A CERTIFICATE OF PUBLIC)	CASE NO. 2018-00005
CONVENIENCE AND NECESSITY FOR FULL)	
DEPLOYMENT OF ADVANCED METERING)	
SYSTEMS)	

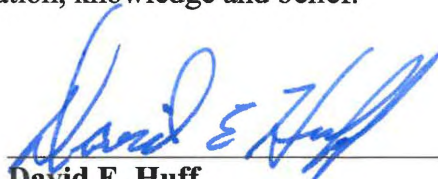
RESPONSE OF
LOUISVILLE GAS AND ELECTRIC COMPANY
AND
KENTUCKY UTILITIES COMPANY
TO METROPOLITAN HOUSING COALITION'S
FIRST SET OF DATA REQUESTS FOR INFORMATION
DATED APRIL 2, 2018

FILED: APRIL 13, 2018

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF JEFFERSON)

The undersigned, **David E. Huff**, being duly sworn, deposes and says that he is Director of Customer Energy Efficiency & Emerging Technologies for LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and that the answers contained therein are true and correct to the best of his information, knowledge and belief.



David E. Huff

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of April 2018.

 (SEAL)

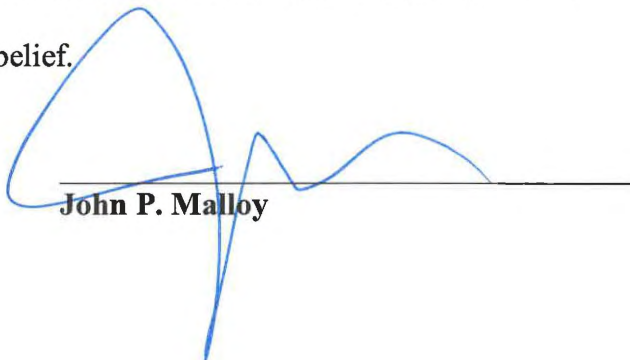
Notary Public

My Commission Expires:
JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

VERIFICATION

COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF JEFFERSON)

The undersigned, **John P. Malloy**, being duly sworn, deposes and says that he is Vice President – Gas Distribution for Louisville Gas and Electric Company and Kentucky Utilities Company, an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.



John P. Malloy

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of April 2018.




Notary Public (SEAL)

My Commission Expires:
JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

VERIFICATION


COMMONWEALTH OF KENTUCKY)
) SS:
COUNTY OF JEFFERSON)

The undersigned, **Rick E. Lovekamp**, being duly sworn, deposes and says that he is Manager – Regulatory Strategy/Policy for Louisville Gas and Electric Company and Kentucky Utilities Company, an employee of LG&E and KU Services Company, and that he has personal knowledge of the matters set forth in the responses for which he is identified as the witness, and the answers contained therein are true and correct to the best of his information, knowledge and belief.



Rick E. Lovekamp

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 13th day of April 2018.



Notary Public (SEAL)

My Commission Expires:
JUDY SCHOOLER
Notary Public, State at Large, KY
My commission expires July 11, 2018
Notary ID # 512743

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Metropolitan Housing Coalition's
First Set of Data Requests for Information
Dated April 2, 2018**

Case No. 2018-00005

Question No. 1

Witness: David E. Huff

- Q-1. With regard to the testimony of Tim Malloy, pages 11-13, referring to the MyMeter program, he cites a survey.
- a. How many households were sent the survey?
 - b. Was it 100% of the households who had signed up for the program?
 - c. How many households responded to the survey?
- A-1. The Companies assume throughout these responses that the questions referring to the testimony of "Tim Malloy" intended to refer to the testimony of John P. Malloy.
- a. The referenced survey was conducted among the LG&E-KU proprietary online panel. All of the panelists were sent the survey. The panel includes approximately 1,000 LG&E and 1,000 KU customers. For this survey 1,995 survey invitations were successfully delivered.
 - b. The referenced survey did not include all households that are participating in the AMS Opt In program. The objective of the survey was to understand why customers were not participating in the AMS Opt In program.
 - c. 666 KU and 404 LG&E

**Louisville Gas and Electric Company and Kentucky Utilities Company
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Case No. 2018-00005

Question No. 2

Witness: David E. Huff

- Q-2. In the Advanced Metering sessions, David Huff referred to a percent of people who signed up for MyMeter who actually logged on and utilized the information. What was that percent?
- A-2. The Companies are not sure of the specific comment referenced. For purposes of estimating the ePortal benefit the Companies used 48% for the percentage of people who logged in to MyMeter at least once based on 2016 MyMeter user data. The latest MyMeter participation study, performed by Tetra Tech, shows that 70% of customers with access to MyMeter have now logged in at least once.

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Case No. 2018-00005

Question No. 3

Witness: John P. Malloy

- Q-3. In the pending Demand Side Management/Energy Efficiency case, 20017-00441, LG&E has recommended discontinuing public education as a mechanism for changing personal behavior. What is the basis for concluding, in this case, that there will be savings projected to be had inuring to the general public through changes in behavior?
- A-3. Public education related to energy savings associated with behavior changes as a result of more granular access to consumption data, and thus the ability to make more informed decisions, differs from public education associated with Demand Side Management. The Company's research shows customers may conservatively save 3% of their bill and has seen AMS Opt-In participants save 3.3% of their bill on average. This level of savings coupled with a robust education program should result in customers actively engaging in the management of their consumption and the tools made available by AMS will assist them in that effort.

**Louisville Gas and Electric Company and Kentucky Utilities Company
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Dated April 2, 2018**

Case No. 2018-00005

Question No. 4

Witness: John P. Malloy

- Q-4. Please provide, by percentage, the reasons for per capita reductions in usage of electricity during the last five years, and isolate the percentage of those reductions that are attributable to deployment of more efficient appliances, and those ascribed to changes in personal behavior?
- A-4. The Companies do not have such analysis, and there is not enough information available to perform such an analysis.

**Louisville Gas and Electric Company and Kentucky Utilities Company
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Case No. 2018-00005

Question No. 5

Witness: John P. Malloy

Q-5. On Pages 7 and 8 of the testimony of Tim Malloy, he states that the submission is essentially the same as of two years ago.

- a. Please describe any changes from the previous AMS filing.
- b. During the interim between the withdrawal of the prior AMS filing and the filing of the current case, has the applicant conducted or contracted for the performance of any additional studies concerning the deployment of AMS systems? If so, please identify and provide a copy of such studies.
- c. Please provide the bases for the projected cost savings associated with the deployment of the AMS.

A-5.

- a. The Companies have provided descriptions for any changes from the previous AMS filing. In addition to the referenced pages of the Malloy testimony, see Exhibit JPM-1 page 10.
- b. During the interim between the withdrawal of the prior AMS filing and the filing of the current case the Companies set out to update the business case for full deployment of AMS systems. This updated study was provided as Exhibit JPM-1.
- c. The bases for the projected cost savings associated with the deployment of AMS can be found in Exhibit JPM-1, Appendix A-5, pages 8-15. See also response to AG 1-34.

**Louisville Gas and Electric Company and Kentucky Utilities Company
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Case No. 2018-00005

Question No. 6

Witness: John P. Malloy

- Q-6. In the Malloy testimony, reference is made to an article regarding non-technical losses. The article, a 2008 article, Appendix 8 to his testimony, cites studies from 2000 and 2001 and claims that the data estimate is not precise.
- a. Please provide a copy of any studies since 2008 of which applicant is aware that describe methods of collecting data on non-technical losses.
 - b. Please provide a copy of any studies since 2008 that show actual changes in non-technical losses solely due to implementation of an Advanced Metering program.
- A-6. The Companies would clarify that Appendix 8 is an EPRI Technical Update report and not an article. Additionally the report provides a range for non-technical revenue losses and concludes on page 34 of 112 that "A 'mode' of 2% would appear reasonable and reflective of the impact on distribution utilities."
- a. The Companies are not aware of any such studies.
 - b. The Companies are not aware of any such studies.

**Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Metropolitan Housing Coalition's
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Case No. 2018-00005

Question No. 7

Witness: John P. Malloy

Q-7. Please provide any studies developed by other utilities, or developed regarding other utilities' deployment of Advanced Metering Systems.

A-7. See attached and Malloy Testimony pages 22-24. The Companies are aware of numerous studies and business cases for AMS and have provided links to many business cases for AMS developed by other utilities. Additional studies referenced by the Companies in Kentucky alone that are related to deployment of AMS include:

- Case No. 2009-00489, the Commission authorized South Kentucky RECC's (South Kentucky) CPCN application, approving a \$19.5 million (including \$9.5 million in grants) investment to implement an AMI infrastructure. In its subsequent rate case, the Commission authorized accounting treatment for recovery of \$3.7 million in early meter retirements through deferred debit and a 15 year amortization period.
- In the Matter of the Application of South Kentucky Rural Electric Cooperative Corporation for an Adjustment of Electric Rates, Case No. 2011-00096, (Ky. PSC March 30, 2012); Approving, among other things, accounting treatment of the \$3.7 million in early meter retirement expense and a 15 year amortization period
- In the Matter of the Request of Shelby Energy Cooperative for Approval to Establish a Regulatory Asset in the Amount of \$443,562 and Amortize the Amount Over a Period of Five Years Case No. 2012-00102 (Ky. PSC April 16, 2012). Approving "Shelby's deferral request and five year amortization period.
- Application of Kenergy Corp., for an Order issuing a Certificate of Convenience and Necessity to install an Automated Metering and Infrastructure System, Case No. 2014-00376,
- (Ky.PSC February 24, 2015); Application of Nolin Electric Cooperative Corporation for an Order Pursuant to 807 KAR 5:001 and KRS 278.020 Requesting the Granting of a Certificate of Public Convenience and Necessity to Install an AMI System, Case No. 2014-00436
- (Ky. PSC February 13, 2015). See e.g., In the Matter of the Request of Kenergy Corp for Approval to Establish a Regulatory Asset in the Amount of \$3,884,717 Amortized over a ten (10) Year Period, Case No. 2015-00141 (Ky.PSC. August 31, 2015); authorizing Kenergy to record a regulatory asset for the loss on the disposal of its electro-mechanical meters based on the undepreciated balance of the meters

retired at the time of their retirement, and that the amortization period for the asset will be addressed in their next rate case.

- Duke Energy Kentucky: Case No. 2016-00152. Application of Duke Energy Kentucky, Inc. for (1) A Certificate of Public Convenience and Necessity authorizing the construction of an Advanced Metering Infrastructure; (2) Request for accounting treatment; and (3) all other necessary waivers, approvals, and relief.
- Grayson Rural Electric Cooperative: Case No. 2017-00419 In the Matter of the Request of Grayson Rural Electric Cooperative Corporation Application for a Certificate of Public Convenience and Necessity to install an Advanced Metering Infrastructure System (AMI).

Additional utilities outside of Kentucky are listed below:

Utility	State	Docket or Case Number	Website if known
Ameren	IL		Link provided in Malloy Testimony
BG&E	MD	9406	
ComEd	IL	12-0298	
ConEd	NY		
Duke Indiana	IN	43501	
Duke Ohio Assessment	OH	08-920-EL-SSO	
Entergy Mississippi	MS	2016-UA-261	
First Energy	OH	16-0481-EL-UNC	
First Energy	PA		https://www.firstenergycorp.com/content/dam/customer/Choice/Files/PA/tariffs/FE%20SMIP%20Deployment%20Plan%20Petition%20-%20Complete.pdf
National Grid	MA	D.P.U. 15-120	
National Grid	NY	14-M-0101	
Oncor	TX	35718	
Pepco	MD		
PPL	PA	M-2014-2430781	
Xcel	CO	16A-0588E	

Whitehouse, Jonathan

From: [REDACTED]
Sent: Thursday, July 28, 2016 12:28 PM
To: Whitehouse, Jonathan
Cc: [REDACTED]
Subject: E Source response to LG&E and KU on AMI Cost/Benefit Approaches

Follow Up Flag: Follow up
Flag Status: Completed



Ask E Source

AMI Cost/Benefit Approaches

Submitted: July 21, 2016 | Answered: July 28, 2016

Hello Jonathan,

Thank you for trusting E Source with your research needs. Our response to your question appears below; we hope you'll find it helpful. If you have any additional questions or feedback, please feel free to reach out to us.

Here to help,

[REDACTED]

Your Question:

I'm looking for benefits claimed in utility business cases for AMI. Avoided O&M through reductions in meter reading costs is one example but what additional benefits have resulted in favorable cost/benefit analyses? What assumptions drove those benefits? If possible, can you also express what the benefits are per year per meter by category? Thanks.

E Source's answer:

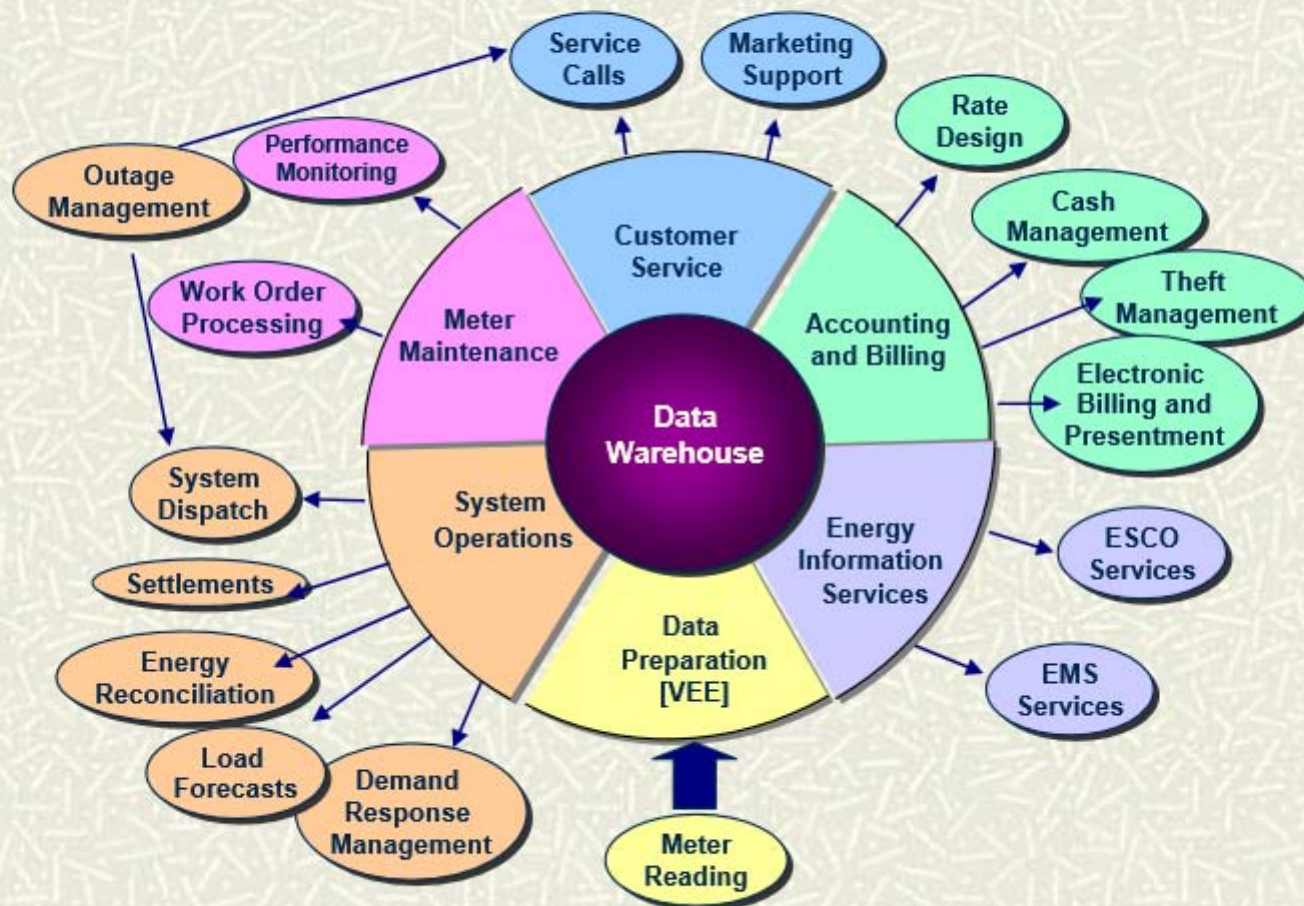
Answered by: [REDACTED]

A decade ago advanced metering infrastructure (AMI) was a questionable investment surround by lots of uncertainty about return on investment and overall cost effectiveness. Some enthusiasts in the metering industry pointed out a wide range of benefits, always focused on the operational savings to utilities, but other benefits were discussed too, including things like customer satisfaction, accounting and billing, energy efficiency and demand response. Below, we compiled a set of resources that speaks to the reported benefits – all signs point to net benefits from AMI with most of those focused on the operational gains.

Some Background

[REDACTED] former Chief Regulatory Officer of Cellnet, gives a good overview of the projected benefits in a slide from a 2004 presentation, [AMI Business Case Presentation- Levy Associates](#):

Business Case – Full Utility Perspective



Levy Associates

AMI Cost-Benefit Analyses

We examined several recent filings by utilities - Orange and Rockland, Ameren Illinois, Rocky Mountain Power, and a report by the US Department of Energy. Despite differing climates, populations and regulatory regimes, each of these utilities presented AMI business cases that were strongly positive. The presented analyses show types of costs and benefits examined, modeling assumptions, impacts on customer classes, expectations of hardware and in some cases software life and related concerns.

- Orange and Rockland (New York) – In its 2015 [Orange and Rockland Advanced Metering Infrastructure Business Plan](#), the utility describes a broad range of benefits from AMI such as:
 - o Operational efficiencies (meter reading, metering, field services, call center, outage management, meter accuracy, revenue protection)
 - o Enhanced customer service;
 - o Improved customer engagement
 - o A foundation for “REV” – New York’s Reforming the Energy Vision
 - o Reduced greenhouse gas emissions

The following costs and benefits were included in the utilities analysis:

Table 1: Financial Highlights and Summary (\$ in millions)

Business Case Financial View	Costs
A. Costs (20 Year Total Costs) (millions)	
O&M Expense for AMI System	\$18
Net Capital Depreciation Expense for AMI System	\$31
Amortization of Stranded Assets	\$12
Sub-Total	\$61
B. AMI Benefits (20 Year Total Benefits)	
AMI Cost Reduction Benefits	\$115
Customer and Societal Benefits	\$28+
Sub-Total	\$143
C. Total (20 Year Net Total)	
Benefits Less Costs	\$82
Simple Payback Period	9.6 years

O&R provided more detailed breakouts, for example for Operational Benefits:

- Rocky Mountain Power – A 2014 [Smart Grid Report](#) discusses the benefits the utility has seen from its smart grid deployment thus far, along with proposed next steps.
- Ameren (Illinois) – In a 2012 [Advanced Metering Infrastructure \(AMI\) Cost / Benefit Analysis](#), Ameren reports net benefits from AMI. The report authors states that, “Taking into account all costs and benefits, and assuming adjustments to customer rates, the Net Present Value (NPV) is \$406 million over the 20-year cost/benefit evaluation term (including terminal value) as seen in Figure 2.” We excerpted Figure 1 below from the report that shows the operational and societal benefits:

Figure 1: AMI Implementation Benefits Summary



This 2014 [Smart Grid System Report](#) authored by the Department of Energy describes many reported benefits of smart meters, including how Oklahoma Gas & Electric has captured major benefits from AMI including.

Some Anecdotal Info on AMI Benefits

Just last year, we interviewed a handful of utilities on how AMI has lived up to the EE/DR expectations. As you will see from these case studies, some of the DR benefits (mainly through pricing programs and smart thermostats) are starting to come to fruition.

Pacific Gas & Electric

PG&E has nearly 10 million smart meters deployed in its service territory. According to this 2013 [Annual Report of Pacific Gas and Electric Company on Status of Smart Grid Investments](#) (PDF) filing, as of September 2013, 120,000 residential customers were enrolled in PG&E's SmartRate program, the country's largest residential critical peak pricing program.

We spoke with [REDACTED], Project Manager of Demand Response Integration at PG&E about whether or not smart meters have lived up to their promise from a DR perspective and where DR programs are trending. In short, [REDACTED] believes that the market is moving towards WiFi and customer-selected products (like smart thermostats); however, he still thinks there's space for AMI to communicate with WiFi platforms and that smart meters will play a major role in moving forward with efficiency (EE) and demand response (DR).

Here is a summary of PG&E's story as it relates to AMI and DR:

PG&E originally put a bid out to identify an AMI platform as early as 2004/2005. At that time, the benefits were seen as 90% operational (i.e. elimination of meter reading, etc.) and 10% DSM, mainly DR. PG&E never selected a bidder at that time, because the major players (mainly Silver Springs Network) simply weren't mature enough to deploy 5 million meters. Two years later, PG&E filed another case known as the Smart Meter Upgrade Case or "The Case" to revisit smart meter deployment. By then, the popularity and expectations around smart grid had grown considerably. Specifically, regulators thought of AMI as "the savior of California."

According to [REDACTED], this wasn't the case at all. [REDACTED] explained that the technology still wasn't there (in 2007) and it couldn't be justified from a cost-effectiveness standpoint. He explained this is why Southern California Edison never got on board with AMI like PG&E ended up doing. SCE had already deployed AMR, so they could capture the bulk of smart grid benefits – the operational benefits – without getting too ahead of DSM related technologies.

PG&E ended up selecting Silver Springs Network to deploy smart meters (in 2007) and proceeded to get rid of its power line carrier technology and implement a mesh network. As a part of "The Case," PG&E had to justify the benefits, so naturally there was a lot of emphasis on DSM expectations in the filing. However, the utility never ended up putting much money towards actually deploying hardware to implement EE and DR programs. Instead, PG&E fully expected the market to develop those customer technologies naturally – i.e. customers would independently purchase and install direct load control devices, home appliances, thermostats, and in-home displace for example, and then register with PG&E to participate in programs.

PG&E overestimated these technologies' market maturation, however and things didn't pan out as planned. The utility has since found that the market for these enabling technologies has been slower to develop. Today, the market is moving towards WiFi. [REDACTED] said, "this is not to say that AMI isn't being used, but it's not the primary means of communication anymore." However, he added that AMI is still important because it provides customers with interval data which can then talk to Wi Fi enabled devices. Plus, it provides many operational benefits to utilities.

Today, PG&E is talking with a lot of manufacturers to try and certify that new devices coming out can talk with AMI.

PG&E is also exploring the idea of moving away from traditional peak shaving approaches towards more integration of renewable energy into its DR strategy. Specifically, the utility is experimenting with localized transmission and distribution networks to see what type of resources you can run for ancillary services.

Some advice from PG&E:

- Do not put all your eggs into one basket. PG&E has 750 MW of DR available and its spread across a lot of different programs, including a base interruptible program for C&I customers, pricing programs, and a direct load control program, for example. Relying on one strategy puts utilities at risk of not being able to curtail load.

To learn more about PG&E's experience, contact:

██████████
Project Manager, Demand Response Integration
Pacific Gas & Electric
██████████

Oklahoma Gas & Electric

Oklahoma Gas & Electric (OG&E) has had a completely different experience with smart meters. Today, all of OG&E's residential customers have smart meters and the utility feels it has been a resounding success from a DSM perspective. We spoke with ██████████, Product Innovations Manager at OG&E, who said that his utility has realized its EE/DR goals with smart meters. By his assessment, half of the value of AMI has been operational and the other half comes from thermostat controls and pricing.

██████████ explained that OG&E's AMI story was driven by state mandates that required utilities to pursue all cost-effective EE and DR in order to postpone power plant builds. OG&E gave thermostats away and installed them for customers, which is a strong value proposition to customers. On top of this, customers save about \$200 per year.

The result – OG&E is seeing the average customer contribute 2 KW reductions on system peak and the utility has 110,000 customers signed up for price response programs.

The utility has many "next generation" plans for customers to connect to mobile apps that will control their smart thermostats and talk with the AMI platform. The utility is also looking to control other devices – swimming pool pumps, window air conditioning units, etc. – so it's testing out all kinds of things right now. And OG&E sees big opportunities for commercial customers who can respond in the same way. OG&E is also testing how to integrate with solar inverters, because the utility believes it can create a value proposition for solar, whereby customers will be able to get hourly information about their usage.

Some tips from OG&E:

- Giving customers the ability to "set it and forget it," while also having the ability to override a set point easily is key to any DR program;
- When it comes to pricing programs, make the price difference noticeable to customers. OG&E's regular rates are \$.04/kWh and jump to \$.46 during peak times – this makes customers notice.

To learn more about OG&E's experience, contact:

██████████
Product Innovations Manager, Marketing & Strategy
Oklahoma Gas & Electric
██████████

Commonwealth Edison

ComEd has deployed 400,000 meters with a residential customer base of \$3.4 million. We spoke with ██████████, Manager of Energy Efficiency at Commonwealth Edison (ComEd), who said that WiFi might be easier, but the advantage of AMI is that it's real-time. At this point, the best that can be done with WiFi is to get data one day after. ██████████ suspects that AMI and WiFi will likely converge somewhere, and his utility is trying to do this. But ██████████ explained that the scale has to become bigger and that it's simply too soon to tell which path is best.

His utility sees AMI for two purposes – 1) to leverage AMI for information – ComEd is presenting a lot of data to customers via O Power based reports and web portal dashboards that show customers' consumption; and 2) to work with devices – ██████████ feels there's a lot of activity in this area right now and is piloting a few DR strategies that involve smart thermostats, smart appliances and DLC devices.

To learn more about ComEd's experience, contact:

██████████
Manager, Smart Ideas Energy Efficiency Portfolio
Commonwealth Edison
██████████

Florida Power & Light

Florida Power & Light (FPL) is reaping the benefits of smart meters in yet another way. FPL deployed smart meters in all 800,000 residential customers' homes. While FPL still uses traditional direct load control equipment for its program, the utility is leaning on AMI to manage its load. We spoke with [REDACTED], Senior Manager of DSM Program Operations at FPL, who said that beyond the operational benefits of smart meters, (which have been huge), his utility is leveraging AMI data to understand the state of the grid's load at any given point in time.

One major effort underway right now is that FPL is trying to use AMI interval data to determine whether or not events provided the level of reduction that was anticipated. The utility wants to know when there's an event, what worked, what didn't and can we tell if a device wasn't activated.

The utility is also starting to leverage data for customers, too. [REDACTED] said that FPL is starting to give customers the ability to view their hourly energy usage via dashboards. This has reduced the number of calls to the utility with complaints and questions about their energy usage.

With respect to what approach [REDACTED] advises, he says it all depends on what you're trying to accomplish. There's really no clear path, but WiFi is certainly becoming more prevalent.

To learn more about FPL's experience, contact:

[REDACTED]
Senior Manager, DSM Program Operations
Florida Power & Light
[REDACTED]

Southern California Edison

While we weren't able to connect with anyone at Southern California Edison (SCE), this 2012 [Case Study of Smart Meter System Deployment](#) (PDF) presents the results of SCE's AMI deployment. Specifically, the report assesses the extent to which SCE's AMI deployment has realized the anticipated benefits. Key findings are presented in Section V (starting on page 24) and include:

- SCE exceeded its original cost prediction (\$1.6 billion) and will spend more than \$5 billion on its smart meter initiative;
- Many benefits (including DSM-related benefits) have been delayed or reduced.

Additional Resources

Here are a few resources that speak more to the costs and benefits of AMI deployments:

- [The Costs and Benefits of Smart Meters for Residential Customers](#) – While a bit dated, this 2011 report by The Institute for Electric Efficiency 2011 makes projects on costs and benefits of AMI and shows net benefits.
- [Guidebook for Cost Benefit Analysis of Smart Grid Projects](#) – This 2012 report by the Electric Power Research Institute (EPRI)

Got another question? [Submit another inquiry](#)

Inquiry number: 00030108

Submitted by: Jonathan Whitehouse

Your organization: LG&E and KU

Time allowance: within 5 business days

Your phone number: [REDACTED]

Your supplied additional e-mail address(es):

[View your Inquiry on esource.com](#)

Whitehouse, Jonathan

From: [REDACTED]
Sent: Thursday, April 09, 2015 12:20 PM
To: Whitehouse, Jonathan
Cc: [REDACTED]
Subject: E Source response to LG&E and KU on Smart Meter/Smart Grid

Follow Up Flag: Flag for follow up
Flag Status: Completed



Ask E Source

Smart Meter/Smart Grid

Submitted: April 2, 2015 | Answered: April 9, 2015

Hi Jonathan,

Great questions! They're broad in nature, so my response is fairly high-level. I emailed you about narrowing the questions to ensure we deliver the type of information you're looking for, but got an out-of-the-office auto-reply. I understand you requested a response by April 13th, so I've done my best to answer as many parts of your question as possible. Don't hesitate to reach out if you'd like more information in a particular area.

Your question:

I'd like some information on smart grid/smart meter initiatives on a national level (topics below). • Status of where smart meter/smart grid is and where it seems to be headed • Number of connected devices – types/location/trends, etc. • Issues/roadblocks experienced. I need a response by April 13th. Please let me know if you have any questions (email is the best way to contact me). Thanks.

E Source's answer:

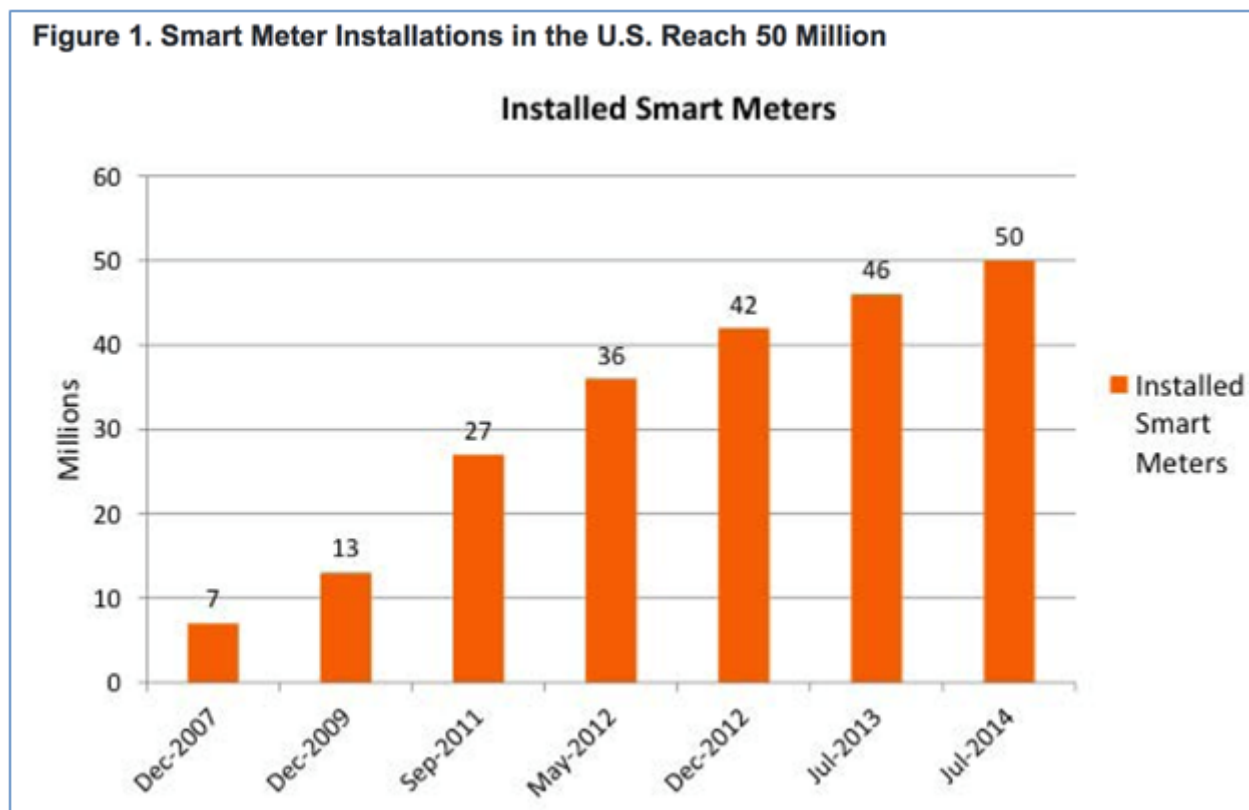
Answered by: [REDACTED]

Contributors: [REDACTED]

Status of where smart meter/smart grid is and where it's headed

Status and Benefits of Smart Meters

According to the Edison Foundation, “As of July 2014, over 50 million smart meters had been deployed in the U.S., covering over 43 percent of U.S. homes, up from 46 million smart meters a year ago... [and] over thirty utilities have deployed smart meters to all their customers.” For more information, check out Edison Foundation’s [Utility-Scale Smart Meter Deployments: Building Block of the Evolving Power Grid](#).



Here’s a summary of smart meter benefits currently realized by utilities with a high number of smart meters deployed:

- **Enhanced outage management**
- **Voltage optimization**
- **Grid integration** of distributed generation, community solar, electric vehicles, storage and micro-grids
- **New customer service opportunities** including automated budget assistance and bill management, energy use notifications, smart pricing and demand response programs. For example, smart meters have enabled over 8 million customers in California, Delaware, the District of Columbia, Maryland and Oklahoma to participate in new smart pricing programs.
- **Operational savings** from automating the meter reading process (reducing truck rolls) and reducing energy theft. BC Hydro’s theft detection pilot uncovered over

2,600 instances of theft; smart meters have enabled the utility to save millions of dollars

Many utilities have shifted focus from smart meter deployment to grid integration and optimization.

Leveraging the Smart Grid

The so-called “smart grid” is ever-evolving, and varies dramatically across states and jurisdictions. Greentech Media’s *Evolution of the Grid Edge: Pathways to Transformation* summarizes the rollout into three pathways: "The Advanced Energy Consumer," "The Innovative Regulator," and the "Proactive Energy Provider." Which approach a utility takes is a largely a product of its regulatory and consumer environment.

Here’s a snapshot of what’s on the horizon and beginning to gain traction:

- Analytics
- Interoperability
- Smart cities
- Internet of things

Another trend is crosscutting platforms, such as Itron’s *distributed intelligence platform* (Itron Riva), which “connects meters and grid devices, analytic software, and Cisco’s communications and computing technologies on a unified software platform to crunch data and automate decision-making out in the field” (Greentech Media).

Connected Devices – Numbers/Types/Location/Trends

We’ve focused on residential connected devices since that’s where most of the emphasis has been to date. We’re not aware of publicly available studies that provide saturation data or “numbers” of connected devices at a national level so we’ve focused on the types of HAN technologies being piloted, and case studies on a few utilities across the country. Please let us know if you’re looking for something in particular that this doesn’t address.

Connected devices have the potential to transform home energy management programs, and a myriad of technologies are being integrated with utility programs. Connected devices for home area networks can include online and in-home displays that allow customers to monitor specific appliance’s energy usage, smart thermostats with the ability to remotely control and program HVAC systems, plug-in electric vehicles, smart appliances and electronics which can receive signals from utilities in order to curb usage and demand. In some cases, these technologies are linked to pricing programs and may be connected via home area networks which allow for integrated control of all

devices/appliances. Here are a few examples of utilities running programs for smart connected devices.

Southern California Edison (SCE) encourages customers to connect their home or business area networks to their smart meters, and register devices such as energy information displays, smart thermostats, computers, digital media players, televisions, home security systems, and smart appliances to enable management and control. Customers can receive a bill credit for registering energy information displays (\$25) and smart thermostats (\$50 on the smart thermostat and \$75 for the installation). In addition, customers can enroll in SCE's peak time rebate program. The day prior to an event, SCE will send an event notification to the device and if customers reduce energy usage to below their baseline, they may qualify to receive a bill credit of \$1.25 for each kWh reduced.

DTE SmartCurrents Pilot involved nearly 2,000 customers testing a dynamic peak pricing rate, energy monitoring technologies, and smart appliances. The pilot wrapped up at the end of 2013. You can find more information on [DTE's website](#) or on the [SmartGrid.gov website](#). DTE utilized direct mail to recruit participants that were then randomly selected to test combinations of smart technologies, such as an online web portal, General Electric (GE) in-home display, GE programmable communicating thermostat, GE Nucleus software, GE iPhone app, and GE smart appliances.

Flathead Electric Cooperative (FEC), a utility in Montana receiving electricity from Bonneville Power Administration, offers the [Peak Time Rebate Program](#). The pilot program was launched in 2012 and provides customers three options for participating in events to reduce peak demand—a \$5 credit for taking and in-home display, an \$8 credit for allowing the cycling of water heaters, and a home energy management system complete with smart appliances and GE Nucleus software for a one-time payment of \$800.

For information about home energy management technologies that can be incorporated into utility demand-response programs, check out the [Highlights from the February 2015 \[E Source\] Smart Home Leadership Call](#). For DR specific home energy management technologies check out this [E Source article](#).

Issues and roadblocks for smart meters/smart grid

Many experts agree that the biggest hurdles are not technical in nature, but include customer backlash, capital issues, security concerns, and policy needs.

Customer concerns:

- **Funding sources and rate increases** – including the use of Reinvestment and Recovery Act funding (some customers had misgivings about using federal tax dollars to fund region-specific projects), and concern about rate increases (customer backlash in Colorado was strong when the Colorado Public Utilities Commission approved a 6.5 percent rate increase, earmarking \$11 million to pay for SmartGridCity)
- **Privacy** - consumer concerns about smart grid data privacy are fueled by a lack of consistent and transparent regulation for the collection, retention, and use of consumer-specific energy-usage data (CEUD). Communicating tangible benefits and providing a social experience can help alleviate this concern
- **Health impacts** – although evidence thus far shows little risk of health concerns due to smart meter radio frequency and electromagnetic fields, fringe ratepayers in parts of California and Maine were influential enough to slow down smart meter rollout in its early years
- **Job impacts** – although not a widespread concern, some consumers expressed concern about job losses for meter readers. It should be noted that the explosion of interest in smart grid technologies and programs has opened up many new job opportunities

In response to these concerns, several states developed opt out policies that allow customers to refuse a smart meter. Customers typically must pay an initial and monthly fee. Very few customers have chosen this route. For more information, check out the E Source report, [To Have or Have Not? A Review of Wireless Meter Opt-Out Policies](#).

Utility concerns:

- **Capital issues:** many utilities have sought rate increases to cover capital expenses related to smart meter roll out and smart grid technology adoption
- **Security vulnerability:** networked smart grid technologies pose risks for cyber attacks
- **Policy needs:** setting clear state policies accelerates smart grid results

Although smart grid infrastructure has been deployed on a utility-by-utility basis, consumer concerns have been relatively consistent and widespread. Utilities hoping to combat negative press and alleviate concerns will have to engage customers proactively and through a variety of channels. For the long term, utilities will also have to build a strong case that smart grid is worth the investment and will create benefits over time, some of which may be difficult to quantify, such as outage management, automated meter reading, and demand-side response.

I hope you find this information useful. If you need any additional assistance, please e-mail [Customer Service](#) or call [REDACTED].

Inquiry number: 00026942

Submitted by: Jonathan Whitehouse

Your organization: LG&E and KU

Time allowance: Medium

Preferred Format: No preference

Your phone number: [REDACTED]

Your supplied additional e-mail address(es): [REDACTED]

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Question No. 8

Witness: John P. Malloy

- Q-8. The article in Appendix 8 of the Malloy testimony acknowledges, on page 49 and 50 of 112, that AMR does not reveal more information. Is it the testimony of Mr. Malloy that the estimated non-technical savings are estimates based on data collection methods and data from before 2008?
- A-8. The Companies would point out that AMR is not comparable to the proposed AMS solution. The EPRI report introduces this topic in the opening paragraph of the cited section on Page 49 of 112 stating, "The first step in transitioning from traditional meter reading to remote was AMR, which replaced meter readers with remote meter reading via one way communications. The primary driver for this was savings on meter readers. This introduced difficulties with respect to theft detection. These difficulties were overcome with the evolution from AMR to AMI. AMI, coupled with MDMS, offers considerable advantages with respect to theft detection and the reduction of nontechnical losses."

It is the testimony of Mr. Malloy that the estimated non-technical savings are based largely on the conclusion of EPRI that a 2% revenue loss "appears reasonable and reflective of the impact on distribution utilities." (Page 34 of 112).

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Question No. 9

Witness: John P. Malloy

- Q-9. With respect to the Appendix 8 article, who authored the article, and was the article peer-reviewed?
- A-9. Appendix 8 of Exhibit JPM-1 was authored by the Electric Power Research Institute (EPRI). The Companies are not aware of the peer review process of EPRI.

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Question No. 10

Witness: John P. Malloy

- Q-10. While the Appendix 8 article suggests things that might work to bring down non-technical losses using Advanced Metering, it does not supply empirical studies that prove that each element has worked in the field. With a number of utilities using Advanced Metering, are there studies that show each element and how it has a direct impact on savings for non-technical losses?
- a. Please provide a copy of all such studies reviewed or relied upon in preparation of the filing.
- A-10. The Companies are not aware of any studies showing each element and how it has a direct impact on savings for non-technical losses. As stated in the EPRI report on page 24 of 112, "Data on revenue losses from non-technical losses are extremely difficult to come by. Data on non-technical losses are not collected by the Energy Information Administration (EIA) or industry associations. Data on the revenue attributable to those losses are not collected or estimated on an industrywide basis. Electric utilities consider these data confidential because they have implications for operating and financial performance."
- a. Not applicable.

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Question No. 11

Witness: John P. Malloy

Q-11. In the last five years, how many meters have been installed for residential, commercial, and industrial customers?

- a. How many of those are new installation, and how many are replacement meters?
- b. What is the projected useful life of the meters deployed by the utilities in their service areas? Please provide the total number of meters and the range of remaining years of useful life.
- c. What is the remaining value of those meters in monetary terms?
- d. What does the applicant intend to do with meters with remaining useful life that are replaced by Advanced Meters?
- e. Are there remaining capital costs associated with the current meters, how much are those costs, and who will pay for those remaining costs?

A-11.

- a. See table below. This information is not readily available in the format requested so Companies compared the meter install date to when the installation was created in CCS to determine which meters were new installs.

	New Installs	Replacements	Total
Residential	40538	141903	182441
Commercial	10607	41954	52561
Industrial	230	1450	1680

- b. The book depreciable life of non-AMS electric meters is 36 years for LG&E and 28 years for KU. As of March 31, 2018, there are approximately 955,000 non-MV90 and non-AMS meters installed in the Companies' service territories. As these meters were installed between the years 1948 and 2018, the remaining service life of these meters ranges between zero and 28 or 36 years.

- c. The remaining book value of the existing electric meters that the Company plans to replace with Advanced Meters is \$52.9 million as of February 2018.
- d. The Company plans to retain approximately 2% of the removed electric meters with remaining service lives to be held in inventory and used for customers who choose to opt-out of AMS after the Advanced Meter deployment. The rest of the meters will be disposed of.
- e. See response to Part C above. The Company plans to request recovery of the capital cost of the retired meters over the meters' remaining service lives.

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Question No. 12

Witness: John P. Malloy

Q-12. What was the average purchase and installation cost per meter per year for the last ten years?

A-12.

Year	LG&E Average Purchase and Installation Cost of Electric Meters and Transformers	KU Average Purchase and Installation Cost of Electric Meters and Transformers	LG&E Average Purchase and Installation Cost of Gas Meters
2008	\$124.38	\$114.31	\$155.23
2009	\$98.78	\$122.74	\$142.49
2010	\$120.38	\$129.94	\$154.88
2011	\$147.69	\$120.39	\$178.64
2012	\$109.60	\$90.42	\$209.50
2013	\$118.84	\$118.59	\$226.51
2014	\$101.61	\$131.84	\$207.97
2015	\$108.84	\$139.49	\$178.57
2016	\$95.30	\$95.04	\$151.62
2017	\$105.04	\$104.05	\$89.87

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Question No. 13

Witness: John P. Malloy

Q-13. What is the life expectancy of the meters as installed within the utility service areas?

A-13. See the response to PSC 1-4.

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Question No. 14

Witness: John P. Malloy

- Q-14. Considering the lost value of meters currently in use that will be retired prior to the end of their useful life,
- a. Will the removal and replacement of those meters with AMS meters bring any savings to the ratepayer?
 - b. If so, what are the projected savings, and when and over what time period will those savings be realized?
 - c. What are the assumptions on which such projected cost savings rest?

A-14.

- a.- c. The removal of the Companies' existing electric meters and replacement with AMS meters is the fundamental purpose of this CPCN filing and all savings identified therein are directly attributable to this replacement.

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Question No. 15

Witness: John P. Malloy

- Q-15. Will the loss of the value of meters currently in use that will be removed for AMS meters bring any new income to the shareholder? If so, what is that projected increase, by share and in the aggregate, of deployment of the AMS and retirement of current meters?
- A-15. No shareholder income will result directly from the retirement of the Company's existing electric meters.

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Question No. 16

Witness: Rick E. Lovekamp / John P. Malloy

Q-16. With respect to the meters to be removed and replaced,

- a. Will the meters that are still operable have any resale value?
- b. If so what will be the formula for determining the resale value, and what is the anticipated aggregate revenue that will be generated from the resale?
- c. Will that revenue be returned to ratepayers, and if not, why not, and how will the revenue be distributed?

A-16.

- a. The Companies are not aware of any resale value for the removed legacy meters given both the current remaining useful life of the meters as well as the clear market shift to AMS metering technologies.
- b. The Companies plan to dispose of the meters after removal so there is no formula to determine expected resale value.
- c. The Companies plan to dispose of the meters after removal so there is no expected revenue from resale.

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Question No. 17

Witness: Rick E. Lovekamp

Q-17. Will the LG&E claim the loss of value of those meters be used by LG&E in its taxes?

A-17. Yes, LG&E will claim a tax deduction on its income tax returns for the remaining tax value of the old meters that are removed from service and retired. This tax deduction is a temporary difference that will reduce current taxes payable and increase deferred income taxes by the same amount.

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Question No. 18

Witness: John P. Malloy

- Q-18. Is the loss of value of the still-operable meters factored into the cost/savings formula presented in the filing before the Commission?
- A-18. Because the Company will be requesting to recover capital costs of the removed meters over the meters' remaining service lives, there is no impact of this value in the cost-benefit analysis presented in the AMS Business Case.

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Question No. 19

Witness: John P. Malloy

- Q-19. Please describe what measures will be taken to assure that the privacy of individual ratepayers will be respected in the collection, storage, and utilization of the usage data collected through the AMS?
- a. Please provide any policy or policies that have been developed regarding the use and release of that data to the utility, and to third-parties such as to law enforcement, government agencies or commercial entities?
- A-19. An efficient encryption key management mechanism for end-to-end security has been developed and will be deployed across all installations.
- a. See the Companies' Privacy Policy at <https://lge-ku.com/privacy>.

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Question No. 20

Witness: John P. Malloy

- Q-20. Please describe whether the AMS system will be used to accelerate utility disconnection for nonpayment, and identify those due process measures that will be developed to protect customers from wrongful disconnection.
- A-20. The Companies' policies regarding disconnection of service will not be changed with the implementation of AMS. Customers will have the same protections regarding disconnection as they do today.

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Question No. 21

Witness: Rick E. Lovekamp

- Q-21. The collection of the cost proposed by LG&E will automatically be charged to ratepayers; how will the projected savings over 2018-2040 be allocated to the ratepayers?
- A-21. See response to AG 1-7.

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Question No. 22

Witness: John P. Malloy

- Q-22. What mechanisms/methods/ analysis/reporting does LG&E propose in order to accurately account for and track the savings each year?
- A-22. See response to PSC 1-44. Regarding reporting, the Companies question the value of the administrative burden for the Commission and the Companies to report additional metrics beyond the current requirements, but the Companies will certainly comply with any reporting requirements the Commission requests.

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Question No. 23

Witness: Rick E. Lovekamp

Q-23. What is the method to ensure the savings reach the ratepayers each year?

A-23. See response to AG 1-7.

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Question No. 24

Witness: Rick E. Lovekamp

Q-24. Should the savings not take place, will LG&E shareholders cover any or all of the difference between what was projected to justify the cost to ratepayers and the savings? Stated alternatively, if the assumptions of savings are not realized, will the risk of non-realization fall entirely on the ratepayers, or will it be shared by the shareholders and if so, under what formula?

A-24. See response to AG 1-7.