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 CERTIFICATES OF PUBLIC CONVENIENCE AND NECESSITY FOR FULL DEPLOYMENT OF ADVANCED METERING SYSTEMS	**)** **)** **)** **)** **)** **)** **)**	**CASE NO. 2018-00005**

RESPONSE OF
LOUISVILLE GAS AND ELECTRIC COMPANY
TO METROPOLITAN HOUSING COALITION'S
HEARING AND POST-HEARING DATA REQUESTS
DATED JULY 26, 2018

FILED: JULY 31, 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 31st day of July 2018.

(SEAL)
Notary Public

My Commission Expires:

SUSAN M. HUG NOTARY PUBLIC ID # 581907 COMMISSION EXPIRES 6/26/2021 STATE AT LARGE - KENTUCKY

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 31st day of July 2018.

(SEAL)
Notary Public

My Commission Expires:

SUSAN M. HUG
NOTARY PUBLIC
ID # 581907
COMMISSION EXPIRES 6/26/2021
STATE AT LARGE - KENTUCKY

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 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 31st day of July 2018.

Susan M. Hug (SEAL)
Notary Public

My Commission Expires:

SUSAN M. HUG NOTARY PUBLIC ID # 581907 COMMISSION EXPIRES 6/26/2021 STATE AT LARGE - KENTUCKY

Louisville Gas and Electric Company
Response to Metropolitan Housing Coalition's
Hearing and Post-Hearing Data Requests
Dated July 26, 2018

Case No. 2018-00005

Hearing Request No. 1

Witness: David E. Huff

Q-1. Are AMR meters able to alert a utility when there is any meter tampering?[1]

A-1. It is the Companies' understanding that AMR meters are able to detect certain kinds of meter tampering. But without the communications capabilities of AMS meters, AMR meters do not afford the same timeliness of detection (i.e., the difference between detection within 24 hours for AMS versus roughly 30 days for AMR). Building a communications network similar to the network the Companies propose for AMS presumably could allow AMR meters to provide timelier tamper detection information. The total cost of such an AMR deployment would be significantly closer to that of the proposed AMS deployment, but without the benefits of over-the-air software and firmware updates and remote service switching, which provide significant savings and efficiencies. Other unquantified customer service benefits of AMS would also not be available with AMR, including the ability to perform remote diagnostics in real time with the customer on the phone, such as checking if a power outage is related to something on the customer's side of the meter, identifying problems with the neutral with data rather than solely customer calls, and high temperature alarms.

[1] *See* hearing video at 4:23:44 – 4:24:04.

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Dated July 26, 2018

Case No. 2018-00005

Hearing Request No. 2

Witness: John P. Malloy

Q-2. What percentage of total operational savings from AMS would be lost by deploying meters that either did not have remote disconnection capability or were not enabled for remote disconnection (which are two different scenarios)?[2]

A-2. About 25% of operational savings would be lost by deploying AMS meters that either did not have remote service switching ("RSS") capability or were not enabled for RSS.

But to understand fully the impact of the two RSS scenarios presented on the net benefits of the AMS deployment, it is necessary to account for four other factors: (1) different meter costs for RSS-equipped meters versus non-RSS-equipped meters; (2) updated operational savings assumptions that better account for likely increases in meter-reading and field-services costs; (3) reductions in capitalized labor cost for the project if RSS is not enabled or installed; and (4) different cost-benefit periods related to different AMS meter service life assumptions. The tables below provide a range of results based on different assumptions for these four factors, which the Companies believe continue to support full AMS deployment with RSS installed and enabled:

Table A: Present Value Net Benefits to Customers of Different RSS Scenarios (cost-benefit period 2018-2040; $ millions)

	RSS installed and used (AMS Business Case assumption)	RSS installed but not used	RSS not installed
AMS Business Case Operational Cost Assumptions	24.6	(5.8)	24.6
Updated Operational Cost Assumptions	104.7	48.2	78.6

[2] *See* hearing video at 4:25:54 – 4:26:47.

Table B: Present Value Net Benefits to Customers of Different RSS Scenarios (cost-benefit period 2018-2038; $ millions)

	RSS installed and used (AMS Business Case assumption)	RSS installed but not used	RSS not installed
AMS Business Case Operational Cost Assumptions	0.3	(26.9)	3.3
Updated Operational Cost Assumptions	75.5	23.7	54.0

Table C: Present Value Net Benefits to Customers of Different RSS Scenarios (cost-benefit period 2018-2033; $ millions)

	RSS installed and used (AMS Business Case assumption)	RSS installed but not used	RSS not installed
AMS Business Case Operational Cost Assumptions	(66.5)	(84.6)	(54.7)
Updated Operational Cost Assumptions	(5.8)	(43.9)	(14.0)

The four attached cost-benefit tables (collectively Attachment 1) show the NPVRR calculations in greater detail for the 2018-2040 values.[3] Each of the tables corresponds to the following assumptions:

- Attached Table 1: AMS Business Case Operational Cost Assumptions; RSS installed but not used
- Attached Table 2: AMS Business Case Operational Cost Assumptions; RSS not installed
- Attached Table 3: Updated Operational Cost Assumptions; RSS installed but not used
- Attached Table 4: Updated Operational Cost Assumptions; RSS not installed

[3] Note that all tables in Attachment 1 fully account for the Tax Cuts and Jobs Act.

The tables above and the attached tables (Attachment 1) show that installing and enabling RSS produces better outcomes than installing and not using RSS in all scenarios. They show also that installing and enabling RSS produces better outcomes than not installing RSS in all scenarios assuming updated levels of operational costs. Finally, installing and enabling RSS produces nearly the same outcomes as installing and not using RSS in the 2018-2040 and 2018-2038 scenarios, but a worse outcome in the 2018-2033 scenario.

Overall, the Companies believe this analysis continues to support full AMS deployment with RSS installed and enabled.

The detailed assumptions used in the Companies' calculations are below:

First, the Companies compared the AMS meter they intend to deploy for single-phase residential customers (the Landis + Gyr E351 AXe-SD), which has RSS, to the comparable Landis + Gyr meter that does not have RSS (the Landis + Gyr E331 FOCUS AXe). (See the attached specification sheet from Landis + Gyr showing the similarities and differences of the meters, attached as Attachment 2.) The cost of the E351 AXe-SD the Companies have negotiated with Landis + Gyr is $[redacted]. Landis + Gyr has represented to the Companies that the pricing for a comparable order of E331 FOCUS AXe meters would be $[redacted] per meter. The Companies have used these residential meter cost assumptions in the attached cost-benefit tables (Attachment 1). These pricing assumptions are consistent with LG&E's RFP results regarding advanced meters for the Louisville Downtown Network, which evaluated proposals from Elster, Itron, Landis + Gyr, Sensus, and Silver Spring Networks. The pricing assumptions are also consistent with RFP results the Companies received for the AMS Customer Offering, which evaluated results from Elster, Itron, Landis + Gyr, and Silver Spring Networks. (Note that redacted information in this paragraph is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.)

Second, the Companies used two sets of assumptions regarding operational savings. The first set of assumptions, called "AMS Business Case Operational Cost Assumptions" in the tables above, uses the same operational savings assumptions used in the AMS Business Case, i.e., an increase in meter-reading costs over current levels of 11% for LG&E and 20% for KU in 2019 (when the Companies' current meter-reading contract ends) and no change to current outside field-services costs, with a 2.2% annual increase in both kinds of costs thereafter. The second set of assumptions, called "Updated Operational Cost Assumptions" in the tables above, assumes meter-reading and field-service cost increases that are in the Companies' current business plan, i.e., for both Companies a 64% meter-reading cost increase and an outside field services increase of 74% beginning in 2019, with a 2.2% annual increase in both kinds of costs thereafter. The second set of assumptions is in line with Mr. Malloy's testimony at hearing regarding such increases based on recent RFI results the Companies have received.

Third, in the scenarios in which RSS is either not used or not installed, the Companies eliminated field services benefits from the AMS Operational Savings Benefits. The

Companies also eliminated the portion of capitalized labor cost associated with enabling RSS in the AMS Business Case, which is a reduction in capital cost relative to the Companies' proposal to include and enable RSS. Because that capital savings is not reflected in the percentage of operational savings lost by not enabling remote service switching, the Companies believe it is important to include it in the NPVRR tables included in this response to provide an accurate view of the various RSS scenarios.

Fourth, to address issues around how different meter-life assumptions might affect RSS, the Companies performed NPVRR calculations for their original cost-benefit period (2018-2040), a period of 2018-2038 to ensure no AMS meter has an assumed life greater than 20 years, and a period of 2018-2033 to ensure no AMS meter has an assumed life greater than 15 years. Please note that the AMS Business Case assumes and the Companies' current expectation remains that no AMS meters will be deployed before the second quarter of 2019, so a full 20-year service life for the first-deployed meters would extend to the end of the first quarter of 2039. Similarly, a full 15-year service life would extend to the end of the first quarter of 2034. To be conservative, the Companies' two shorter analysis periods ended at the end of 2038 (less than a full 20-year service life) and 2033 (less than a full 15-year service life).

Attached Table 1: AMS Cost-Benefit Summary (2018-2040)

$M	Nominal RR[1]	Nominal RR - RSS Not Enabled	NPVRR[1]	NPVRR - RSS Not Enabled
(Costs)				
Total Project Costs (Capital)	(515.0)	(495.5)	(342.5)	(327.8)
Total Project Costs (O&M)	(29.8)	(29.8)	(25.8)	(25.8)
Total Project Costs	**$ (544.8)**	**$ (525.3)**	**$ (368.3)**	**$ (353.6)**
Total Recurring Costs (Capital)	(63.0)	(63.0)	(20.9)	(20.9)
Total Recurring Costs (O&M)	(108.8)	(108.8)	(46.5)	(46.5)
Total Recurring Costs	**$ (171.8)**	**$ (171.8)**	**$ (67.4)**	**$ (67.4)**
Total Lifecycle Costs	**$ (716.6)**	**$ (697.1)**	**$ (435.7)**	**$ (421.0)**
Benefits				
Operational Savings	425.1	325.8	203.1	158.0
ePortal Benefit	155.3	155.3	73.5	73.5
Recovery of Non-Technical Losses	385.1	385.1	183.7	183.7
Total Lifecycle Benefits	**$ 965.5**	**$ 866.2**	**$ 460.3**	**$ 415.2**
Net Benefits vs (Costs)	**$ 248.9**	**$ 169.1**	**$ 24.6**	**$ (5.8)**
Discount Rate			**6.58%**	**6.58%**

[1] As presented in the July 3, 2018 Verified Informational Update Filing fully revised for Tax Cuts and Jobs Act.

NPVRR - Net Benefits vs (Costs)		
15-year	**$ (66.5)**	**$ (84.6)**
20-year	**$ 0.3**	**$ (26.9)**

Attached Table 2: AMS Cost-Benefit Summary (2018-2040)

$M	Nominal RR[1]	Nominal RR - No RSS Capability	NPVRR[1]	NPVRR - No RSS Capability
(Costs)				
Total Project Costs (Capital)	(515.0)	(449.1)	(342.5)	(298.8)
Total Project Costs (O&M)	(29.8)	(29.8)	(25.8)	(25.8)
Total Project Costs	**$ (544.8)**	**$ (478.9)**	**$ (368.3)**	**$ (324.6)**
Total Recurring Costs (Capital)	(63.0)	(58.2)	(20.9)	(19.5)
Total Recurring Costs (O&M)	(108.8)	(108.8)	(46.5)	(46.5)
Total Recurring Costs	**$ (171.8)**	**$ (167.0)**	**$ (67.4)**	**$ (66.0)**
Total Lifecycle Costs	**$ (716.6)**	**$ (645.9)**	**$ (435.7)**	**$ (390.6)**
Benefits				
Operational Savings	425.1	325.8	203.1	158.0
ePortal Benefit	155.3	155.3	73.5	73.5
Recovery of Non-Technical Losses	385.1	385.1	183.7	183.7
Total Lifecycle Benefits	**$ 965.5**	**$ 866.2**	**$ 460.3**	**$ 415.2**
Net Benefits vs (Costs)	**$ 248.9**	**$ 220.3**	**$ 24.6**	**$ 24.6**
Discount Rate			**6.58%**	**6.58%**

[1] As presented in the July 3, 2018 Verified Informational Update Filing fully revised for Tax Cuts and Jobs Act.

NPVRR - Net Benefits vs (Costs)		
15-year	**$ (66.5)**	**$ (54.7)**
20-year	**$ 0.3**	**$ 3.3**

Attached Table 3: AMS Cost-Benefit Summary (2018-2040) -- Updated Operational Savings

$M	Nominal RR	Nominal RR - RSS Not Enabled	NPVRR	NPVRR - RSS Not Enabled
(Costs)				
Total Project Costs (Capital)	(515.0)	(495.5)	(342.5)	(327.8)
Total Project Costs (O&M)	(29.8)	(29.8)	(25.8)	(25.8)
Total Project Costs	**$ (544.8)**	**$ (525.3)**	**$ (368.3)**	**$ (353.6)**
Total Recurring Costs (Capital)	(63.0)	(63.0)	(20.9)	(20.9)
Total Recurring Costs (O&M)	(108.8)	(108.8)	(46.5)	(46.5)
Total Recurring Costs	**$ (171.8)**	**$ (171.8)**	**$ (67.4)**	**$ (67.4)**
Total Lifecycle Costs	**$ (716.6)**	**$ (697.1)**	**$ (435.7)**	**$ (421.0)**
Benefits				
Operational Savings	594.5	440.4	283.2	212.0
ePortal Benefit	155.3	155.3	73.5	73.5
Recovery of Non-Technical Losses	385.1	385.1	183.7	183.7
Total Lifecycle Benefits	**$ 1,134.9**	**$ 980.8**	**$ 540.4**	**$ 469.2**
Net Benefits vs (Costs)	**$ 418.3**	**$ 283.7**	**$ 104.7**	**$ 48.2**
Discount Rate			**6.58%**	**6.58%**

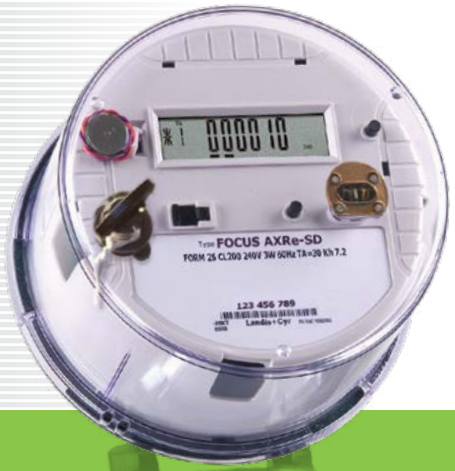
NPVRR - Net Benefits vs (Costs)		
15-year	**$ (5.8)**	**$ (43.9)**
20-year	**$ 75.5**	**$ 23.7**

Attached Table 4: AMS Cost-Benefit Summary (2018-2040) -- Updated Operational Savings

$M	Nominal RR	Nominal RR - No RSS Capability	NPVRR	NPVRR - No RSS Capability
(Costs)				
Total Project Costs (Capital)	(515.0)	(449.1)	(342.5)	(298.8)
Total Project Costs (O&M)	(29.8)	(29.8)	(25.8)	(25.8)
Total Project Costs	**$ (544.8)**	**$ (478.9)**	**$ (368.3)**	**$ (324.6)**
Total Recurring Costs (Capital)	(63.0)	(58.2)	(20.9)	(19.5)
Total Recurring Costs (O&M)	(108.8)	(108.8)	(46.5)	(46.5)
Total Recurring Costs	**$ (171.8)**	**$ (167.0)**	**$ (67.4)**	**$ (66.0)**
Total Lifecycle Costs	**$ (716.6)**	**$ (645.9)**	**$ (435.7)**	**$ (390.6)**
Benefits				
Operational Savings	594.5	440.4	283.2	212.0
ePortal Benefit	155.3	155.3	73.5	73.5
Recovery of Non-Technical Losses	385.1	385.1	183.7	183.7
Total Lifecycle Benefits	**$ 1,134.9**	**$ 980.8**	**$ 540.4**	**$ 469.2**
Net Benefits vs (Costs)	**$ 418.3**	**$ 334.9**	**$ 104.7**	**$ 78.6**
Discount Rate			**6.58%**	**6.58%**

NPVRR - Net Benefits vs (Costs)		
15-year	**$ (5.8)**	**$ (14.0)**
20-year	**$ 75.5**	**$ 54.0**

Product Specifications



Residential:
E331 FOCUS AXe
E351 AXe-SD

Landis+Gyr
manage energy better

Assured Future-Ready, Advanced Metering Performance

Overview

The FOCUS® platform for advanced metering and smart grid applications is designed to enhance your sensor ecosystem with industry-leading reliability and innovative features. Expanding on Landis+Gyr's proven and industry leading AX solution, the FOCUS AXe provides enhanced security with tamper detection features, more power and memory and reliable functionality for the utmost in performance today—and the future.

With features like dual demand and reactive, the FOCUS AXe can accommodate next generation applications (pre-pay, power quality, tamper detection, etc.) to enhance the value of your meter sensor eco system.

The E351 FOCUS AXe-SD incorporates a 200A, motor driven, cam action disconnect/connect switch under the meter cover. This advanced, market-leading switch, coupled with the field-proven reliability of the E351 AXe-SD, delivers Landis+Gyr's third-generation design answer to today's evolving utility requirements.

FEATURES & BENEFITS:
Why Landis+Gyr makes a difference.

- Two, simultaneous demands kWh and kVA or kVAR
- Detect meter removal/insertion from meter socket
- Real time rate input (optional)
- Power quality data (sag/swell)
- Most advanced cam-driven switch design to withstand 10K cycles at full rated current
- Switch continues operation even under low voltage conditions
- Expanded non-volatile memory
- Magnetic/DC presence detection (based on leading current)
- Optical port lockout/open
- Supports two methods of calculating kVA/kVAR covering Q1-Q4 quadrants
- Enhanced power supply
- Surpasses ANSI requirements for surge protection (10KV) and meter accuracy
- Advanced over-the-air-flashable firmware upgrades avoids loss of billing or configuration data
- Motor-cam driven service disconnect integrated into meter base
- 8 channels of load profile
- Pre-pay ready

Product Specifications: E331 FOCUS AXe and E351 AXe-SD

Specifications

General Specifications	Active Energy “kWh-kW” meter and Reactive Energy “kVA or kVAR”	
	Digital Multiplication Measurement Technique	
	Non-Volatile Memory	
	Designed for 20+ years life	
	Meets ANSI standards for performance	
	Utilizes ANSI protocol (between meter and AMI device)	
	9-Digit LCD	
	Display scroll sequence programmable (factory or end user)	
	Configuration Port – cover does not have to be removed or optional ANSI C12.18 optical port available	
Operating Temperature	-40C to +85C under cover	
Nominal Voltage	120V or 240V	
Operating Voltage	80% to 115% of Vn	
Frequency	60Hz +/- 5%	
Humidity	5% to 95% relative humidity, non condensing	
Starting Load (Watts)	Class 20	0.005 Amp (0.6W)
	Class 100	0.030 Amp (3.6W)
	Class 200	0.050 Amp (12W)
	Class 320	0.080 Amp (19.2W)
	Class 480	0.120 Amp (28.8W)
Voltage Burden	< 1.9W Max	
Load Performance Accuracy	Accuracy Class 0.2% (reactive energy 0.5%)	
Available Forms	Self-Contained	1S, 2S, 2SE (320A), 12S, 25S
	Transformer Rated	3S, 4S
	K-Base	2K (480A)
Display Options	Energy Metrics: +kWh, -kWh, Net kWh, added kWh (Security), KVAh or kVARh	
	Metric Energy Display Format – 4x1, 4x10, 5x1, 5x10, 6x1 or 6x10	
	Time of use, demand billing and two demands (kW and kVA or kVAR)	
AMI Platform	Modular	
Selectable Meter Multiplier	Up to 4096 as result of PT ratio • CT ratio	
Applicable Standards	ANSI C12.1 for electric meters	
	ANSI C12.10 for physical aspects of watt hour meters	
	ANSI C12.18 Protocol specifications for ANSI Type 2 Optical Port	
	ANSI C12.19 Utility Industry End Device Data Tables	
	ANSI C12.20 for electricity meters, 0.2 and 0.5 accuracy classes	
	CAN3-C17-M84 Canadian specifications for approval of type of electricity meters	
Service Disconnect	10,000 operations at full rated current (disconnect/connect)	
	Available forms: 1S, 2S, 12S, 25S	
International Certifications	Measurement Canada (MC) AE-1967	

Phone: **678.258.1500**
FAX: **678.258.1550**

landisgyr.com

Landis+Gyr
manage energy better

Louisville Gas and Electric Company
Response to Metropolitan Housing Coalition's
Hearing and Post-Hearing Data Requests
Dated July 26, 2018

Case No. 2018-00005

Question No. 1

Witness: John P. Malloy

Q-1. Please provide the per-unit cost for the current meters utilized in the LG&E system, and the per-unit cost of the proposed advanced meters for which LG&E has requested the CPCN.

A-1. Certain information requested is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.

The per-unit cost for the digital meters the Companies currently place in service for residential customers when a new or replacement meter is needed is $[redacted] and the per-unit cost of the proposed advanced meters is $[redacted]. Note that these per-unit costs do not reflect or include the Companies' almost 734,000 electromechanical meters in currently service, which are no longer being manufactured.[4] (Note that redacted information in this paragraph is confidential and proprietary and is being provided under seal pursuant to a petition for confidential protection.)

[4] LG&E has 326,776 electromechanical meters in service; KU has 407,038.

Louisville Gas and Electric Company
Response to Metropolitan Housing Coalition's
Hearing and Post-Hearing Data Requests
Dated July 26, 2018

Case No. 2018-00005

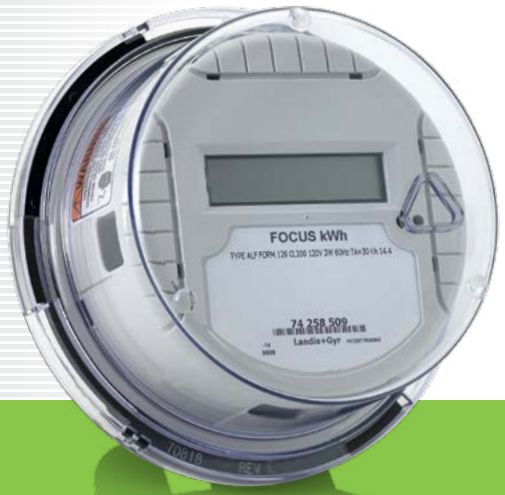
Question No. 2

Witness: John P. Malloy / Rick E. Lovekamp

Q-2. Please provide the monthly cost to a residential customer for the current generation of electric meters deployed by LG&E, and the number of years for which the customers will pay that monthly cost.

A-2. Based on LG&E's cost of service models, the meter related costs associated with the current generation of electric meters that would be attributed to customer related costs is estimated at $0.41 per customer per month. However, this assumes that the Basic Service Charge ("BSC") reflects the full cost of service customer related costs. A significant portion of customer related costs are reflected in the energy rate and not the BSC. The Company currently estimates that the cost of the current meters will be depreciated over a period of 15 years; however, the amortization period for the meters would be dependent on the results of a depreciation study.

Note that the digital meter the Companies currently place in service for residential customers when a new or replacement meter is needed is typically the Itron Centron. Itron has represented to the Companies that the expected service life of the Centron is 20 years. That is consistent with similar non-AMR and non-AMS meters in the market. For example, the comparable Landis + Gyr meter, the E130 FOCUS AL, has an expected service life of 20+ years (the specification sheet for the meter and a residential metering overview showing the expected service life are attached).



Residential:
E130 FOCUS AL

Landis+Gyr
manage energy better

Durability and Reliability Meet Advanced Residential Metering

Overview

The FOCUS® family of meters delivers an advanced, reliable and economical solid-state platform for advanced metering applications. Designed for the utmost in reliability and better overall endpoint performance, the FOCUS AL uses minimal parts and connectors. Its over-sized innovative single circuit board design provides the flexibility to install a modular communications board or KYZ option output board. And with highly accurate load performance and the use of a field-proven Digital Multiplication Measurement Technique, the FOCUS AL assures dependable and consistent operation over its lifetime.

QUICK AND EASY RECONFIGURATION STEPS:

- Locate the configuration port on the front cover
- Select from positive, negative, net and added (security) metrics
- Change displayed information, order or digits
- Configure a CT/PT meter multiplier to obtain a direct reading
- Preset or reset kWh

FEATURES & BENEFITS:

Why Landis+Gyr makes a difference.

- Bidirectional metering enables distributed energy, solar/wind and cogeneration applications
- Enhanced security
- Non-volatile memory
- Designed for a 20+ year life
- Surpasses ANSI requirements for surge protection (10KV) and meter accuracy
- Low-resistance, single-piece current coil avoids problematic heat
- Ease of AMI integration

Specifications

General Specifications	Active Energy “kWh-only” meter	
	Digital Multiplication Measurement Technique	
	Non-Volatile Memory	
	Designed for 20+ years life	
	Meets ANSI standards for performance	
	Utilizes ANSI protocol (between meter and AMI device)	
	8-Digit LCD	
	Display scroll sequence programmable (factory or end user)	
	Configuration Port – cover does not have to be removed	
Operating Temperature	-40C to +85C under cover	
Nominal Voltage	120V or 240V	
Operating Voltage	80% to 115% of Vn	
Frequency	60Hz +/- 5%	
Humidity	5% to 95% relative humidity, non condensing	
Starting Load (Watts)	Class 20	0.005 Amp (0.6W)
	Class 100	0.030 Amp (3.6W)
	Class 200	0.050 Amp (12W)
	Class 320	0.080 Amp (19.2W)
	Class 480	0.120 Amp (28.8W)
Voltage Burden	< 1.8W Max	
Load Performance Accuracy	Accuracy Class 0.5% – typical accuracy 0.2%	
Available Forms	Self-Contained	1S, 2S, 2SE, 12S, 25S
	Transformer Rated	3S, 4S
	K-Base	2K
Display Options	Energy Metrics: +kWh, -kWh, Net kWh, and added kWh (Security)	
	Metric Energy Display Format – 4x1, 4x10, 5x1, 5x10, 6x1 or 6x10	
AMI Platform	Modular or Integrated	
Selectable Meter Multiplier	Up to 240 as result of PT ratio • CT ratio	
Applicable Standards	ANSI C12.1 for electric meters	
	ANSI C12.10 for physical aspects of watt hour meters	
	ANSI C12.19 Utility Industry End Device Data Tables	
	ANSI C12.20 for electricity meters, 0.2 and 0.5 accuracy classes	
	CAN3-C17-M84 Canadian specifications for approval of type of electricity meters	
International Certifications	LAPEM (Mexico) Certification # K3112-12-E/4114, 4115 and 4116	
	Measurement Canada (MC) AE-1559	

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Residential Metering

Landis+Gyr
manage energy better

Precision Meets Advanced Energy Management

At the core of Landis+Gyr's global success in helping utilities manage energy better stands the FOCUS® family of solid-state, residential metering solutions. Designed to evolve alongside new technologies, FOCUS meters are a staple in protecting your investment, enhancing customer service and building on your sensor ecosystem. Our third-generation service disconnect models are consistently proven in the field, 14 million and counting.

Flexible and robust in design, the FOCUS family meets performance requirements with unsurpassed quality and efficiency. Stringent testing for hardness, higher spec materials, yet fewer board design components/pieces, deliver a durable reliable meter. Thus, you can expect highly accurate and consistent load performance over the 20+ year life of any FOCUS meter.

Landis+Gyr works with a number of communication providers and provides multiple configuration options in the FOCUS meter. The result: an easily adaptable solution for the various advanced metering technologies you need to leverage—whether you are on an RF, PLC or cellular network—to protect your investment and confirm future readiness.

HIGHLIGHTS:

- Most advanced, cam-driven switch design to withstand 10K cycles at full rated current
- Surpasses ANSI requirements
- Switch continues operation, even in low voltage conditions
- Prepay ready
- Bidirectional metering enables distributed energy, solar/wind and cogeneration applications
- Scalable—without expensive soft-key upgrades (sag/swell)
- Real-time monitoring and data delivery
- Power quality data
- Over-the-air firmware update ready
- Anti-theft protection
- Temperature monitoring
- Two, simultaneous demands (kWh and kVA or kVAR)
- Two reactive methods
- Ease of AMI Integration

Precision Meets Advanced Energy Management

		The FOCUS Family of Residential Meters		
		E130 FOCUS AL	E330 FOCUS AX E350 AX-SD	E331 FOCUS AXe E351AXe-SD
Features	Non-volatile memory	+	+	+
	Digital Multiplication Measurement Technique	+	+	+
	20+ year life design	+	+	+
	Time of use and demand billing display options		+	+
	Optical port lockout option		+	+
	Event log of 500+ entries		+	+
	Service limiter function (SD models only)		+	+
	Load profile (8 channels)		+	+
	9-digit LCD		+	+
	12 self reads		+	+
	Expanded memory and power supply			+
	Enhanced security and tamper detection features			+
	Voltage monitoring	+	+	+
	Sag/swell detection		+	+
	Reactive kVAh or kVARh		+	+
	2nd demand (kVA or kVAR)			+

Choice and Flexibility

E130 FOCUS AL

Designed with field proven technology, the FOCUS AL uses minimal parts and connectors for reliability in basic bidirectional kWh measurement. Discrete sensing technology allows for monitoring of individual voltage along with tamper conditions. The AMI-friendly design offers many communications options, creating what is considered to be the best meter on the market for adaptability.

E330 FOCUS AX and E350 AX SD

Building upon the E130 FOCUS AL, Landis+Gyr takes residential metering to the next level by adding demand, time-of-use and load profile capabilities to the E330 FOCUS AX. The E350 FOCUS AX SD expands AX capabilities by incorporating a 200A, motor driven, cam action disconnect/reconnect switch under the meter cover. Considered the most advanced switch in the market today, field proven and reliable E350 AX SD is Landis+Gyr's third-generation design answer to evolving utility requirements.

E331 FOCUS AXe and E351 AXe SD

Expanding on the AX solution, the FOCUS AXe/AXe SD provides enhanced security, more AMI power availability and two demands/reactive methods—among other enhancements to support emerging smart grid initiatives.

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Louisville Gas and Electric Company
Response to Metropolitan Housing Coalition's
Hearing and Post-Hearing Data Requests
Dated July 26, 2018

Case No. 2018-00005

Question No. 3

Witness: John P. Malloy / Rick E. Lovekamp

Q-3. Please provide the monthly costs that would be paid by a residential customer for the advanced meter deployment, if approved, and identify the number of years during which the residential customer of LG&E will be paying a monthly cost for both the current generation of meters and the advanced meters.

A-3. Based on LG&E's cost of service models, the meter related costs associated with the advanced meters after full deployment that would be attributed to customer related costs will be $1.43 per residential customer per month. However, this assumes that the Basic Service Charge ("BSC") reflects the full cost of service customer related costs. A significant portion of customer related costs are reflected in the energy rate and not the BSC. LG&E currently estimates that the AMS meters will be depreciated over a period of 15 years. See the response to Question No. 2 above regarding existing meters.

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Question No. 4

Witness: John P. Malloy

Q-4. How long is the manufacturer's warranty for the proposed gas meter index, exclusive of the battery warranty?

A-4. The Companies plan to obtain warranty periods for both electric meters and gas meter index modules (excluding the batteries) of 5 years, which is longer than the warranty of three years for the digital electric meters the Companies currently deploy and the 12-month warranty for the AMR-type gas meter index modules LG&E has deployed in certain circumstances. The AMS gas meter index module batteries will have a 20-year warranty.