COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Electronic Application Of Kentucky Power Company For (1) A Certificate Of Public Convenience And Necessity Authorizing The Deployment Of Advanced Metering Infrastructure; (2) Request For Accounting Treatment; And (3) All Other Necessary Waivers, Approvals, And Relief	))))))	Case No. 2024-00344

DIRECT TESTIMONY OF

STEPHEN D. BLANKENSHIP

ON BEHALF OF KENTUCKY POWER COMPANY

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS.

A. My name is Stephen D. Blankenship, and I am the Region Support Manager for Kentucky Power Company ("Kentucky Power" or the "Company"). My business address is 12333 Kevin Avenue, Ashland, Kentucky 41102.

II. BACKGROUND

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.

A. I earned a bachelor's degree in industrial relations in 1995 from the West Virginia Institute of Technology, and an associate degree in Electronics and Computer Engineering Technology in 2019 from Grantham University. Throughout my 26-year career, I have held positions of increasing responsibility within the AEP family of companies, which have focused primarily on distribution operations. I began my career in 1998 as a Customer Service Representative in Hurricane, WV for American Electric Power Service Corporation, a subsidiary of AEP. From 2002 to 2016, I held distribution dispatching positions of increasing responsibility in locations that included Ft. Wayne, Indiana; Columbus, Ohio; and Ashland, Kentucky. In 2016, I was promoted to Distribution Dispatch Supervisor for Kentucky Power. In 2019, I was promoted to

Meter Revenue Operations Manager for Kentucky Power and in 2020, I was promoted to Region Support Manager.

Q. PLEASE BRIEFLY DESCRIBE YOUR DUTIES AND RESPONSIBILITIES AS REGION SUPPORT MANAGER FOR KENTUCKY POWER.

A. I am responsible for the management of Kentucky Power's Distribution Dispatch Center, Meter Revenue Operations, Meter Services, and storm coordination for the Company's twenty-county service territory. As part of my duties, I am responsible for the safe installation, operation, maintenance, testing, reading, and connecting/disconnecting of meters, field credit activities, and maintaining metering equipment.

Q. HAVE YOU PREVIOUSLY TESTIFIED IN ANY REGULATORY PROCEEDINGS?

A. Yes, I testified before the Kentucky Public Service Commission in Case No. 2020-00174 (base rate case), Case No. 2021-00370 (Commission's investigation of the service, rates, and facilities), Case No. 2023-00092 (most recent integrated resource plan) and Case No. 2023-00159 (most recent base rate case). I have also provided responses to discovery requests in Case No. 2021-00129 (application to defer incremental expenses for February 2021 Major Event Day storms) and Case No. 2021-00135 (application to defer incremental expenses for the December 24-25, 2020, Major Event Day storm).

III. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my direct testimony is to describe Kentucky Power's proposed deployment of Advanced Metering Infrastructure ("AMI"). I will also describe the customer and reliability benefits of AMI. My testimony also includes an overview of the Company's current Automatic Meter Reading ("AMR") infrastructure and its need to be replaced. Finally, I discuss certain inputs of the cost-benefit analysis ("CBA") for the proposed deployment and alternatives considered in connection with the Company's evaluation of AMI.

Q. ARE YOU SPONSORING ANY EXHIBITS?

A. I am sponsoring the following exhibits:

- Exhibit SDB-1: Map of the Kentucky Service Territory
- Exhibit SDB-2: Landis+Gyr AMI Meter Specifications
- Exhibit SDB-3: Gridstream Radio Frequency (RF) Mesh Network
- Exhibit SDB-4: Landis+Gyr Network Gateway Specifications
- Exhibit SDB-5: Landis+Gyr Network Router Specifications

Q. WERE THESE EXHIBITS PREPARED BY YOU OR UNDER YOUR DIRECTION?

A. Yes.

IV. THE COMPANY'S AMI PROPOSAL

Q. PLEASE EXPLAIN THE COMPANY'S PROPOSAL IN THIS PROCEEDING REGARDING AMI DEPLOYMENT.

A. The Company is proposing to proactively replace its existing metering infrastructure with Landis+Gyr's AMI systems throughout the Company's service territory (see Exhibit SDB-1 for a map of the Company's service territory) as part of a multi-year improvement project to ensure the reliability of the distribution system and maintain continuity of service to customers through the deployment period. As explained further below, the Company's proposed proactive deployment of AMI: (1) is needed based on the current condition of the existing metering infrastructure, (2) is the least-cost, reasonable alternative to serve customers, and (3) provides significant customer and reliability benefits.

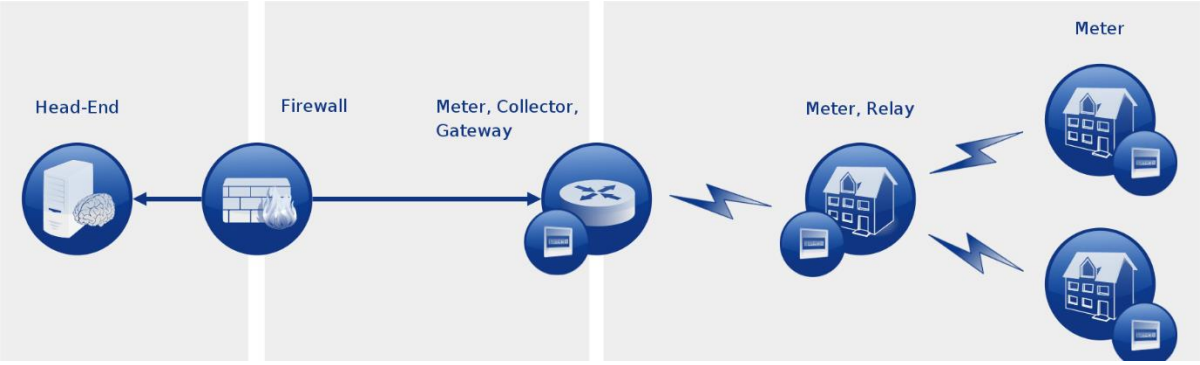
Q. PLEASE DESCRIBE AMI.

A. AMI is an architecture for automated, two-way communication between an AMI meter, or "smart" meter, and the utility company. An AMI meter records energy usage and related data for billing and analysis by the electric utility. A majority of the meters also incorporate a switch that can be operated remotely to connect or disconnect the meter.

An AMI meter communicates energy usage and related data, such as bi-directional data from distributed energy resources ("DERs"), hot-socket troubleshooting, and analytical voltage data to and from other AMI meters, routers, and/or gateways using an encrypted RF system. The system is designed to establish the most effective RF communication path between the meter and the gateway. Where the meter is unable to communicate directly with a gateway, routers are positioned to

"pass" the RF signal on to the gateway. The gateway then communicates with the head end system, which is part of the back-office Information Technology ("IT") system. Figure SDB-1 illustrates how an AMI communication system interfaces with the distribution system. Exhibits SDB-2 through SDB-5 provide meter specifications, mesh network specifications, gateway, and router specifications respectively.

Figure SDB-1: AMI Communication System Interface



Q. PLEASE DESCRIBE THE SPECIFIC AMI TECHNOLOGY THE COMPANY PROPOSES TO DEPLOY.

A. The Company proposes to deploy Landis+Gyr AMI meters that have two internal processors that will offer traditional electric usage readings as well as interval data for usage and meter voltage. Additionally, the meters feature an integrated remote connect/disconnect switch, which allows for the interrupting and closing capability of the meter class's amperage. The AMI technology also supports back-office IT system event recordings such as power up/down events for the identification of power outages, remote over-the-air programming for account or tariff assignments, and remote firmware upgrades in support of cybersecurity and operational efficiency.

Additionally, the second processor allows for more reliable interval data, communications flexibility, the enhanced collection of interval data (near-live usage updates), and enhanced system anomaly detection. These features will help customers identify times of low demand enabling them to make more energy efficient choices. It also helps system operators to identify distribution malfunctions before they result in an outage. Furthermore, the second processor enables a more dynamic billing system; one that is prepared for the future of managing the balance between electricity supply and demand as well as the enablement of new emerging tariffs. This allows for the evolution of both utility and customer insights.

Q. WHAT IS THE SCHEDULE AND EXPECTED COST ASSOCIATED WITH KENTUCKY POWER'S AMI DEPLOYMENT?

A. The Company is proposing to deploy AMI throughout its service territory over a four-year period (2026-2029). This multi-year deployment minimizes costs by using economies of scale to complete the most densely populated areas first, and then adjusting resources to complete the deployment in rural areas, which is more travel intensive.

Kentucky Power's deployment plan is to achieve cost efficiencies by deploying a planned approach to AMI over a wide area. A broad strategic deployment would minimize costs by planning the installations over a given area, by bringing contractors in for a targeted change out of meters. This avoids the higher costs associated with a less coordinated reactive meter deployment approach. Figure SDB-2 shows the Company's deployment plan, including costs and number of meters deployed per year.

Please also see Exhibit LMK-1 in Company Witness Kahn's testimony for the associated costs of AMI deployment.

Figure SDB-2: AMI Deployment Plan ($ millions)

Project Category	2026	2027	2028	2029	Grand Total
Capital	$12.124	$11.515	$12.110	$5.368	$41.117
O&M	$0.549	$0.405	$0.833	$0.629	$2.416
Total Cost	$12.673	$11.920	$12.943	$5.997	$43.533
Number of Meters Planned	57,840	43,249	45,440	20,180	166,709

Q. WHAT HAPPENS IF AMI IS NOT DEPLOYED STARTING IN 2026?

A. Due to the current failure rates of meters in the Company's service territory, Kentucky Power needs, at minimum, roughly 3,000 replacement meters a year to replace completely failed units. If AMI rollout does not begin in 2026, Kentucky Power will lack sufficient meter stock to replace failed meters and will have to purchase refurbished, compatible meters from affiliates, if available.

V. BENEFITS OF AMI

a. Customer Benefits

Q. HOW WILL AMI METERS BENEFIT CUSTOMERS?

A. Customers will experience a net savings over the useful life of AMI meters. Specifically, the CBA supported by Company Witness Kahn identifies several primary areas of operational savings that will reduce costs to customers: avoided capital expenses, reductions in labor expense, and reduced outage and restoration costs.

Q. PLEASE DESCRIBE THE OPERATIONAL COST SAVINGS THE COMPANY REFLECTED IN THE CBA ASSOCIATED WITH AMI.

A. There are three main categories of operational costs savings to customers included in the CBA:

- Avoided Costs - Avoided capital represents the inefficient and costly rollout of an operationally incompatible Standard Consumption Message ("SCM")+ AMR system. These benefits are captured in the CBA supported by Company Witness Kahn. A transition to AMI will keep customers from having to fund and support an obsolete and outdated system that would ultimately have to be replaced with AMI technology later.
- Reduction in/Avoided Direct Costs - Customers will benefit from reduced labor costs and Operations & Maintenance ("O&M") spending through fewer truck rolls and site visits to read and reconnect/disconnect meters. Outage restoration costs will also be avoided as a result of AMI. AMI meters can sense the voltage at a customer's premises and can alert the Company automatically if there is a power interruption. By receiving information from AMI meters, the Company will often be able to pinpoint the outage location and enable the Company to restore service more quickly, reducing the overall costs of the outage restoration. Similarly, AMI technology will allow the Company's Incident Command System structure to have more insight into outage count and location of an outage during storms. This means that during storms where mutual assistance is necessary, the mutual assistance can be released earlier, reducing the restoration costs.

- Mitigate Tampering and Theft - AMI meter data will allow Kentucky Power to proactively detect meters that have indications of tampering. If customers tamper with meters to reconnect them when service has been disconnected or for other reasons, AMI meter data can be analyzed to detect such tampering. Similarly, AMI technology will also allow the Company to detect meters that have been stolen and installed in a new location.

Q. WHAT ARE SOME OF THE OTHER CUSTOMER BENEFITS THAT AMI OFFERS?

A. The change to AMI will enhance the customer experience through new customer programs while, at the same time, modernizing the grid and making it more reliable and more efficient.

For example, AMI will give Kentucky Power the ability to remotely, and more quickly, perform service connections and reconnections to better accommodate customers' needs. AMI technology has enabled other AEP operating companies, such as Ohio Power Company, to remotely reconnect customers on average within ten minutes, which is significantly faster than the time that it has typically taken for AMR customers. Also, as explained further above, AMI technology will enable Kentucky Power to identify instances of meter tampering. Finally, as explained by Company Witnesses Kahn and Cobern, AMI will allow the Company to develop and provide more innovative solutions for customers' convenience, to reduce energy consumption, and, ultimately, to reduce their electric bills.

Most importantly are the considerations that can be made for customer safety. If there is an emergency at a residence, a remote disconnect can be made at the meter

to assist emergency crews upon arrival. This aids not only in the protection of the customer, but also in the protection of the first responders securing the scene of an emergency. Furthermore, Kentucky Power may be made aware of hot-socket alarms, or a trouble instance sourced from the meter itself. Kentucky Power may proactively dispatch crews to replace the metering equipment before any failure or damage to customer facilities occurs.

Q. DOES THE COMPANY HAVE A CUSTOMER ENGAGEMENT STRATEGY TO NOTIFY AND EDUCATE CUSTOMERS ABOUT THE BENEFITS OF AMI METERS?

A. Yes. Company Witness Cobern's testimony describes the Company's customer engagement strategy.

b. Reliability Benefits

Q. DO AMI METERS IMPROVE CUSTOMER RELIABILITY?

A. Yes. Currently, the only way a Kentucky Power customer can report an outage is through calls to the customer operations center and outage reporting via Kentucky Power's official online channels. AMI meters, on the other hand, can sense the voltage at a customer's premise and can alert the Company automatically if there is a power interruption. By receiving information from AMI meters, the Company can evaluate the extent of an outage without waiting for additional customers to call. In addition, the Company will be able to pinpoint the location associated with an outage, which enables the Company to restore service more quickly.

Q. CAN AMI METERS PROVIDE OTHER RELIABILITY BENEFITS?

A. Yes. If isolated customer outages remain after service restoration has been completed, the Company can identify which customers are still out and can take immediate action without, again, waiting for those customers to call. A recent example of this occurred in the service territory of another AEP operating company, Public Service Company of Oklahoma ("PSO"). The AMI deployment enabled PSO to read the current voltage of hundreds of thousands of meters during a storm recovery. This process of reading voltages of AMI meters avoided the need to send field personnel to individual premises to locate or verify outages. AMI meter polling allowed PSO to complete the restoration process approximately 24 hours earlier than would have been possible with AMR meters.

By monitoring voltage, the Company will also be able to identify distribution line transformers that are approaching failure and replace them proactively before the failure causes an outage. Currently, the Company can only identify potential transformer failures through a time-intensive manual process. AMI meters can monitor and detect other power quality issues such as a loose neutral, which is a common cause for voltage fluctuation at a customer's premise. In addition, AMI meters can monitor and report the health of the meter itself. For example, Ohio Power Company performs daily hot-socket analyses for all residential AMI meters, which are used to detect conditions that would lead to the meter failing. This leads to improved power quality and voltage to customers while monitoring the temperature of the meter.

Q. WHAT ARE SOME OF THE OTHER OPERATIONAL BENEFITS OF AMI TO KENTUCKY POWER?

A. AMI allows for additional infrastructure synergies with automated equipment. It can support equipment automation, energy efficiency programs, equipment failure prediction, phasing identification, and gathering load information for devices and network systems to design for future load increases. For example, Volt/Voltage Amps Reaction ("VAR") Optimization is an energy efficiency enhancement that maintains a precise narrow voltage bandwidth over the entire length of a distribution feeder allowing customer devices to operate most efficiently. AMI meters can monitor the voltage of a feeder and alert the Company if the voltage is outside the bandwidth. The Company can have voltage readings at every end-of-line point where the meters are placed, and therefore assist with satisfying the Voltage Survey and Record requirement in 807 KAR 5:041, Section 7.

Another advantage of AMI meter technology is its ability to install firmware upgrades remotely. These include bug fixes, security updates, and performance upgrades, similar to the process of upgrading your cell phone. With AMI technology, firmware upgrades from the manufacturer can be pushed remotely over the communication network to the meter. Currently, with AMR meters, meter personnel are required to visit each meter and manually install a firmware upgrade.

Finally, AMI technology also can support DERs such as wind, solar, microgrids, and battery storage by providing real-time, bi-directional measurements of the energy metrics required to support these resources. AMI will also provide the Company additional data on how DERs impact its distribution grid. As of September 5,

2024, the Company had 47 DERs go into service this year bringing the total DERs in the Company's service territory to 329. Kentucky Power is on pace to receive a total of 116 new applications in 2024.

Q. DO AMI METERS PROVIDE MORE ACCURATE METER READINGS IN COMPARISON TO AMR?

A. Yes, AMI meters will provide more accurate usage data to Kentucky Power. With AMR metering, consumption errors, or inaccurate meter readings, are often difficult to detect and time consuming to correct. For example, if a meter has a reading error at the beginning of the billing cycle, Kentucky Power may not be aware of the error until the end of the billing cycle when the meter is read, or even after the billing cycle. With AMI meters, Kentucky Power will be able to detect various reading errors quickly through diagnostic reports that run multiple times a day (every four hours) which are then available for immediate review by the Company's analytics group.

c. Safety Benefits

Q. IS EMPLOYEE SAFETY A CONSIDERATION IN KENTUCKY POWER'S DECISION TO DEPLOY AMI METERS?

A. Yes, safety is always of paramount concern to Kentucky Power. Company meter personnel are mindful of the fact that their presence may cause customer dissatisfaction when reading meters. Meter readers may face many hazards including vicious animals, unfamiliar terrain, hostile customers, and other dangers when dispatched to a customer's premises to service, connect, or disconnect meters. Other hazards include slips, trips, and falls from hidden hazards, slippery surfaces, uneven walkways, and

objects or debris in yards. Some meter locations also have limited access and are difficult to reach under the best circumstances.

The deployment of AMI meters significantly reduces the number of required on-site visits, reduces miles driven, limits exposure to potential hazards associated with physically accessing the meter location and thereby reduces the exposure to these hazards faced by Kentucky Power's company meter personnel. AMI also increases meter operations efficiency by eliminating the need for various trips to the meter location.

VI. VENDOR SELECTION PROCESS

Q. PLEASE GENERALLY DESCRIBE THE PROCESS TO SELECT A REPLACEMENT METER INFRASTRUCTURE.

A. The Company issued both a Request for Proposal ("RFP") (to AMI vendors) and a Request for Quote ("RFQ") (to the sole SCM+ vendor) to determine which was the best path forward for the Company and its customers. After receiving responses to these, the Company selected one of the AMI bidders (Landis+Gyr). The CBA, as discussed by Company Witness Kahn, demonstrates that the Company's selection was the lowest cost alternative coupled with the best customer benefits.

Q. PLEASE DESCRIBE THE PROCESS THAT WAS FOLLOWED TO SELECT AN AMI SYSTEM VENDOR.

A. Kentucky Power prepared an RFP to seek proposals for AMI systems that meet current industry meter standards and was flexible enough to accommodate future growth and advancements in technology. On February 14, 2024, the Company issued an RFP for

proposals to replace the existing but obsolete infrastructure with AMI. On March 13, 2024, the Company received two proposals in response to that RFP for AMI systems.

The criteria of the RFP for AMI were as follows:

a. Reduced meter reading expenses as a result of timely and accurate electric meter readings for monthly billing and support of time-based rates.

b. Reduced labor expenses through the use of service switches and rapid communication to electric meters to verify power status and meter data.

c. Enhanced customer experience.

d. Improved outage detection and restoration efforts.

The factors that were evaluated in this bid included, but were not limited to:

Category	Considerations	
Key Personnel	• Related experience • Capabilities • Commitment	• Qualifications • Past Performance
Project Plan & Methodology	• Understanding of objectives • Timeline • Resource mix • Training	• Change Management • Project plan • Plan to mitigate challenges and disruptions
Features & Functionality	• User interface and experience • Adherence to Technical and Functional requirements • Innovation and continuous improvement	• Capabilities • Technologically advanced (i.e., "future proof") solution
Managed Services	• Support and maintenance services • Warranty	• Service Level Agreement
Information Technology	• Integration • Architecture • Performance testing	• Communication systems' technical capabilities • Adherence to technical requirements
Cyber Security	• Adherence to Cyber Security requirements • Security standards and processes	• Adherence to Company's Security Contract Supplement
Pricing Structure	• AEP capitalization requirements for cloud services	• Total Cost of Ownership
Ease of Doing Business	• Ease of entering into contract • Financial stability	• Adherence to RFP instructions • Experience during RFP process

On the basis of the bid evaluation process, the Company selected Landis+Gyr to supply AMI meters and the associated communication network. Landis+Gyr offered competitive pricing and excellent technical support. Furthermore, Landis+Gyr provided flexible technology solutions which align with the Company's obligation to serve its customers. Specifically, Landis+Gyr's flexibility in their technology solution better addressed the challenging topography of eastern Kentucky through their cellular service offerings, service network, hardware solutions, and compatibility with internal and third-party applications, all of which are beneficial to Kentucky Power customers. Additionally, Landis+Gyr is a proven technology used throughout the Commonwealth.

VII. DEPLOYMENT ALTERNATIVES CONSIDERED

Q. COULD THE COMPANY SIMPLY CONTINUE TO OPERATE ITS CURRENT AMR INFRASTRUCTURE AND AVOID INSTALLING AMI TECHNOLOGY?

A. No, maintaining the Company's existing AMR system is cost-prohibitive and operationally unsustainable. Specifically, the need to replace the Company's existing AMR meters is primarily driven by the failure rate of the current meter system, the inability to obtain replacement parts, and the customer and reliability benefits of an AMI system that our customers expect but are unattainable through AMR.

First and foremost, repairing the current meter reading equipment has become more difficult as the system is no longer supported by any vendor. The Company is currently purchasing old, refurbished meters to maintain its system.

Additionally, more than 84% of Kentucky Power's AMR meters are between 10-20 years old. The expected design life of the AMR meters is 15 years with an

industry standard failure rate of less than 5%. In the past three years, the Company's failure rate of tested 10- to 15-year-old AMR meters was 25% and the Company's oldest meters were at 50%.

For purposes of determining the failure rate, the Company considers a failed meter one that no longer fully communicates and does not clearly display the usage data and/or accuracy outside the meter's specifications rendering it unusable. A failed meter is confirmed through testing the meter. Age is not the only determining factor for a failed meter; however, approaching or exceeding an assets expected design life unquestionably correlates with increased asset failure rates. The concern is compounded when multiple assets begin to reach the end of their designed life in the same general time span. With a significant majority of the Company's meters already at or past the expected useful life, the data clearly shows that AMR meter failure rates will increase over time.

Absent AMI, Kentucky Power would have to move to the SCM+. platform that is not compatible with the current system. As such, all of the Company's existing AMR meter reading system equipment would need to be replaced with SCM+ technology, and further enhancements would be required to Kentucky Power's back-office IT systems due to the differences in the meter data structure between the SCM and SCM+ platforms. Without the proposed replacement program, the Company expects that it would need to maintain the current meter infrastructure, which would result in increased overall costs and a deterioration of service. Therefore, from an operational standpoint, a transition to the SCM+ platform is not a reasonable approach and is something the Company cannot support.

Further, the Company has an obligation to serve its customers with reliable energy service. If the Company installed SCM+, it would be wholly reliant on a single vendor, who, in a response to the RFQ, did not guarantee they would support the SCM+ technology through its 20-year useful life. For all these reasons, and as shown in the Company's CBA, an investment in SCM+ technology is neither prudent nor cost efficient, especially when considering the benefits of AMI.

Q. GIVEN THE INABILITY TO CONTINUE USING ITS EXISTING AMR METERS, WHAT AMI ALTERNATIVES DID THE COMPANY EVALUATE IN ADDITION TO AMI?

A. In addition to the proposed proactive AMI deployment, which is considered Alternative 1 in the CBA, Kentucky Power looked at one other AMI alternative: Alternative 2 in the CBA which is reactive replacement with Landis+Gyr.

Under this alternative, the Company would run the existing AMR meters to failure. When the existing meters fail, they would be replaced with AMI meters. Deployment of AMI under this scenario would take place between 2026 – 2033. As demonstrated in the CBA, this is not the least-cost, reasonable alternative for the customer. Specifically, Alternative 2 is not the preferred alternative because customers would incur the increased costs associated with maintaining two different meter systems, would incur higher labor expenses as the Company would facilitate the replacements with its internal labor instead of contract labor under the proactive deployment scenario, and the benefits associated with AMI, including improvements in reliability, would be passed on to the Company's customer base much slower (all

customers would receive the benefits by the end of year 4 in the proactive (Alternative 1) scenario as compared to year 8 in the reactive scenario (Alternative 2)).

Q. ALTHOUGH SCM+ IS NOT A REASONABLE SOLUTION FROM AN OPERATIONAL PERSPECTIVE, DID THE COMPANY EVALUATE A MIGRATION TO THE SCM+ PLATFORM?

A. Yes. In addition to the RFP process discussed above, the Company solicited a RFQ for the installation of SCM+ meters and infrastructure. Based on the response to the RFQ, the Company ran two scenarios for SCM+ deployment, a proactive deployment scenario (Alternative 3 in the CBA) and reactive deployment scenario (Alternative 4 in the CBA). However, importantly, the CBA discussed by Company Witness Kahn demonstrates that a migration to SCM+ is the most expensive alternative as compared to either AMI scenario. These scenarios are not cost-effective because they represent only a cost to customers. The SCM+ meters provide no benefits beyond the Company's existing metering infrastructure but would require significant capital investment, resulting in higher costs to customers. Under these scenarios, customers would also see an increase in associated labor expense, ongoing costs for reconnect/disconnect trips, and similar outage restoration costs and times, all while having to rely on technology that will likely be replaced by AMI once the technology reaches the end of its useful life or is no longer supported by the one vendor.

For all these reasons, and as shown in the Company's CBA, an investment in SCM+ technology is neither prudent nor cost efficient, especially when considering the benefits of AMI.

VIII. CONCLUSION

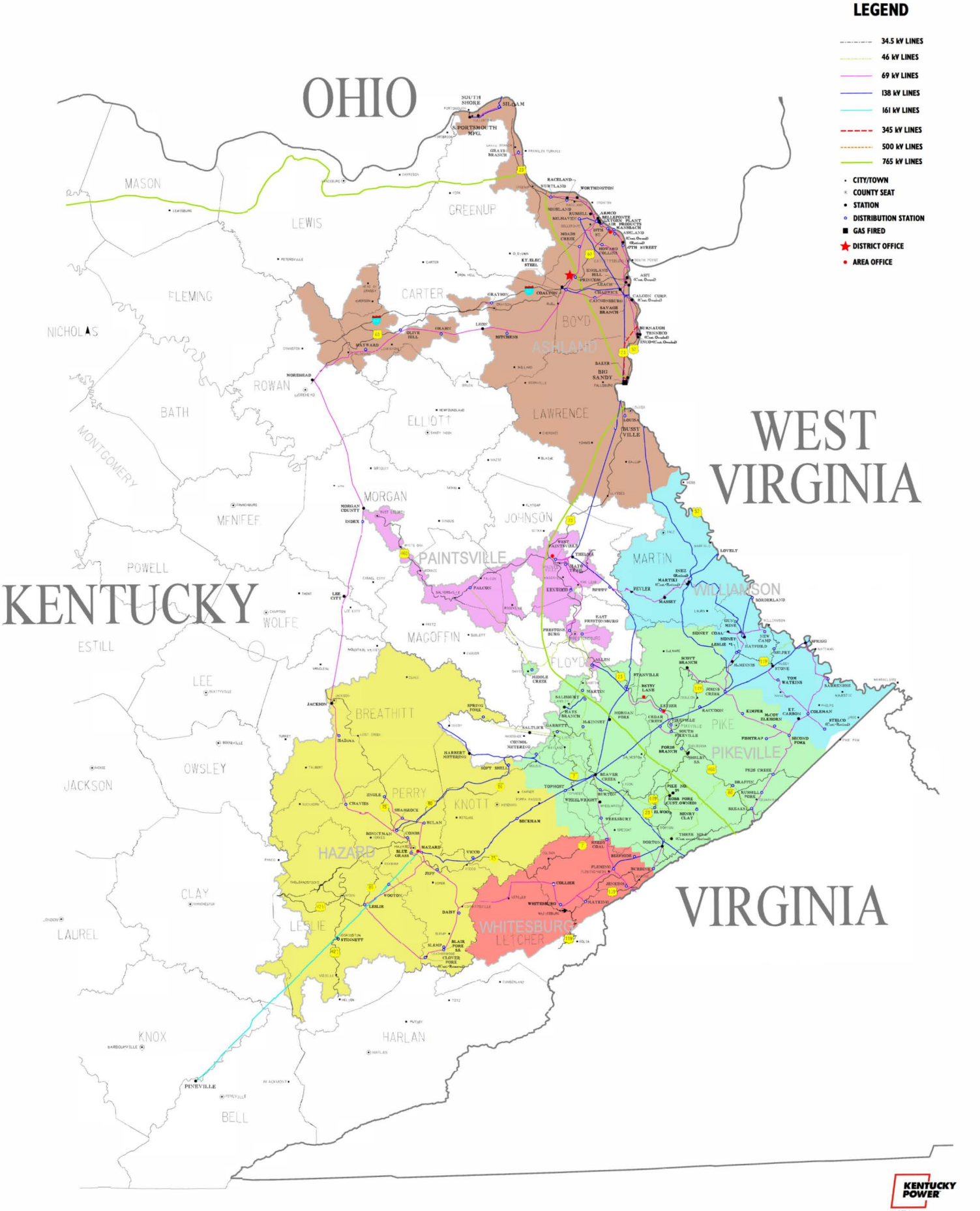
Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. Kentucky Power evaluated potential solutions to its current AMR system's obsolescence, and the proposed AMI deployment offers the most benefits for customers. Specifically, the Company has demonstrated, by the Company's CBA, that AMI is the least cost, reasonable alternative, provides significant customer, reliability, and safety benefits, and is ultimately a net benefit to customers over the expected design life of the new meters. As such, the Commission should approve the Company's AMI proposal.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

Kentucky Power Service Area



Meet Revelo®

The IoT Grid Sensing Meter

The Revelo metering family is the industry's first IoT grid sensing electric meters benefiting both utilities and their customers. Demands on the grid edge are changing – today's energy consumers want more insight and control to manage energy better. Enhanced reliability, safety, and the growing adoption of distributed energy resources (DER) require more than traditional meter-to-cash capabilities. Revelo is a true grid sensor, providing unprecedented insight and control through industry-leading waveform data technology, offering superior edge computing capabilities and a greater ability to sample, process, store, and deliver data to the right places in real-time.

FEATURES

- High resolution current and voltage streaming to an integrated Edge Intelligence Card
- Gridstream® Connect App OS enabled sensor
- Communications flexibility
- E360 available in 200 amp and 320 amp disconnect to facilitate residential growth in load due to electrical vehicle chargers, heat pumps, etc.
- E660 available in wide voltage (120-480V) without a disconnect switch for C&I use.
- Millisecond resolution network time to aid phase and grid anomaly detection
- Micro arc sensing for early detection of hot socket conditions
- Wi-Fi Certified and internet enabled open application ecosystem with third-party and utility partner application creation potential
- Enhanced power quality and richer harmonics measurement
- High-resolution billing system (ready for the future of transactive energy)
- Wi-SUN certified to enable the future of Wireless Smart Utility Network interoperability

Revelo® – The IoT Grid Sensing Meter

PRODUCT SPECIFICATIONS

GENERAL	
Metering Features	• Standard Active and Reactive Metrics • Time-of-Use with perpetual Calendar • Load Profile – 2 independent recorders – 16 channels per recorder, 32 channels total – 2MB of interval memory with configurable allocation between recorders – Energy, demand, and PQ channel sources • Tamper Detection Features – Cover removal switch – Magnet tamper sensor – Meter removal and insertion detection – Meter inversion detection • Safety Related Features – Multi-sensor temperature monitoring – Micro-arc sensor – Meter orientation change detection – Form 2S virtual neutral for improved load-side voltage monitoring
E360 SERVICE DISCONNECT SPECIFICATIONS	
200 Amp Disconnect	• 10,000 operations at 200 Amps – 5,000 open/close cycles (10,000 operations) • Available Forms: 1S, 2S, 12S, 25S
320 Amp Disconnect	• 6,000 operations at 320 Amps – 3,000 open/close cycles (6,000 operations) • Available Forms: 2SE
PERFORMANCE SPECIFICATIONS	
Accuracy Class	ANSI C12.1 Class 0.2%
Voltage Accuracy	+/- 0.2% typical
Frequency	Rated accuracy across 50Hz and 60 Hz +/- 5%
Starting Load	• Class 20: 5 mA • Class 100: 20 mA • Class 200: 40 mA • Class 320: 80 mA
Operating Temperature	-40C to +85C under the cover
Humidity	Up to 95% relative humidity, non-condensing
Design Life	20+ years
Over Voltage Withstand	Temporary (1/2 sec) 150% rated voltage Continuous (5 hours) 130% rated voltage
Voltage Burden	< 5.0 W max
Nominal E360 Voltage	• E360 Form 2S-SD / 2SE-SD: 240 VAC (line-to-line) • E360 Form 1S-SD: 120V VAC (line-to-neutral) • E360 Form 12S-SD / 25S-SD: 120 VAC (line-to-neutral)
Nominal E660 Voltage	• All E660 forms 120 – 480 VAC

AVAILABLE FORMS	
E360 Self-contained (S-Base)	2S-SD, 2SE-SD, 1S-SD, 12S-SD, 25S-SD
E660 Self-contained (S-Base)	1S, 2S, 2SE, 12S, 12SE, 16S, 16SE
E660 Transformer Rated	3S, 4S, 5/45S, 6/36S, 9S

COMMUNICATIONS	Technology	Speeds	Output Power
Series 6 RF	IEEE 802.15.4-2015 900 MHz FSK/OFDM	50–2400 kbps	500 mW Max
Wi-Fi Certified	Certification ID: WFA118337	Up to 72.2 Mbps	32mW Max
Optical Port	ANSI C12.18	9600–38400 bps	N/A

EDGE INTELLIGENCE	
Operating System	Landis+Gyr Linux with App OS sandbox environment
Streaming Sensor Data	• 14.6 kHz sampled voltage and current waveform data • 100ms aggregate metrology and sensor data
SECURITY	
Encryption	256-bit AES
Wi-Fi	WPA2 & WPA3
Digital Image Signing	Signature validation for all firmware and application images
Physical Hardening	Port security and Data at Rest Encryption
APPLICABLE STANDARDS	
ANSI C12.1	Code For Electricity Metering
ANSI C12.10	Physical Aspects Of Watthour Meters - Safety Standard
ANSI C12.18	Protocol Specification for ANSI Type 2 Optical Port
ANSI C12.19	Utility Industry End Device Data Tables
ANSI C12.20	American National Standard for Electricity Meters— 0.1, 0.2, and 0.5 Accuracy Classes
UL 2735	UL Standard for Safety Electric Utility Meters

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Landis+Gyr

LET'S BUILD A BRIGHTER FUTURE TOGETHER

Since 1896, Landis+Gyr has been a global leader of energy management solutions. We've provided more than 3,500 utility companies all over the world with the broadest portfolio of products and services in the industry. With a worldwide team of 1,300+ engineers and research professionals, as well as an ISO certification for quality and environmental processes, we are committed to improving energy efficiency, streamlining operations, and improving customer service for utility providers.

Gridstream RF Mesh

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Advanced Grid Communications Network

The Gridstream® RF network simply does more. Handles more messages. Connects to more sensors. Provides more control. And ultimately returns more to your bottom line. How? By supporting advanced multi-commodity metering, grid automation and home energy management applications – under a single network. Gridstream RF gives you the power to monitor and control, all while positioning your grid to meet future applications and standards requirements.

The innovative network is designed to support up to 5-minute interval data collections from residential and commercial meters, along with applications for advanced grid and load management.

Gridstream RF is a true mesh, peer-to-peer network where each endpoint, device and router extends the coverage and reliability of the network. It's also self-healing to provide dynamic routing of messages that automatically adjust for changes to endpoints and the introduction of obstructions such as foliage or new construction.

The system's routers are low power devices that extend network coverage and throughput. In addition, data collectors support up to 25,000 meters, which further minimizes infrastructure and maintenance costs.

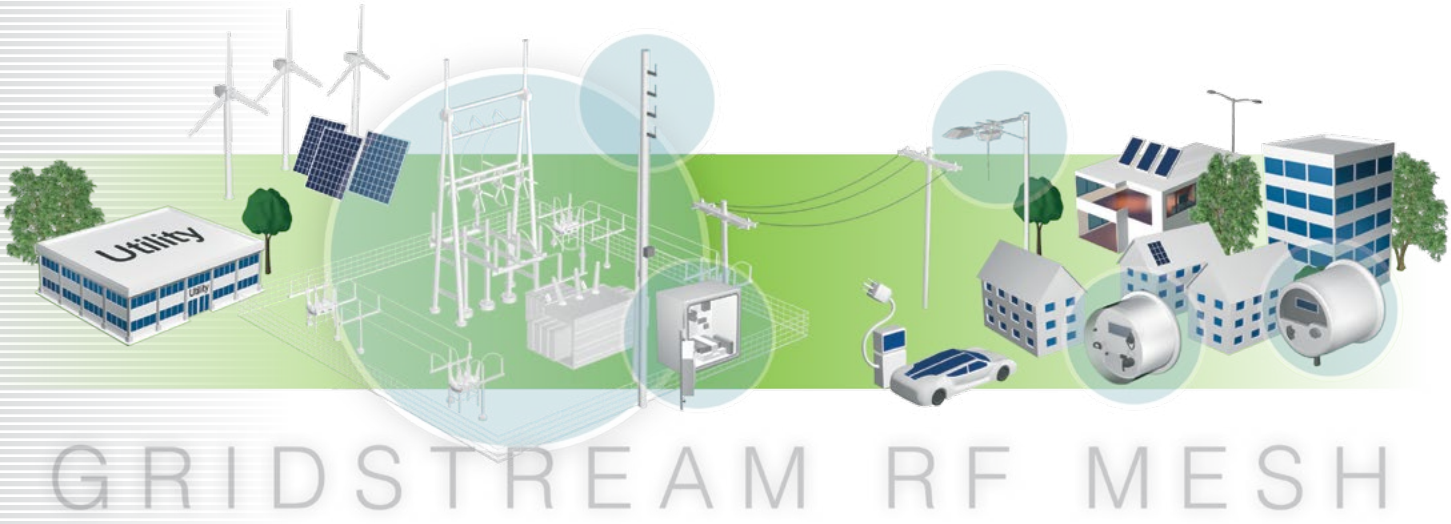
From operations and engineering to customer service and billing, Gridstream delivers the applications that best define smart grid value.

HIGHLIGHTS:

- Best-in-class security
- Remote configuration of endpoints
- "Plug-and-play" auto-registering endpoints and devices
- Outage and restoration notifications
- Variable payment options, such as prepay and time-of-use rates
- Remote disconnect/connect with advanced FOCUS® meters
- ZigBee®-enabled home area network
- Theft detection
- Direct load control and dynamic voltage management
- Standards-based network components, software and software integration

Gridstream

Gridstream RF Mesh Connects Utility Assets Across the Grid



Applications

Distribution System Analytics

Leverage voltage and power quality data to optimize performance and reliability and prevent outages before they occur.

Demand Response

Peak power management options include dynamic voltage management, time-based pricing programs and direct load control.

Remote Disconnect

Offset costs and improve operational efficiency through consumer-directed programs and the ability to perform immediate load-side disconnects.

Consumer Energy Management

Engaging the consumer through energy portals, home area networking and dynamic payment programs such as prepay, encourages energy efficiency and improves customer service.

Multi-Commodity and Scope

Two-way communication capabilities extend to water and gas modules, distribution devices and direct load control switches for a one-stop resource management package.

Outage Detection

Because endpoints are in continuous communication with the network, outage reporting and restoration detection are triggered automatically.

Integration with Most Applications

Realize secure and easy integration into existing utility operations. Utilizing a standards-based approach, Command Center (the operating software for the Gridstream system) and the Gridstream Meter Data Management solution enable interoperability with other utility applications like those used for CIS, billing, engineering, operations, analytics and data management.

Phone: **678.258.1500**

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Network Gateway

Flexible and Interoperable Utility IoT Network Communications

Landis+Gyr's Network Gateway is an integral part of Gridstream® Connect, our industry-leading utility IoT platform. The Network Gateway is a powerful field data center that supports a variety of communications protocols. By enabling device and sensor interoperability, the Network Gateway provides unparalleled flexibility and limitless potential for growth.

FLEXIBLE COMMUNICATIONS

- Supports a wide array of communications technologies, including RF Mesh, Mesh IP, and cellular WAN backhaul
- Multiple radio options

BATTERY BACK-UP

- Maintenance-free Lithium Iron Phosphate battery

LAYERED INTELLIGENCE: INTELLIGENCE WHEN AND WHERE YOU NEED IT

- On-board Linux processor
- Distributed data processing lowers cost of data sharing and networking

FUTURE-READY AND SCALABLE

- Configurable, serviceable, and upgradeable
- Secure Wi-Fi for local configuration of radios or integrated sensor controller
- 2X Ethernet ports

FLEXIBLE COMMUNICATIONS | BATTERY BACK-UP | LAYERED INTELLIGENCE | FUTURE-READY AND SCALABLE

Network Gateway

PRODUCT SPECIFICATIONS

ELECTRICAL	
Input Voltage Range	120 to 240 VAC
Current	0.5A-0.25A
GATEWAY PROCESSING UNIT	
CPU	Cortex A5
RAM Memory	512 MB DDR2 RAM
FLASH Memory	2 GB NAND + 4 GB External
GATEWAY RADIO PROCESSING UNIT	
CPU	Dual-core Cortex M4
RAM Memory	304 Kbytes
FLASH Memory	2 MB + 4MB External
ROM Memory	8 Kbytes
SERIES 5 RADIO VARIANT	
Communication Protocol	IEEE 802.15.4g - SUN FSK PHY
RF Frequency Range	902-928 MHz
Channel Spacing	N2450 (RF Mesh IP): 400 KHz
	N2400 (RF Mesh): 100, 300 KHz
RF Data Rate	N2450 (RF Mesh IP): 50, 150, 200 Kbps
	N2400 (RF Mesh): 9.6, 19.2, 38.4, 115.2 Kbps
Modulation Type	2FSK, 2GFSK
SERIES 6 RADIO VARIANT	
Communication Protocol	IEEE 802.15.4 – 2015 SUNPHY
RF Frequency Range	902 – 928 Mhz 2400 – 2485 Mhz
Channel Spacing	400 KHz, 1200 KHz
RF Data Rate	50 Kbps to 600 Kbps (900 Mhz Band –Series 5 Compatibility Mode) 100 Kbps to 2400 Kbps (2400 Mhz Band)
Modulation Types	SUNFSK, O-QPSK, OFDM

TRANSMITTER	
Output Power (at Antenna Connector)	Up to 1W
ETHERNET & WIFI	
ETH 0 | ETH 1	10/100/1000 Ethernet | 10/100 Ethernet
WI-FI	Yes
LTE Cat6	Yes
MECHANICAL	
Enclosure	Aluminum / IP67
Dimensions	10.94" W x 5.31" D x 12.23" H (278mm W x 135mm D x 311mm H)
Weight	11.7 lbs
Operating Temp Range	-40°C to 60°C (-40 to 140° F)
Storage Temp Range	-40°C to 70°C (-40 to 158° F)
REGULATORY COMPLIANCE	
Safety & EMC, FCC Class A Device	

Kbps = Kilobytes per second

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R651 Network Router

R651 Network Router

Creating a robust communication path for smart grid applications and intelligent end devices

The Landis+Gyr R651 Network Router helps form the powerful Gridstream® Connect RF wireless mesh network used in advanced metering, distribution automation, and demand response applications. Network performance and reliability are assured via the router's basic mesh functions, including full two-way, peer-to-peer communication to all devices in the network, asynchronous spread spectrum frequency hopping, and dynamic message routing.

FUNCTIONS:

The R651 Network Router is designed to deliver enhanced onboard memory and communication speeds to support future application and development needs. In addition, advanced functionality enables individual message prioritization, automatic network registration and localized intelligence. The Network Router also has GPS capability for enhanced location, troubleshooting, and optimization services.

The Network Router offers several benefits:

- Interoperability to enable integration with numerous partners and supported devices
- Lower utility TCO via enhanced battery life (15 years) with lithium-ion technology
- Dynamic routing by each radio in the mesh network
- Backwards compatibility – Series 5 and Series 6 variants to support RF Mesh, Mesh IP, and future upgradability to Wi-SUN
- Support for distribution automation and mission critical grid sensors
- GPS capability enabled for better location and optimization services
- Available to order in a DC-powered configuration for specific deployment needs

INTEROPERABILITY | ENHANCED BATTERY LIFE | BACKWARDS COMPATIBILITY | GPS CAPABILITY

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R651 NETWORK ROUTER

PRODUCT SPECIFICATIONS

Size	4.90" H x 11.82" W x 9.30" D
Weight	9.6 lbs
GPS	1.56GHz/1.57GHz/1.6GHz
Operating Temperature	-40°C to 80°C
Power Supply	Input AC Voltage: 120 -240 Vac -20%, +15% Power Consumption, Battery not charging: 7W typical Power Consumption, Battery charging: 9W typical
RF Output Power	Up to 30dBm
General Radio Items	RF Frequency Range: 902-928 MHz Channel Spacing: 200, 400 kHz (RF Mesh IP) 100, 300, 500 kHz (RF Mesh) RF Baud Rates: 50, 150, 200 kbps (RF Mesh IP) 9.6, 19.2, 38.4, 115.2 (RF Mesh) Battery Backup Time: 10+ hours over the battery operating life Battery Life: 15 years (full life of router)
Processing	RAM: 640 Kbytes Flash Memory: 2 MB + 4MB External
Approvals	FCC CFR Title 47 (Part 15, Subpart B and C)
ANSI C12.1 Compliance	Operating vibration; operating shock; electromagnetic radiation emissions, electromagnetic susceptibility, surge withstanding capability, electrostatic discharge
Enclosure Material Type	Aluminum/Nema-4
Shipment Includes	Router AC power cable (or DC cable for DC variant) Antenna kit Mounting hardware

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VERIFICATION

The undersigned, Stephen D. Blankenship, being duly sworn, deposes and says he is the Region Support Manager, for Kentucky Power, that he has personal knowledge of the matters set forth in the foregoing testimony and the information contained therein is true and correct to the best of his information, knowledge, and belief after reasonable inquiry.

Stephen D. Blankenship

Commonwealth of Kentucky)
) Case No. 2024-00344
County of Boyd)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Stephen D. Blankenship, on November 6, 2024

Marilyn Michelle Caldwell
Notary Public

MARILYN MICHELLE CALDWELL
Notary Public
Commonwealth of Kentucky
Commission Number KYNP71841
My Commission Expires May 5, 2027

My Commission Expires May 5, 2027

Notary ID Number KYNP71841