



Virgin Islands Water and Power
Authority

Territory Wide AMI Solution

PR-04-25

November 22, 2024

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Cover Letter

November 22, 2024

Nicole Aubain
Contract Administration, Manager
Virgin Islands Water and Power Authority
9720 Estate Thomas Al Cohen Plaza
St. Thomas, VI 00802

RE: PR-04-25 - Virgin Islands Water and Power Authority Territory Wide AMI Solution RFP

Dear Ms. Aubain and Team:

Our proposal offers an AMI solution that we are confident will not only meet but exceed Virgin Islands Water and Power Authority's (VIWAPA) overarching goal of providing the citizens of the Virgin Islands with safe, efficient, reliable, and cost-effective electric power.


To support VIWAPA's AMI goals outlined in the RFP, Itron proposes our industry-leading Gen5 solution. Itron's Gen5 is a proven advanced grid infrastructure solution incorporating Gen5 Riva electric meters, edge computing technology, and industry-leading communication network with advanced analytics accompanied by the scalability to add water and smart cities functionality. As shown in this proposal, our AMI solution for VIWAPA provides these key benefits:

- » **A Future-Proof, Scalable Solution** - Unlike other AMI systems, the Itron Gen5 network provides intelligent connectivity for Distributed Intelligence (DI), Distribution Automation (DA), Demand-Side Management, Smart Street Lights, Smart Cities, electric vehicle supply equipment (EVSE), and Industrial Internet of Things (IIoT) applications – all on the same network. Since our Gen5 solution is standards-based at every level, it has the capability (bandwidth, module memory, over-the-air upgrades, backward compatibility, and more) to support innovative future grid technologies.
- » **Full-Service Turnkey Solution** – Itron's financial strength provides us with the ability to prime a turn-key AMI deployment while mitigating associated risks through our industry expertise and proven team structure. Our installation and integration partners have a successful history working with Itron on multiple deployments up to 500,000 endpoints for highly similar AMI deployments with identical environmental conditions. Our relationships offer a unified team to VIWAPA with critical processes and procedures in place, reducing ramp-up time after award. We have included references below from our contractors to show the impact of these projects.

If you have any questions, please contact Jacob Cain, Enterprise Client Executive, at 423-834-2271 or Jacob.Cain@itron.com.

I confirm that I am an authorized representative of Itron.

Sincerely,



Joan Hooper, Senior Vice President and Chief Financial Officer

Section 1: Solution Summary

The Virgin Islands requires a grid that is reliable, resilient, and efficient, and it is clear that Virgin Islands Water and Power Authority (VIWAPA) also desires a flexible and customizable solution that will set a strong foundation to deliver multiple benefits and improvements to your customers for many years. While the industry commonly refers to “AMI” (advanced metering infrastructure), this term is dated (pre-2010); the expectation of AMI from utilities, customers, governments, and regulators is now much higher than a decade ago. Our advanced solution will achieve those core AMI requirements (remote reads, interval data, disconnects / reconnects, etc.) but will also modernize and transform VIWAPA’s energy infrastructure, improve operational efficiencies, and provide capabilities beyond traditional AMI in a move towards Grid Modernization.

VIWAPA and Itron have held a long-standing partnership in serving your constituents. Our 2014 project was viewed by VIWAPA executives as a major success by delivering the project on time, on budget, and with ROI exceeding expectations. Our existing relationship and understanding of VIWAPA’s business and geographical challenges will be leveraged to work collectively to achieve the goals outlined in this RFP. Itron has developed integrations with VIWAPA’s core systems (Central Square, MeterSense, and MilSoft), which will help expedite the time-to-value process of transforming business operations from automated billing to extending to grid edge capabilities, as stated in the RFP.





















Itron’s Gen5 is a proven advanced grid infrastructure solution incorporating Gen5 Riva electric meters, edge computing technology, an industry-leading communication network, and advanced analytics. These components will work seamlessly together to provide a comprehensive solution for VIWAPA’s needs.

Itron Solution for VIWAPA

Itron is offering a complete, turnkey solution that provides the technology, services, and capabilities VIWAPA seeks and meets VIWAPA’s stated goals. Building the foundation to meet these goals requires fundamental capabilities tailored to an island environment:

- » **Reliable network connectivity across the islands.** A secure, standards-based IPv6 mesh network will ensure VIWAPA can connect a wide range of devices and use cases from a robust partner ecosystem to solve today’s and tomorrow’s challenges. Technology obsolescence must be considered to survive the decades of system life – which is best achieved by being private, backward compatible, and operating in the unlicensed radio frequency spectrum (ISM band). Unlike our competitors with similar mesh networks, Itron’s Gen5 network maintains registration with two Access Points, allowing the system to quickly fail over to the secondary AP should the first AP go offline, greatly increasing network reliability throughout the islands.
- » **Edge processing on the side of every home.** The distribution grid of the future is constantly evolving in real time. Scale and state management are the most significant challenges when attempting to monitor and manage millions of things, and edge processing is the answer. Every meter and device that operates on the network and grid can run analytics at the edge with access to the highest resolution data and grid connectivity awareness to sense grid changes locally. By processing at the edge, these changes are detected with low latency to send the actionable intelligence back without burdening the network or back-office systems with endless amounts of raw data. This is the power of Itron’s Distributed Intelligence (DI) platform.

The proposed Itron technology has around 50 million IPv6 communications devices installed across 50+ utility customers, supporting many applications, such as smart energy, gas, and water deployments. Since the introduction of AMI 2.0 or AGI, Itron has shipped over 4.2 million of our DI-enabled meters.

Application	Devices	Customers
Meters	>35,700,000	109 Utilities
Water and Gas Endpoints	>4,800,000	70 Utilities
Distribution Automation Endpoints	>118,000	        
Demand Response Devices	150,000 Mesh >3,000,000 Managed	    
Smart Streetlights	>4,000,000	  
Electric Vehicles and Renewables Integration	4 Deployments	  

Itron's Proven Gen5 Multi-Application Networking

Advanced Network Platform

At the center of our solution for this RFP is our industry-leading **GenTM5 RivaTM private mesh network**, a proven, standards-based, multi-application platform that supports electricity, water, and gas AMI, DI, distribution automation, demand-side management, smart streetlights, smart cities, and industrial Internet of Things (IoT) applications—all on the same network. The Gen5 network seamlessly integrates multiple radios for the home area network (HAN), neighborhood area network (NAN), and wide area network (WAN) into one secure communications platform for a wide range of smart metering, smart grid, and smart city applications. Itron uses mesh as the primary “last mile” technology and has two decades of experience in cellular communication.

Headend System

Itron's Gen5 AMI headend suite, **UtilityIQ[®] (UIQ)**, is a purpose-built, enterprise-class suite of applications designed specifically to take advantage of the capabilities of the proposed Itron mesh network, supporting electric, gas, and water metering solutions. The application suite includes the following software:

- » **Core Headend: Advanced Metering Manager (AMM), Meter Program Configurator (MPC), Control Platform**, which includes **Firmware Upgrader (FWU), Network Center**, and **NodeSim**.

Advanced Meters with Distributed Intelligence

Itron's **Gen5 Riva electric meter** is the most advanced in the world, and over three million meters have been shipped worldwide since its introduction in 2015. It offers full AMI capabilities and can run DI applications to unlock a growing range of value-added use cases, including identifying outages and diagnosing their cause. Itron also offers a robust ecosystem of meter suppliers that can cover any functionality VIWAPA needs.



Network Infrastructure

The Gen5 network is a powerful and flexible RF mesh network that is well-suited for diverse service territories. The network's infrastructure is made up of **Access Points (AP), Relays**, and **SocketAPs**. APs route traffic from the RF mesh to the headend system via Ethernet or cellular IP connections. Relays

extend the reach of the mesh. SocketAPs provide cellular egress to isolated groups of meters. As outlined above, the Itron network, each meter maintains a registration with two APs, a primary AP and a secondary AP. This allows the system to quickly fail over to the secondary AP should the first AP go offline. During our Network Optimization process we monitor the network stats to ensure the vast majority of the meters are served by both a primary and secondary AP.

Distributed Intelligence

Itron's **Distributed Intelligence (DI) solution** allows VIWAPA to extend the value of its AMI investments beyond billing and grid planning to active grid operations and innovative customer services. Itron's newest customers on the Gen5 Riva platform are contracted for or preparing for DI implementation. The DI platform is embedded with every Riva electric meter, and its use of the standard "app" model allows new applications to be developed by utilities, third parties, and Itron at any time and deployed to any meter at any time. This ensures continued innovation and growth of business value and ROI over the extended life of the AMI investment. Itron is -- and will remain -- the market leader in meter-based DI. Itron is including pilot period to evaluate DI applications value to VIWAPA. More information regarding Itron's industry-leading DI solution is available below in **Section 6 – Requirement Compliance Responses**.

Distribution Automation

Itron's Gen5 platform supports our **Distribution Automation (DA) solution**, which provides a reliable, high-performance two-way communications infrastructure connecting the smart grid and DA devices with the back office. The solution enables centralized and decentralized operations and management of the distribution network. The Itron field area network for DA has been deployed at over 20 utilities with more than 140,000 DA devices. This response includes expanded information regarding Itron's network equipment, including **Master and Remote Bridges**.

Advanced Analytics

Itron's solution includes multiple advanced analytics capabilities, including DI analytics applications such as Location Awareness, Active Transformer Monitoring, and Active Transformer Voltage Monitoring. **IntelliSOURCE®** consists of an advanced analytics module with load forecasting using machine learning algorithms, while **Operations Optimizer™ (OO)** provides an extensive library of analytic use cases. Itron's optional data analytics platform in OO, ingests AMI and other data for analysis, workflow, and visualization. Endpoint data collected by the Itron network is automatically loaded into OO, resulting in a seamlessly integrated solution. **Streetlight.Vision® (SLV)** provides Advanced Analytics tools to analyze each device's inventory and behavior through canned, custom, and scheduled reports. These applications are added to the software footprint anytime and access the network and distributed intelligence services as needed.

Smart Cities

The Gen5 platform can serve as the foundation for a connected city. The Itron smart streetlighting and smart city platform is a proven, scalable, multi-purpose network that offers multiple applications on one network, including the largest smart streetlight project in the world with 500,000 networked streetlights. World-class smart streetlight deployments based on this platform include Florida Power & Light, Commonwealth Edison (Chicago), and the cities of Chicago, Paris, London, Canberra, and Copenhagen. Itron has also worked with third-party partners to build a broad ecosystem of compatible devices and applications, including air quality sensors, temperature monitoring, intelligent traffic management, smart parking management, and more.

SaaS and Managed Services

Itron provides a **complete SaaS solution** for operating, maintaining, and monitoring hosted applications, including SLAs for Application Uptime, Read Rates, and on-Demand Operations like connect/disconnect and reads. Itron Global Managed Service (GMS) will manage, operate, maintain, and monitor the IT environment, applications, and networks 24 hours per day, every day of the year.

For VIWAPA, Itron recommends our **Hybrid SaaS** option deployment model. With Hybrid SaaS, VIWAPA leverages Itron's significant experience to reduce deployment time and project risk while maintaining the benefits of long-term ownership and capitalization.

With Managed SaaS, VIWAPA purchases a license for the software applications needed to support network endpoints. In turn, Itron builds, owns, maintains, and manages the back-office headend system software and supports the IT infrastructure at a secure Itron data center. This design includes a buffer to support growth. VIWAPA owns and maintains the solution's meters and network devices.

VIWAPA will then pay Itron a monthly SaaS fee to provide the IT infrastructure for the environments they have contracted. As part of this fee, Itron monitors the network's access points, relays, and bridge devices. Itron sends notices via a remedy ticket to VIWAPA when a device is outside of monitoring thresholds so VIWAPA can easily investigate and resolve as needed.

This flexible deployment model shifts the solution's IT risk and skill requirements to Itron. By leveraging existing infrastructure at Itron data centers, we can rapidly deploy client environments, which significantly reduces one of the largest operational risks in any smart grid deployment. Shared infrastructure (i.e., routers, storage, database, servers, backups, etc.) also allows VIWAPA to avoid additional costs and delays associated with acquiring dedicated hardware without sacrificing data integrity and security.

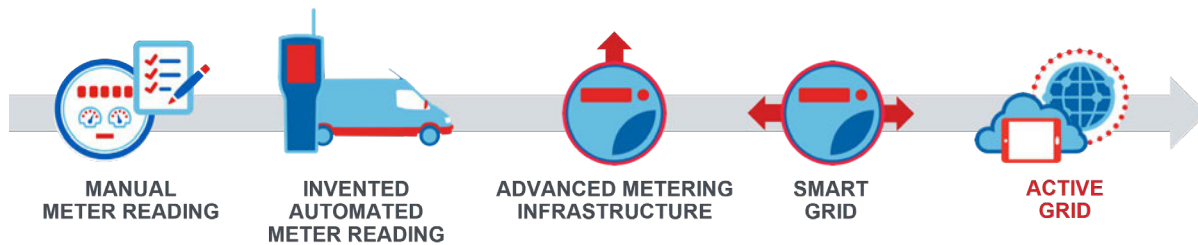
Software licenses (and associated software maintenance) are unbundled from the monthly SaaS fee, leaving only an ongoing managed services fee for hosting and maintaining the applications. Although Itron collects the data, VIWAPA fully retains its ownership.

Public Carrier Support

Along with the Gen5 mesh network described above, Itron's solution includes cellular-equipped electric meters communicating directly with the headend. Itron has been working closely with our cellular module vendors and major U.S. carriers to implement LTE-M standard capabilities (including assured 20-year battery life for gas and water meters and modules.) Today, Itron manages 3 million cellular-connected endpoints within its network platform, including the largest cellular-only AMI deployment in the world at Consumers Energy. We are leveraging this experience and close partnerships with carriers to lead the industry in enabling AMI use case support on LTE-M and NB-IoT technology.

About Itron

Itron was founded and incorporated in 1977 in Spokane, Washington, as a computing and communications company whose initial focus was automating the collection of meter data for the utility industry. In the early 1980s, Itron pioneered and developed the first broadly adopted automated meter reading (AMR) systems, which consisted of utility field workers using portable, radio-equipped computers—running dedicated application software—to collect data from meters remotely via wireless radio signal.



Itron's Decades of Innovation

Itron soon evolved this technology to vehicle-based drive-by systems to deliver new levels of scale and efficiency, and eventually to the fixed network infrastructure and two-way communications that many utilities are deploying today.

Legal Company Name: Itron, Inc.

State Incorporated: Washington

Company Background

As a global technology and services company dedicated to the resourceful use of energy and water Itron provides solutions for measuring, managing, and analyzing energy and water. Our comprehensive product portfolio includes electricity, gas, water, and thermal energy measurement devices and control technologies; communications systems; software; and management and consulting services. Itron provides value to our clients by delivering knowledge that is essential for optimizing the delivery and use of the world's vital resources. Together, we are creating a more resourceful world.



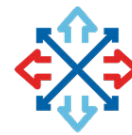
OUR VISION

The way we manage energy and water will define this century.



OUR PURPOSE

Itron is dedicated to **creating a more resourceful world.**



OUR VALUE PROPOSITION

We enable cities and utilities to safely, securely and reliably deliver critical infrastructure solutions.

Itron is the only end-to-end solutions provider offering a full suite of customized products and services that help utilities manage the world's most valuable resources efficiently and sustainably. Itron has deployed hundreds of millions of electricity, gas, and water meters to leading utilities throughout the world. Itron's Gen5 network platform has nearly 50 million devices deployed across more than 50 utility customers supporting a wide breadth of applications. Itron has provided AMI and MDM technology deployment to a wide variety of utility and cooperative clients nationally.

Additional Facts About Itron

- » 75% of power in the U.S. touches Itron technology
- » More than 80% of electricity in North America is forecast by Itron software
- » Itron has over 8,000 customers in 100 countries
- » Itron has the #1 industrial IoT and smart city solution running on a single platform
- » Itron networks are installed in 7 of the 10 largest metropolitan areas in the U.S.
- » Itron has more than 700 managed services customers in North America
- » Over 70 million Itron gas endpoints have been installed in North America

Why Itron is the Best for VIWAPA

Itron has the experience and capabilities to successfully deliver the tasks requested in this RFP, accompanied by the unique challenges of operating in a Caribbean Island environment. As shown through our experience references below, Itron has successfully deployed our Gen5 AMI network on the neighboring island of St. Kitts, Jamaica, South Florida, and the Gulf Coast amongst other locations with similar harsh climate and network coverage challenges. With this experience in mind, our solution provides several key advantages, making it the best for VIWAPA:

- » **Resiliency:** Since our Gen5 network is resilient and self-healing and our AMI system stores data at multiple points (in meters, at the headend, etc.), the network is designed to be resilient to individual component failure, ensuring reliable 100% coverage throughout VIWAPA's island service territory. Itron also designs our APs and Relays to be IP65-rated, supporting high humidity and coastal environments. Our proposed equipment has been installed in harsh tropical environments throughout the Caribbean, including South Florida, Jamaica, St. Kitts, and additionally in Singapore.
- » **Future Expansion:** The Itron Gen5 platform provides a foundation for Intelligent Connectivity with future expansion in mind, with the ability to run various applications that address business objectives, including expansion to water and streetlight capabilities. Flexible architecture also allows applications such as DI, DA, Demand Response, Energy Efficiency, Direct Load Control, Conservation Voltage Reduction, and Streetlight Control to run on the Itron communications network. Itron's network provides future capabilities not seen in competitor offerings.
- » **Full-service turnkey solution:** Itron provides one point of contact and one point of responsibility for all aspects of the project. We make sure meters, modules, network equipment, and other installation materials are delivered when and where they are needed. We see installations occur on time, endpoints are correctly registered on the network, and critical legacy systems are fully integrated. Itron's turnkey support eliminates the need for redundant internal utility processes to manage multiple contractors and suppliers while reducing overall project risk, improving project coordination, and channeling accountability to a single vendor (Itron) for project success. Additionally, through our SaaS and Managed Services offering, we handle the complex and time-consuming tasks so you can focus on your core business.
- » **The Industry's best and most mature DI solution:** Itron's DI platform is the leading-edge computing solution for the utility industry. We have the largest and most proven suite of applications with no other vendor having more DI-capable assets in the field, Itron's platform offers VIWAPA immediate value from DI in grid operations with optional applications capable of identifying issues such as failing service connectors, damaged service wires, meter bypass theft, and EV/Solar detection. VIWAPA can draw from a robust ecosystem of Itron partner apps to solve future challenges, introduce new services, and improve customer engagement.

Our solution provides high-level capabilities that align with Itron's strategic vision to provide an open ecosystem, greater functionality, and cost efficiency. The solution supports VIWAPA's goal of providing a more resilient and reliable grid and enhancing system operational efficiencies. Itron's solution will also allow VIWAPA to move beyond traditional AMI capabilities to an AGI by implementing DA, utilizing DI applications, and deploying DERs and smart streetlights. Itron has vast experience working on various projects with many utilities worldwide, and our track record demonstrates that you can rely on Itron to be a trusted partner. As a registered VIWAPA supplier, we welcome the opportunity to set the foundation for and add value to VIWAPA's AGI investment. Itron presents the lowest risk option to VIWAPA for this critical project, and we look forward to implementing our Gen5 AMI solution to support VIWAPA business initiatives and a sustainable future.

Summary of the Project from Start to Finish

To deliver the full value of the AMI system, Itron provides comprehensive project services. Itron's project management methodology—Itron Advantage—ensures effective project quality control from start to finish and is a proven framework for managing project deployments that are successful, on-time, and on-budget, as show in the figure below. More information regarding Itron Advantage can be found in **Section 4 – Project Deployment/Installation** below.



Throughout the duration of the VIWAPA AMI project, Itron is proposing the following services. Upon selection, we will work with VIWAPA to create a scope of work document to define these services in further detail.

- » **Project Management** – Project management is provided for all phases of the project. The Project Manager is responsible for coordinating Itron-related tasks with VIWAPA to ensure the project is delivered on time and on budget. The Project Manager works with VIWAPA to fully understand the desired project timelines, set milestones, and define deliverables.
- » **Network Design** – The network design is based on location data provided by VIWAPA as well as the information obtained during site surveys. The network design determines the location of APs, relays, and socket APs taking into consideration endpoint locations, RF signal propagation, physical topography, and network device site restrictions.
- » **System Testing** – End-to-end testing of the functionality of the AMI system is provided. These tests are a mix of lab and field tests and consist of:
- » **Field Network Deployment Support** – During the deployment (Build) phase, training is provided to the Installation Contractor (TMD) and VIWAPA on field deployment and troubleshooting procedures.
- » **Network Optimization** – The optimization process involves remote analysis of network performance, including routing, bandwidth, resiliency diagnostics and on-the-ground troubleshooting to address any hard to hear locations. Optimization is performed after meter deployment is complete. Upon completion of Network Optimization, compliance to performance requirements will be demonstrated.
- » **AMI System Deployment** – The Itron Services Team works with VIWAPA to plan all aspects of the AMI system deployment including the number and type of environments, backhaul network planning, security planning, remote access, storage and backup and optional disaster recovery. Itron provides the infrastructure and provisions the application in the Itron data center, then installs, configures and

tests the hosted UtilityIQ application(s) as well as any back-office network and external connections as required.

- » **Integration and Configuration Assistance** – UtilityIQ will be configured to meet VIWAPA's requirements. Additionally, during a comprehensive workshop, Itron Solution Architects work with VIWAPA to determine the data exchange required between UtilityIQ and existing systems of record and scope the effort required to enable this integration. Itron does not perform the actual system integration on VIWAPA back-office systems. The Services Team instead acts as the UtilityIQ expert in defining data flows and formats as well as configuring the AMI system. Finally, Itron works with VIWAPA and our third-party integrator, TRC, to test and troubleshoot the customer environment during the Plan Phase of the project.
- » **Application Training** – Includes a single on-site session over four days with a classroom size of six students. Training courses are provided as a consultative-style training session(s), live/hands-on demonstrations with the Itron applications and "Question and Answer" interaction with an experienced instructor. The following structured courseware is included: AMM, Network Center, MPC, FWU and Field Service Unit Tools.
- » **Technical Support and Maintenance** – Provided that annual maintenance fees are current, Itron provides ongoing support to ensure customers have access to technical support; software and firmware upgrades; and hardware replacements needed for optimal performance of its AMI solution.

Deployment

Itron and our subcontractors are fully committed to delivering a comprehensive and efficient mass deployment strategy for the AMI program across the Virgin Islands. Upon signing the contract, Itron will require 4 to 6 weeks to mobilize relevant resources to begin project implementation, and we plan to complete installations within the chosen 12, 18 or 24-month timelines, inclusive of the 1-month Pilot installation and 30-day assessment periods. Our recommended installation timeline is 18 months.

To ensure a rapid and synchronized deployment, we will employ a workforce of 7 -12 installers. These installers will begin installations on St. John in the Pilot area, pause for 30 days and resume installations in St. John before moving to St. Thomas and finally to St. Croix. This will ensure the remainder of the project is spent focused on the meter population in front of us and closes out these remote areas so that VIWAPA can begin realizing the benefits of AMI as soon as possible. Each installer will be a skilled technician equipped to handle installations efficiently. This approach will enable us to meet the deployment timeline chosen.

Our supervisory approach will involve a tiered management structure, with a dedicated Itron Project Manager and a field project manager overseeing the installers and coordinating activities on each island. This system ensures effective communication, issue resolution, and accountability at all levels of the deployment.

Itron goes through a bidding process prior to selecting installation vendors. All Itron subcontractors must be ISO 27001-compliant. As part of the selection process, we perform a compliance assessment for subcontractors. Bids are evaluated based on a combination of price, experience, qualifications, and capacity to complete the work at hand. Before finalizing selection of an installation contractor, Itron will provide VIWAPA with the ability to review (approve or disapprove) the partner(s) we have selected for your deployment project.

Installation Contractor



Itron has selected **Texas Meter & Device Company (TMD)** as our Installation Contractor. TMD has been in continuous operation since 1937, is headquartered in Waco, Texas, and has over 250 employees. TMD's core business functions include: AMI installation and change out for electric, water, and gas applications; AMI retrofit, shop testing, field testing and verification, meter application design, C&I meter software support, meter certification and audits, C&I meter installation and maintenance and much more. TMD has completed over 100 AMI service projects, each with unique requirements, and has completed over 4M meter exchanges while currently contracted to complete an additional 2M endpoints over the coming three years.

Installation Control

In our role as prime contractor, Itron will manage performance responsibilities and risks for the following:

- » Establishing of all necessary contracts with the endpoint installation and logistic resources. This includes both subcontractor contracts as well as any communication contracts, if required.
- » Establishing service level agreements in the areas of deployment schedule and milestones (including tracking), quality assurance/control, call center performance, safety indices, programs and tracking, inventory and asset management, and information systems performance.
- » Managing all contractual terms relating to performance of the project.
- » Handling of all program administration responsibilities with installation and logistic subcontractors including reporting, customer complaints, payment, grievance, safety, reporting, interaction with other contractors, etc.
- » Acting as a single point-of-contact and single point-of-responsibility for all project matters including those related to installation and logistic contractors.
- » Applying consistent processes and procedures that address the delivery and long-term operation and maintenance of the solution, not just the installation of a single endpoint.
- » Establishing and tracking all quality and safety best practices throughout the life of the project. Through thousands of system deployments, Itron has distilled best practices and acquired a deep knowledge of quality standards.
- » Providing project performance visibility through online tools that track installation, system performance, quality, and inventory. In addition, meter acceptance and billing are also tracked online and available to all members of the project team.
- » Optimizing the supply chain management process by providing a single, consolidated invoice for hardware, software, professional services, and installation services.

Our supervisory approach will involve a tiered management structure, with dedicated project managers overseeing multiple crews and regional deployment leads responsible for coordinating activities in each VIWAPA region. This hierarchical system ensures effective communication, issue resolution, and accountability at all levels of deployment.

Systems Integrator (SI)



Itron has selected **TRC** as our integration partner for this VIWAPA submission. TRC offers integration services for large enterprise solutions within the transmission and distribution space and is a current Itron partner with the LADWP AMI project and maintains a history of large, successful integrations with Itron with deployments over 500k meters. Itron has included the resumes of key personnel for TRC as *Attachment - TRC - Key Personnel Resumes*.

Itron will provide integration support using standard MultiSpeak 4.1 adapters to interface with either an existing customer information system (CIS) or enterprise service bus (ESB). Itron does not perform the actual system integration with VIWAPA-owned back-office systems. The Services Team instead acts as the UtilityIQ expert in defining data flows and formats as well as configuring the AMI system. Finally, Itron works with VIWAPA and TRC to test and troubleshoot the customer environment during the Plan Phase of the project.

Account Management

During the deployment phase of the project, Itron personnel will be onsite to provide technical support. Itron's project manager is an onsite resource who also has access to whatever other resources may be required from Itron during the implementation of the system.

During the final phase of the project, support is transitioned to Itron's Support Services group. Itron customers can obtain assistance on any issue through Itron's Global Support Services. Support services include system operator assistance, troubleshooting, sales order inquiries, service questions, and any other questions that our customers may have. Calls are routed by system type so they can be immediately directed to personnel trained on the customer's specific system. Itron's goal is to resolve reported problems during the first telephone call.

For calls that require additional assistance, Itron's System Support personnel act as a "second tier" of resources. They investigate and resolve issues that require effort outside of the Service Desk. In those cases where an issue requires a higher level of technical support, Itron Support Services personnel will coordinate and track support until resolution.

Itron's Global Support Service Desk personnel are available during regular business hours, Monday through Friday, 8 a.m. to 5 p.m., local time. Should incidents occur outside of regular business hours that cause a customer system to be unavailable, Itron's Global Support Services staff is available 24x7x365. Under Itron's Maintenance Agreement or SaaS, the following on-call support resources are available to customers:

- » **Service Desk:** Itron Support Services personnel are available through the Itron Service Desk, which is available worldwide. Itron provides a Customer Support Hotline for questions, problem reporting, and service requests. Itron's Customer Support Hotline is staffed during local business hours.
- » **Email:** Itron customers can also correspond with Itron Support Services via e-mail to request assistance with support-related issues (support@itron.com). Various support services teams monitor this mailbox and distribute service requests to Itron product teams with knowledge and skills in the specific topic.
- » **After-hours Support:** After standard business hours, customers can call Itron Support Services to report issues. Support personnel are available 24x7 to address Severity 1 issues. Non-Severity 1 calls are recorded and responded to on the next business day.
- » **Itron Customer Center:** Registered customers can visit Itron Customer Center, our 24x7 online service and support centers that is compatible with iPhones and Android devices. Itron Access includes a full line of support services and online resources. Users can search FAQs and a Knowledge Base for detailed product information; submit, revise, and monitor service requests; monitor purchase order information; and sign-up for industry events, including Itron Inspire.
- » **Training and Knowledge Transfer:** Itron is committed to training and empowering our customers so that they are equipped to efficiently operate, manage, and maintain their Itron business solutions. Training is available through all project-based implementations, and it is also available as a supplemental service offering at Itron's current rates.

Customer support is included at no additional charge in our SaaS price.

Post Deployment Operations

Post implementation is typically light for the UIQ system. Typically, a team of 2-5 resources depending on the utility size and deployment timeframe. Roles such as System Admin and AMI Operations. Duties such as non-communicating network gear and endpoints will have to be monitored and field investigations dispatched should it be required. As part of our offering, Itron will provide monitoring and assessment services dispatching network or meter replacement work order to VIWAPA as needed.

Post Deployment Support

Itron Global Support Services believes that the foundation of a great company is in the strength of the services provided to its customers. The team also recognizes the importance of keeping its customers' systems operating and trouble-free. To maximize customer satisfaction, Itron Global Support Services has developed a warranty and post-warranty organization and processes for support of its hardware and software products.

The Itron Global Support Services team has the knowledge and tools necessary to keep your staff informed on the latest energy and water technologies, help you improve operational efficiencies and derive more value from your business solutions.

Itron customers can obtain assistance on any issue through Itron's Global Support Services. Support services include system operator assistance, troubleshooting, sales order inquiries, service questions, and any other questions that our customers may have. Calls are routed by system type so they can be immediately directed to personnel trained on the customer's specific system. Itron's goal is to resolve reported problems during the first telephone call.

Itron's Global Support Services is committed to providing our customers with comprehensive operational support throughout the solution's lifecycle and ensuring the highest possible level of success and satisfaction with any Itron solution. This commitment drives everything Global Support Services does and results in consistently receiving high marks from Itron's customers in overall customer satisfaction. Itron surveys customers annually on ease of doing business, responsiveness of our service and sales organizations, and overall value of the product.

Global Customer Support Services Quick Facts

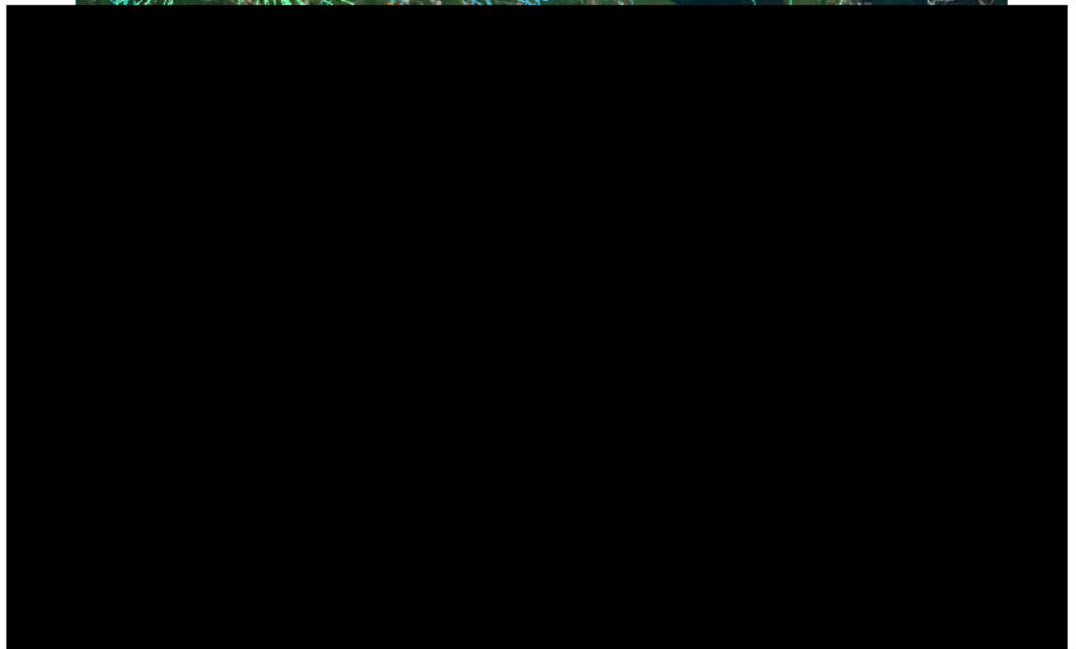
 15 Average tenure (years) of Technical Support Services subject matter experts with Itron	 95% Issues resolved without engineering assistance	 24/7 Technical Assistance Center
 4.7 Customer Satisfaction Score	 66 Net Promoter Score	 100% response within Severity 1 & 2 commitments

Section 2: Network Coverage Plans



1 HOP
2 HOPS
3 HOPS
4 HOPS
5 HOPS
6 HOPS
7 HOPS

 **Access Point**



1 HOP
2 HOPS
3 HOPS
4 HOPS
5 HOPS
6 HOPS
7 HOPS

 **Access Point**

 **Relay**



1 HOP
2 HOPS
3 HOPS
4 HOPS
5 HOPS
6 HOPS
7 HOPS

 Access Point

 Relay

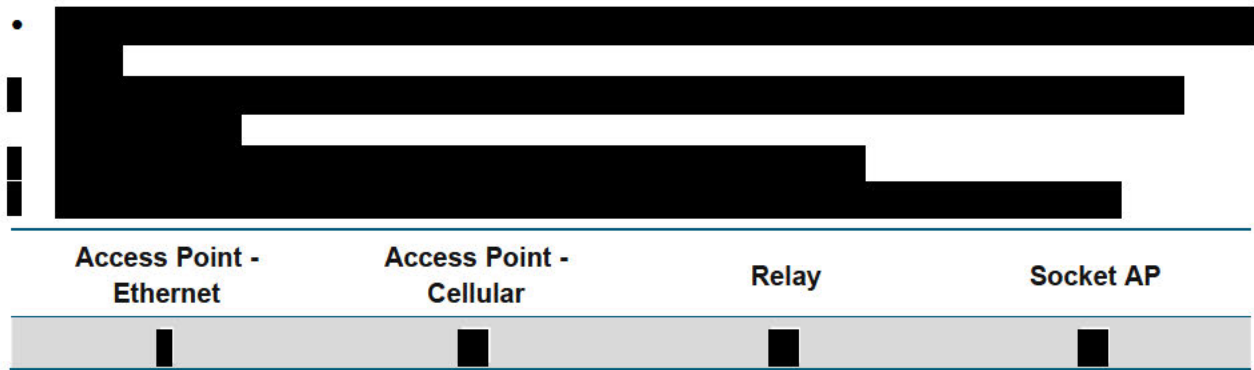


Design Assumptions

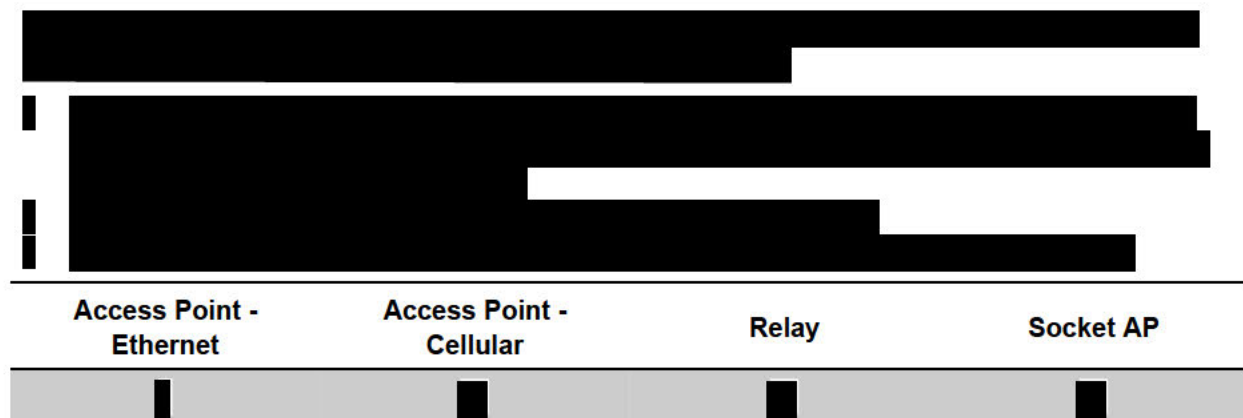
[Redacted text block]

Scenario 1 (Baseline)

[Redacted text block]



Scenario 2 (Real Time)



Predicted Network Statistics

[Redacted]

Scenario 1: Baseline		Scenario 2: (Real Time)	
[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]
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[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]

As outlined in *Appendix J, Section 2: Network Coverage Plans*, Itron has considered the following requirements during the design of Network Coverage Plans for VIWAPA:

Include endpoint loading of various components (e.g., Meters per tower/collector or total hops) and bandwidth utilization information to demonstrate the capacity of the network plan to support the steady state load as well as any additional traffic associated with fail over should a network device fail.

[REDACTED]

For any backhaul communications link not utilizing VIWAPA's communications network, identify the capacity and quality of service requirements for any third party communications and the annual communications costs associated with such third party communications services for those carriers located on the islands.

[REDACTED]

The coverage plans should indicate the available network bandwidth to support distribution automation (DA), endpoint distributed intelligence (DI) and an indication of the number of devices, which would be supported without additional network equipment.

[REDACTED]

Section 3: Customer References and Experience

We are proud to present three AMI references to St. Kitts Electric Company (SKELEC), Jamaica Public Service Company (JPS), and Florida Power & Light (FPL). These references demonstrate how Itron works with our customers to address the ever new and changing needs faced by utilities today. Since we have deployed both large- and small-scale projects in numerous countries through the Caribbean, Itron has the valuable global experience needed to manage the diverse challenges of implementing and integrating complex smart metering systems for VIWAPA.

The proposed Itron technology has over 50 million IPv6 communications devices installed across 50+ utility customers supporting a wide breadth of applications. World-class smart energy, gas and water deployments based on this platform include Florida Power & Light, Commonwealth Edison (Chicago), Consolidated Edison (New York City), Singapore Power, and DEWA (Dubai); municipal and cooperative utilities such as CPS Energy, City of Seaford, City Utilities of Springfield, and Choptank Electric Coop; and iconic smart streetlight/smart city projects in Halifax, Richmond Hill, Vancouver, Paris, London, Chicago, and Copenhagen. TECO has extensively deployed Riva meter based DI capabilities. Avangrid's New York affiliates, NYSEG and RG&E, are actively deploying Gen5 Riva meters and 550G gas ERT modules in a project differentiated by full scale DI and near real-time AMI data collection.

Our references below comply with requirements in Section 3 of the RFP regarding Customer References and AMI Past Experience of our implementation of our proven Gen5 AMI solution in each project presented. Our compliance with RFP Section 3 is included in the following table.

All references should be from utilities of 50,000 or more electric meters and where possible co-deployed with water meters and streetlights using the proposed version of the solution.	Comply – Two references include 50,000 or more electric meters with many co-deployed with the third reference with highly similar geographic location.
At least one (1) reference should be from a utility with similar environmental characteristics. i.e. temperature, humidity and storms. VIWAPA prefers that this be a Caribbean island.	Comply – All references contain tropical, Caribbean environments.
At least one (1) reference should have a highly varied geography similar to that of VIWAPA's mountainous and dense foliage territory.	Comply – Jamaica Public Service and St. Kitts.
At least one (1) reference should be from a turnkey solution where the Offeror provided the Deployment Services and Managed Services.	Comply – Itron provided deployment and managed services for all references.
Offerors should provide contact information of individuals who can speak to the work completed on referenced projects.	Comply – All of our project references include contacts.

Itron also understands that supporting multiple vendors and technologies such as 4G LTE, IPv6 mesh, and other assets across a common platform is critical to effective utility operations. Itron's leadership and experience in leveraging both mesh and cellular technologies together seamlessly is very important, both from a security and operations management perspective.

Reference 1: St. Kitts Electricity Company, Ltd.

Name and address of the customer	St. Kitts Electricity Company, Ltd. (SKELEC) Central Street Basseterre St. Kitts, St. Kitts & Nevis
Customer Contact	Kenrod Roberts, Assistant Engineering Manager Tel: +1 (869) 662-7155 Email: kenrodr@skelec.kn
Number of electric meters	22,000
AMI technology version deployed	Gen5 AMI
Start Date and Completion Date	Deployment period: 2023 - 2026

Scope

SKELEC provides daily electricity service to approximately 22,000 residential and C&I customers and manages over 16,400 lights across the entire island. St. Kitts and SKELEC is poised to be regional leader in renewable energy through the construction of the Caribbean's Largest Solar Generation and Storage System. The landmark solar generation and storage project will provide between 30-35% of St. Kitts baseload energy needs for the next 20-25 years while reducing carbon dioxide emissions by more than 740,000 metric tons. SKELEC chose the Itron Gen5 AMI network platform to enable:

- Automated metering
- Distribution automation
- Grid sensing and analytics
- Load management
- Street lighting control

Beginning in 2023, the project targeted 22,000 electric customers island-wide. The solution's software includes a network management system, the UtilityIQ AMI headend system, and Itron's Operations Optimizer for grid analytics (both a Software-as-a-Service (SaaS), which helps SKELEC identify potential energy theft and areas of the grid that they can target for operational improvements.

Software

UtilityIQ AMI headend suite of applications:

- Advanced Metering Manager (AMM) data collection system
- Control Platform (CP), which includes Firmware Upgrader (FWU)
- Meter Program Configurator (MPC)
- MultiSpeak Adaptor for easy integration
- Operations Optimizer: Revenue Assurance (analytics)

Hardware

- Access Points (AP), **Relays**, **SocketAP**

Integration

SKELEC accesses the solution's software via Itron's cloud-based Software-as-a-Service (SaaS) IT environment. The SaaS subscription includes Customer Support and Maintenance.

Future Applications

In the future, SKELEC can also choose to leverage Itron's multi-application platform to deliver future applications such as water use cases, expanded Pre-Pay options, TOU billing, distribution automation, and other smart city and home functionalities across St. Kitts, helping to further improve reliability.

Reference 2: Jamaica Public Service AMI and Smart Lighting Solutions

Name and address of the customer	Jamaica Public Service Company, Limited (JPS) 6 Knutsford Boulevard Kingston 5, Jamaica Phone: 888-935-5577 or 888-225-5577
Name, telephone number and email address of the contact person	Hugh Hamilton , Director – Grid Modernization & Telecommunications Tel: +1 (876) 937-9395 Email: hhamilton@jpscsc.com
Number of electric meters	51,000
AMI technology version deployed	Gen5 AMI
Start Date and Completion Date	Deployment period: 2016–2022

Scope

JPS provides daily electricity service to approximately 682,835 residential and C&I customers and manages over 110,000 lights across the entire island. They are also a key partner in national development, with a vibrant corporate social responsibility portfolio and a strong environmental focus.

Gen5 AMI Network Solution – 2016 - 2022

JPS chose the Itron Gen5 AMI network platform to meet their program objectives. The platform features open standards, IPv6 Internet protocols, and a Wi-SUN activated RF-mesh network designed to promote interoperability between networked devices. The network supports multiple utility and smart city services.

Beginning in 2016, the initial phase of the project targeted 21,000 homes and businesses in seven parishes across the island, and then grew to include 51,000 electric meters and 35,000 smart streetlights. All devices operated over the same network infrastructure. The solution's software includes a network management system, the UtilityIQ AMI headend system, and Itron's Operations Optimizer for grid analytics, which helps JPS identify potential energy theft and areas of the grid that they can target for operational improvements.

2018 Expansion

The initial rollout was such a success that in 2018 JPS contracted with Itron for a full deployment of the platform across the entire island. JPS will continue building on the previous Itron deployments until the platform supports a total of 650,000 (with the potential of up to 670K) electricity meters. The solution also empowers JPS customers to manage their energy costs more effectively through a web portal (by others) with more timely and granular insights into their energy use.

Future Applications

In the future, JPS can also choose to leverage Itron's multi-application platform to deliver future applications such as expanded Pre-Pay options, TOU billing, distribution automation, and other smart city and home functionalities across Jamaica, helping to further improve reliability. In 2017, JPS began a three-year program to upgrade the country's lighting infrastructure with new LED streetlights and smart networked lighting controllers (NLCs). To implement this program, this gradually built on their existing Itron Gen5 IPv6 network platform by connecting 110,000 smart LED streetlights (37,000+ currently deployed) in population centers around the island, including Kingston, Spanish Town, Negril, and Falmouth. To manage and control the networked lighting controllers, Itron provides the SLV Central Management System (CMS) to JPS via SaaS. Integration activities included providing a design workshop with JPS to determine the scope and nature of data exchange required between UtilityIQ and JPS' backend systems. Based on the strength of the workshop and Itron's integration support documentation, JPS was able to perform the integration themselves via their internal middleware.

Reference 3: Florida Power & Light

Name and address of the customer	700 Universe Boulevard Juno Beach, FL 33408
Name, telephone number and email address of the contact person	Please contact Jaime Ramirez, Portfolio Account Manager – Itron, Inc. Tel: +1 (864) 650-5889 Email: Jaime.Ramirez@itron.co
Number of electric meters	5M+
AMI technology version deployed	GenX
Start Date and Completion Date	<ul style="list-style-type: none"> • 2008: Initial AMI Field Pilot • Residential Meters: 2009 – 2012 • Distribution Automation: 2011 – Present • Commercial Meters: 2012 – 2015 • Smart Lighting: 2014 – 2017

Scope

In 2009, FPL contracted with Itron for a full deployment of their system and a broader Smart Grid deployment for their Energy Smart Florida program. FPL's solution includes Itron's GenX RF mesh AMI Network, Smart Lighting, and DA offerings. The deployment spans FPL's service territory and is the largest implementation of its kind in North America. When fully deployed it will include the following devices, all installed over the same network canopy:

- 5.5 million meters (deployed to date)
- 467,000+ streetlight controllers
- 35,000 DA devices

The smart lighting solution is one of the largest deployments in the world. And more than 457,000 smart streetlights photocells have been deployed that employ embedded Itron NICs. FPL has also engaged in a pilot for Pole Tilt Sensors. And the solution's DA deployment currently spans 509 substations, providing communications to more than 29,000 control and telemetry devices, all installed over the same network canopy. Moving forward, FPL plans to expand its AMI network to its NW Territory (formerly Gulf Power) in 2024. This expansion features tens of thousands of Gen5 Riva meters with onboard DI edge computing capabilities. FPL will then deploy several DI applications on targeted metering populations.

- **AMI Network:** The AMI network supports 5.5 million Aclara and Landis+Gyr electricity meters for residential, commercial, and industrial customers. The network's infrastructure consists of Itron Access Points, Relays, and Network Interface Cards (embedded in meters from Aclara and Landis+Gyr).
- **Distribution Automation (DA):** 35,000 DA Bridges provide network communications to Automatic Feeder Switches, Capacitor Bank Controllers, FCIs, Voltage Regulators, Network Protection Monitors, Reclosers, Transformer Monitors, and Line Sensors.
- **Streetlight Controllers:** Itron NICs are embedded into 457,000 streetlight photocells to remotely control and manage streetlights.
- **Adding new devices:** Since its initial rollout, the solution has included Itron's Gen3, Gen4, and Gen5 AMI and Distribution Automation (DA) components. Since these Itron RF networks are backwards compatible, FPL did not risk stranding or replacing older field assets when adding newer components.

Gen5 Riva meters: The 2022 purchase of Gulf Power by Next Era Energy has expanded FPL's service territory into Florida's Northwest region, creating an opportunity for Itron to provide an additional 500,000 Gen5 Riva electricity meters and supporting network infrastructure.

Section 4: Project Deployment/Installation

TMD plans on utilizing a travel crew to complete the work, and because of this the shorter 12-month option is preferred. Travel crews provide us the best option for controlling labor and providing efficient production on the island. TMD plans on executing a 12-month deployment, meaning we will have 12 months from the first installation of Mass Deployment to complete the balance of required installs. If other timing options are selected (18 month and 24 month) they will revert to the same based on the selected project window.

WOMS (Installation Management System)

TMD is using Enight+ on other deployments and will utilize Itron's version of the software

Asset Management

The ability of our Asset Management System and resulting WOMS allows TMD to provide fully customizable reporting for all data collected on the project or inherent to the assets on the project. We track everything. Every asset, vehicle, meter (inclusive of all meter data either inherent or collected), skip, trouble code, RTU, schedule date, milestone, etc. is tracked through the Asset Management System.

Inventory Management

The WOMS will utilize barcode scanning for all inventory. This barcoding will allow the WOMS to track each piece through the following inventory cycles:

1. Scanned Received/Quarantined – Meters are scanned into TMD warehouse and immediately put into a quarantined location within the system. This fulfills the requirement of all meters to be quarantined until testing is complete. They remain here until the utility approves them through their asset management system or through sample testing or both.
2. Scanned RTUs – Meters that fail out of the box are scanned into RTU status and prepped for communication back to the utility.
3. Released to Inventory/Production – Quarantined meters are transferred out of quarantine and into inventory to be deployed once accepted by the Utility. At this point they are moved out of the physical quarantine location and into the physical inventory location.
4. Scanned Staging – Meters are scanned out of inventory into an issued status as they are assigned to a technician.
5. Scanned Installed – The technician scans the meter at installation recording the serial number and barcode and tying it to the installation order.
6. Scanned Returned to Inventory – Meters that are not deployed during the deployment route for the day are scanned as returns to inventory, are captured into the WOMS, and physically located back into inventory. The WOMS will not allow duplicates of installed

TMD tracks and reconciles inventory daily. Every legacy meter is placed in a box by the installation technician, dated and initialed in order to be palletized and cataloged for future customer inquiries. This makes the meters easier to find for testing, sorting, and managing the inquiry. These reports can be provided daily, weekly, monthly or any combination depending on the recipient and level of frequency required.

Communication / Network Equipment Installation

Since no pole data was provided by VIWAPA, Itron's RF study assumes there is a viable VIWAPA overhead asset at all designed AP and Relay locations. VIWAPA will ensure all designed Access Point and Relay locations are suitable for device installation and will install secondary power and / or new poles where needed. Additional network communication devices may be required, or their locations altered due to the results of field site surveys.

Antenna Height: AP and Relay antennas will be installed at a minimum of 8m (26.67ft) above ground level (AGL). Additionally, Access Points and Relays will be installed with battery packs.

TMD has estimated installing 22 Cellular Access Points, 74 Relays, and 21 Socket APs to meet the baseline requirements. TMD will not install any Ethernet Access Points located in substations. Should VIWAPA require real-time network communications, TMD estimates installing 59 Cellular Access Points, 66 Relays, and 21 Socket APs.

TMD has estimated using a bucket truck and 2-man crew installing 8 devices per day. We estimate the total time to install all network equipment will be approximately 1-2 weeks for the baseline network design and 2-3 weeks for the real-time network design.

Electric Meter Deployment

TMD will organize the VIWAPA AMI deployment project under the leadership of Chris Carpenter, EVP Services and James Smith, VP Services. TMD will have a full-time on-site project manager who will manage the AMI electric meter exchange team.

Customer Communications

VIWAPA has not stated their desired customer communications process. TMD suggest a single written notification a month in advance of the deployment and an IVR call when the account is assigned to a technician to complete (typically within 2 days of arriving at site).

Door hangers should have a check box stating whether the installation was completed or if an appointment is required requesting contact to schedule the follow up appointment. All special needs accounts requiring appointment prior to an attempt will be provided in the Utility data so that prior arrangements can be made to schedule those accounts and remove them from the mass deployment routing.

TMD will perform a minimum of two (2) fully documented attempts to gain access to a customer premise to install the meter/endpoint as follows: Two (2) initial attempts shall be via physical visits to the premise on separate dates and times. TMD will perform one (1) attempt via call to the customer to schedule an appointment.

Any attempt to provide an appointment that is missed by the customer will be turned over as an RTU regardless of what attempt this takes place on the meter access steps. At accounts where obvious obstructions or impediments prevent access, those accounts will be turned over to the call center after the first attempt to begin scheduling appointments.

TMD will supply weekly reports with all customer contact noted. The entire engagement process will not exceed 30 days. While customer notification is required for all installations, installation appointments will only be necessary if the meter is not readily accessible, or service is to *critical* residential customers or when interruption of service is anticipated.

When possible, TMD will notify customers of any schedule changes at least 1 day before the original appointment.

Unable to Complete

If 15 days after the final call is made, and TMD is still unable to complete the work, then TMD will return the work order to the VIWAPA as "Return to Utility (RTU)". Full documentation of attempts to access meters will include date, time and method of attempts will be provided.

Call Center

TMD will provide a call center and a toll-free number that customers can call to request claims, to schedule installation appointments, or to report problems concerning installations. The call center will be staffed with offsite employees in the United States. TMD will staff its call center from 7:00am – 5:00pm local time, Monday – Friday.

The call center will be the primary point of contact for all customer claims. Claims brought to the VIWAPA will be referred directly to TMD management for immediate follow-up. TMD's expectation is that all claims or customer inquiries sent through the call center are followed up within the first hour after receipt.

If the meter exchanged is RTU'd to VIWAPA or if there is a known infrastructure issue preventing TMD from completing the work, TMD would route or defer calls to the VIWAPA to schedule the exchange with the customer.

Hiring/Employee Verification/Vehicles

All TMD installation employees are full-time employees of TMD, we do not utilize 1099 labor. Further all employees have access to TMD benefits including medical insurance, 401K matching, and company paid life insurance. Once an employee has passed his/her background check and drug testing, they will receive a TMD badge and uniform clearly identifying them as a TMD employee. TMD will also provide each installation meter technician with the proper Personal Protective Equipment (PPE) and hi-viz vest/uniform clearly identifying them as a TMD employee.

TMD provides new or late model vehicles of the same make and model leased for the specific project. All TMD vehicles will have TMD signage clearly marking the vehicle as a TMD vehicle. Additionally, each vehicle will indicate that TMD is working on behalf of VIWAPA, so that customers know TMD, and its employees are associated with VIWAPA for the purposes of the project.

Warehouse

TMD will source two warehouses approximately 5,000 square feet that will be a multi-purpose facility capable of providing cross-dock, warehousing, and office space to facilitate loading and unloading of AMI network equipment and electric meters as well as warehouse capacity to securely store the AMI network and electric meters. Also, the office space will provide training and offices for the project manager and supervisors to conduct project management and training activities. TMD will centrally locate the warehouse to facilitate the most efficient routing for TMD installation crews.

Inventory Level

TMD will develop a deployment plan that will estimate the number of installations required each day based on an average production rate per meter technician. From this metric TMD will determine the required inventory level of meters and endpoints plus 10% to be retained in the warehouse and cross-dock location.

Deployment

TMD plans on executing a 12-month deployment, meaning we will have 12 months from the first installation of Mass Deployment to complete the balance of required installs. If other timing options are selected (18 month and 24 month) they will revert to the same based on the selected project window.

TMD will establish two (2) warehouse facilities, one in Saint Thomas and another in Saint Croix and we have budgeted up to 5,000 SF for each. The project will begin with the pilot on Saint John's that will take approximately a month to complete, TMD has included pricing for lodging on the island for our crew for a month. After ISAT, TMD will begin Mass Deployment (beginning the overall 12-month deployment timeline) on Saint Thomas. Once complete TMD will transition to Saint Croix where we have scheduled six (6) months to complete the deployment. Hassle Water will only take a day or two to complete and can be included in either section of the project (St. Thomas or St. Croix).

TMD will also deploy a call center for managing customer appointments and claims as well as contracting with a local licensed electrician to provide meter pan and socket repair services as required. Additionally, TMD will implement our Work Order Management System (Installation Management System) to manage network and meter inventory, as well as daily installation of network equipment and electric meters.

Deployment Ramp Up

Per the RFP project timeline, the 1,000-meter Pilot installations and System Acceptance Testing should be adequate to ramp up production in readiness for mass deployment. Additionally, as previously stated, TMD will bring in a travel crew with trained and experienced meter technicians for meter installation, which significantly reduces training and ramp up time.

Ramp up and Steady State productivity Rates

As stated above, the deployment team will be a full-scale mass deployment productivity within the first month of meter/endpoint installations. This will yield an overall mass deployment timeline of approximately 12 months.

Ramp Down Process and Productivity Rates

TMD has scheduled 1-2 months of schedule for clean-up activities to address, hard to access and normal clean-up activities with sites that required multiple trips due to customer unavailability. This has proven to be more than adequate time to complete any of the clean-up work required to complete the deployment.

TMD will typically break out a separate work stream of meter technicians that will be just focused on performing clean-up activities 1 month before the end of scheduled mass deployment. This month coupled with the 1-2 months factored in for clean-up provides additional cushion to complete the deployment on time. Hard to access sites will be the main risk to ensure the proper steps were taken when these sites were first identified and adequately addressed so they can be completed during the clean-up activities.

Work Attempts

TMD will complete a meter exchange as promptly as possible, and within 30 days, after a first failed attempt. TMD will provide at least 2 documented field attempts on 2 separate days, with each field attempt a door hanger will be left for the customer, and 1 documented telephone attempt to attempt to complete each installation, following which TMD will return the applicable meter exchange/AMI Endpoint to Utility as promptly as practicable. The exchange will be skipped if TMD cannot complete the installation due to the inability to enter the Customer's premises or the meter is inaccessible.

Monthly Productivity

St. John – TMD plans to deploy 3,566 meters in a month on St. John.

St. Thomas – TMD plans to deploy 25,476 meters over a 6-month period which is approximately 4,246 per month.

St. Croix – TMD plans to deploy 26,390 meters over a 6-month period which is approximately 4,398 per month.

Hassle Water – TMD plans to install 141 meters in a day.

Quality Assurance

WOMS software is a forced march application where each step of the workflow must be completed before moving to the next step. These steps include advancement with validation control; as an example once at the physical address, the technician must validate and check the box validating the address is correct, the next step forces the technician to enter the meter number associated with the order/address, where the technician enters the meter number from the nameplate of the meter (meter number is not shown on the screen), if the meter number matches, the next screen is available in the work flow. If the meter number was incorrectly entered, or is a wrong number, the technician cannot advance to the exchange screen and either re-enters the number or codes the work order with the wrong meter number.

TMD will conduct inspections for 100% of the sites worked on by new technicians for the first 10 days. Any failures will be brought up to the technician immediately. After this term and the development of proficient results, the inspection sites will be reduced to 5%. If issues are found at any time during the initial inspection period, the term will be extended, and the technician will be retrained on the points of failure.

If at any period of the inspection process the technician fails to grasp the level of proficiency required, they will be reassigned or removed from the project. All issues found in the field that are a direct result of TMD failure to follow expected procedures defined in the statement of work will be immediately addressed and corrected by TMD.

Project Management Approach

TMD's delivery Team recognizes that the AMI electric meter exchanges require a flexible structured, adaptable, and rigorous project management approach to ensure timely completion and technically correct project results. To ensure project success, TMD will provide a full-time onsite Project Manager that will be the single point of contact with VIWAPA's Project Manager.

Our Team will use a Hardware Lifecycle Development methodology along with a tailored Project Management Institute (PMI) best practices model to ensure successful project delivery. Our project management approach and methodology are detailed below.

Project Initiation

In the Project Initiation phase the Project Manager will work with the TMD project Team and VIWAPA's Project Manager to develop the various documents needed to manage the project. The first of these documents is the Project Management Plan (PMP) that defines the project's governance and conduct and the additional subordinate PMP sections necessary to deliver a successful project outcome. These additional PMP sections include:

- Safety Plan
- Quality Assurance Plan

- Risk Management Plan
 - Network, Meter, and Module Deployment Plan
 - Change Management Process
- Roles and Responsibilities
- Project goals, objectives, and expected VIWAPA benefits.

The Project Manager will also prepare a project kick-off meeting where our project Team, its key stakeholders and VIWAPA and its key project stakeholders will review these documents for approval as well as agree on “what success looks like”. We believe it is fundamental to the project’s success to have a common vision of what success looks like at the end of the project, at the outset.

Unable to Complete

If 15 days after the final call is made, and TMD is still unable to complete the work, then TMD will return the work order to the VIWAPA as “Return to Utility (RTU)”. Full documentation of attempts to access meters will include date, time and method of attempts will be provided.

Installation Acceptance

TMD will ensure that each AMI electric meter is installed correctly and is powered up with the faceplate properly activated. If a device is not communicating with the network, TMD will work in good faith with the manufacturer to assist them in getting the device to communicate with the network. However, if there are a significant number of AMI meters that are not properly communicating with the network, TMD will charge the manufacturer for additional trips to the field to troubleshoot and repair the AMI meter’s communications with the network.

Project Implementation Methodology

Project Deployment Team

This team's goal is to hand over a fully functioning solution that meets our customer needs. By managing thousands of projects, Itron has gained the experience, and the expertise needed to manage even the most complex large-scale solutions. For example, the team has extensive experience with setting up complex IT systems, integrating with back-office business systems and third-party components, guiding customers with updating and automating associated business processes, and managing subcontractors responsible for field deployment activities. Itron has the organization, project management, technical expertise, training resources, and tools needed to deliver a successful project.

Itron will provide the experienced staff required for optimal performance of this engagement. The Itron project team will consist of resources assigned directly to this engagement to ensure continuity in project and customer support activities. Supporting the Engagement Manager will be a team of subject matter experts who each play a key role in ensuring that the project and progress plan is delivered on. Itron's proposal for the project team follows, with role descriptions for its members. Itron anticipates that the customer would provide resources which would be similarly aligned on accountability to make this structure truly successful. For both parties, a person may play multiple roles within the project organization.

- » **Program Manager(s):** Itron Program Managers work closely with the customer to ensure delivery success of the project. They monitor each project phase, its governance, and its deliverables to ensure they meet the project objectives, and that changes are managed and implemented as required.
- » **Program Administrator:** Identify and track contractual requirements including project progress, invoicing, warranties, calendaring renewal dates, notice requirements and reporting requirements.
- » **Field Engineer(s):** As the principal deployment and trouble-shooting resources during deployment, the Itron Field Engineer will train installers, oversee network installation and interface with the customer's installation team.
- » **Net Labs Engineer:** Lead network performance analyst for optimization work and compliance with required SLAs.
- » **Smart Grid Engineer:** Serves as the subject matter expert on the connectivity and operation of the headend system and other software applications and provides first line support for validation, investigation, escalation, and resolution of technical issues. Supports customer testing and performs functional and system testing.
- » **Network Design Engineer:** Responsible for Itron's RF network designs. Itron's Design Engineer will create initial and supplemental network designs, and support optimization effort.
- » **Solution Architect:** Provides utility solutions integration advice and assistance which may include technical architecture design, data workflow design, systems integration design, systems configuration design, and scalability and security design.

Actual assignments may change based on resource availability at the time of award. However, the qualifications and résumés provided here represent the caliber, credentials, and level of experience of personnel who will be assigned to this important project. Representative resumes are included in *Attachment – Itron – Key Personnel Resumes* accompanying this proposal response.

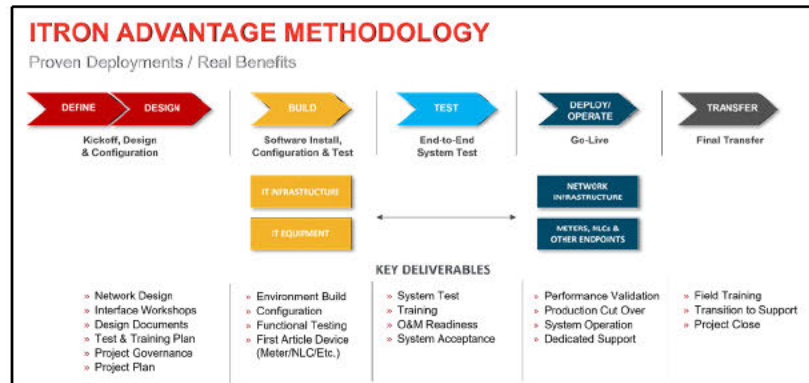
Itron Advantage Project Methodology

Itron's project management methodology, called Itron Advantage, follows industry best practices for implementation methodologies. It is a measurable approach based on the PMI Project Management Body of Knowledge (PMBOK) and PRINCE2. Itron Advantage focuses on the requirements of the utility industry, while mitigating project risk and ensuring its quality. Itron Advantage fully defines project requirements and deliverables and ensures that all stakeholders understand them. The process also identifies, assigns, and manages all tasks and dependencies through existing RACI models. Processes

address risk identification and mitigation, scope management, schedule management, resource assignments, communications, reporting, change management, and issue resolution.

Project Phases

Itron Advantage employs a consistent multi-phased structure across all Itron solutions. This structure provides predictable, measured, and effective quality control throughout the project.



Itron Advantage's five project phases have been refined over many projects to ensure success

Itron Advantage Project Phases

Phase	Summary
Define	The project team gathers information to initiate and manage the project. Key activities include a project kickoff, identifying team members, a solution capabilities overview (Itron solution presentations) and workshops to gather and validate solution requirements.
Design	The project team prepares design specifications and plans required to meet the project objectives. Key design specifications include the Business Solution Design (BSD) and the Technical Architecture Design (TAD). This phase also includes the plans required to build, test, train, and deploy the solution.
Build	The team installs, configures, and tests the solution according to the solution's plans and designs. VIWAPA personnel receive training in the system's use.
Deploy/Operate	The team performs activities to deploy, operate, and optimize the solution, as applicable.
Transfer	This phase transitions full operation of the solution to VIWAPA and closes the project. This phase also transitions VIWAPA's ongoing support needs from the Itron project team to Itron Support Services.

Project Requirements

Itron places great importance on clearly defining the customer's requirements, understanding project goals, and reaching consensus before commencement. To that end, Itron Advantage ensures that project requirements are fully defined and understood by all stakeholders, and that all tasks and dependencies are identified, understood, and assigned. Itron then fully defines each project deliverable in a Statement of Work (SoW). A Project Plan documents all associated project tasks and timelines. Itron scrupulously adheres to this plan and controls any changes through our change management process.

Risk Mitigation

Itron Advantage mitigates the risks associated with any scale by tightly controlling project tasks, deliverables, and variables. The process ensures that each task and deliverable is identified, documented, assigned, tracked, and managed to a successful conclusion, and that appropriate resources are made available as needed throughout the project. Focus remains on mitigating risk, stakeholder communication, task execution and accountability, and closely managing change.

Experience from Lessons Learned

Finally, Itron provides lessons learned from previous projects. This is the most important knowledge a resource can have, because an AMI implementation touches so many organizations, operations, processes, and day-to-day tasks. Itron Advantage is project-proven to deliver on time and within budget.

Key Implementation Activities

This document describes a typical project implementation and is intended to serve as a baseline reference. The Itron Advantage methodology is inherently flexible, allowing for customization as appropriate. While this template version of the Itron Advantage methodology reflects the best practices and lessons learned from our extensive global experience, our expectation is that, early in the project, we will adapt this baseline template into a set of detailed plans that are specific to the VIWAPA AMI project and its unique requirements. As such, the content here should be viewed to represent Itron's experience and expertise and is not intended to be prescriptive or to conflict with VIWAPA's requirements as expressed elsewhere in the RFP. The following are key activities that help ensure successful project implementation:

- » Reviewing solution capabilities with VIWAPA.
- » Discussing the process for solution implementation.
- » Capturing VIWAPA requirements.
- » Building the systems.
- » Supporting any required system integration.
- » Performing testing and training.
- » Bringing the system online and going live.

Detailed Methodology and Deliverables

The following topics describe the activities, responsibilities, and deliverables associated with each project phase.

Project Preparation

Our experience has taught us that performing some important logistics and planning effort before kicking off a project sets a strong foundation for project success. It is important to select the core project team and engage them in the project as early as possible. For example, they may take part in contract negotiations or final selection meetings prior to initiating the project. Such early exposure introduces the team to the VIWAPA project team and provides a solid introduction to the project and its key deliverables.

It is also important to allow sufficient time for the team to review the proposal, Statement of Work, and other documentation from the project's Bid team. This provides the team with the details needed to begin the planning process for project implementation. Internal reviews from lessons learned on past projects can also help identify possible risks for the project early on so the teams can actively plan to mitigate such risks.

It is also valuable to bring both Itron and VIWAPA management teams together before the formal project kickoff. This allows the teams to review the Statement of Work (SoW) and ensures that all managers understand the work, deliverables, roles, and responsibilities of each team. Identifying gaps or risks early as a combined management team minimizes surprises later and gets the teams working together immediately. Meeting to set the first phase's project kickoff time and agenda items also helps ensure that the project starts on the right path with a strong and cooperative message.

Define Phase

In the Itron Advantage methodology, requirements definition occurs in the Design phase. During this phase, the Itron project management team works with VIWAPA to develop and document a mutually agreed-upon SoW, and to validate business solution requirements through a set of requirements

workshops. Once in agreement, these documents provide the basis for the project scope, schedule, resources, and responsibilities of each stakeholder.

Kickoff and Workshop Planning

The Define phase begins with the project kickoff meeting. The kickoff meeting includes the entire project team. Key activities include introducing the team members, reviewing the project schedule and SoW requirements, and presenting a Solution Overview. Stakeholders initiate discussions on Project Planning, Business Solution, and Solution Architecture. The project team also establishes a Project Charter that identifies the Project Manager and team members. Following the kickoff, project groups break out to begin planning for upcoming workshop requirements and specific technical training, and further review the project schedule and team roles and responsibilities. During this time, project managers also develop and agree on a Project Governance Plan.

Solution Requirements Workshops

The Itron Project Manager then facilitates workshops with VIWAPA to gather, understand, define, and document the detailed business requirements for the proposed solution and to identify any future requirements that may be applicable to the infrastructure design. These workshops develop an initial prioritization of the solution requirements, used later in deployment planning. The solution requirements workshops are divided into **functional overview** and **detailed requirements** workshops.

Functional overview workshops are a form of training designed to help VIWAPA understand each of the solution components and the best-practice configuration of each component. For the **detailed requirements workshops**, the Solution Delivery Team interviews VIWAPA to better understand the business use cases and their implications on the application components. The Solution Architect and Business Consultant conduct these onsite requirements workshops. The Project Manager and Technical Consultants also support them, when required. Together, these workshops define the solution's detailed functional, technical, and integration requirements, the use cases to be tested, and the test approach for each use case. They also prioritize solution requirements for later use in deployment planning.

During this phase, Itron also ensures that we fully understand and document the Risk Management, Quality Management, and Social Accountability requirements. By focusing on project requirements, assumptions, risks, and the solution's required business use cases, the team can capture VIWAPA's precise functional and non-functional requirements. At the completion of these workshops, the project team prepares a Business Solution Requirements (BSR) document, which captures all these requirements in readiness for the Statement of Work and for validating the solution requirements.

Statement of Work and Validating Solution Requirements

The Itron project management team then works with VIWAPA to develop a mutually agreed-upon Statement of Work (SoW). Together, we review the standard solution functionality as defined in the SoW and align the SoW with the Business Solution Requirements (BSR). This is done for the AMI system's headend components, communication components, IT interfaces, and other components, as applicable. For AMI field deployments, activities focus on validating the preliminary network design by verifying design data inputs. Key team members focus on meter/network technical training, reviewing equipment configuration designs, validating installation standards, and coordinating field activity logistics.

Define Phase Deliverables

The output of the Define phase is a full understanding of the solution design requirements, a comprehensive statement of work, and an integrated project plan and schedule. The table below shows the Define Phase deliverables.

Item	Deliverable / Activity	Description	Itron + Partner Project Team	VIWAPA
1	Project Schedule Project Charter & Governance RACI	After reviewing all project roles and responsibilities and completing the kickoff meeting, update the Project Schedule and the Project Charter & Governance to reflect any changes. Note: These documents may evolve through the	Project Schedule Project Charter & Governance	Review and provide edits as applicable.

Item	Deliverable / Activity	Description	Itron + Partner Project Team	VIWAPA
		Define Phase of the project.		
2	Business Solution Requirements document (BSR)	When custom integrations are required, the Business Solution Requirements (BSR) are an output from an initial workshop that confirms the solution requirements. The customer must review the document and sign off on these requirements and associated scope.	Prepare and submit for review and sign-off.	Reviews and signs upon agreement.
3	Operational Effectiveness Plan & Assessment	This deliverable is also an output from the workshops. Operational effectiveness planning ensures that the customer has the right people with the right skills to operate and maintain the system after it goes live. Note: The primary intention of this deliverable is to create awareness. It will evolve throughout the life of the project.	Prepare and submit for review.	Review and initiate activities, as identified.
4	Operations and Maintenance (O&M) Roles and Responsibilities	Outlines VIWAPA's O&M roles and responsibilities for the Itron solution. Note: This document may evolve throughout the life of the project.	Prepare and submit for review.	Review and provide the right resources to support Operations and Maintenance.

To conclude this phase, VIWAPA reviews the SoW and the BSR to ensure that the proposed solution meets their intended requirements. Once approved, all applicable stakeholders must sign the SoW and the BSR before the project can proceed to the next phase. Stakeholders must also agree on project management and governance details. The SoW then becomes the basis for the project scope, schedule, resources, and responsibilities of all of the project partners. Once VIWAPA approves these documents, the project moves into the Design phase.

Design Phase

During the Design phase, the project management team defines and documents the solution architecture that will realize VIWAPA's business objectives. The team also develops an integrated project plan and schedule for system implementation, integration, testing, training, and deployment. The customer procures supporting back-office IT systems if applicable.

Design Sessions

The project team holds detailed design sessions that translate the captured business use cases into system use cases and interface use cases. The team then produces documentation that ensures that the design of the system architecture and/or business processes meet project requirements. The team delivers two key documents:

- » The Business Solution Design (“**BSD**”) maps project requirements to the system design.
- » The Technical Architecture Design (“**TAD**”) includes solution architecture diagrams, provides details of the required IT environments, identifies the system's hardware and software requirements, and provides the design of the of the disaster recovery (“**DR**”) environment, when applicable.

The team then submits the documents for customer approval. The project moves into the Build phase after the BSD and the TAD are approved.

Disaster Recovery (Optional)

Itron recognizes that disaster recovery requirements tend to be very individualistic with each utility. When disaster recovery is required, Itron will work with VIWAPA to create a DR plan for the solution. Itron has participated in planning and testing numerous DR exercises and can assist with developing the design requirements for a DR plan and with supporting its implementation.

Project Planning

When the customer approves the system architecture, the Project Managers work with VIWAPA's project team to plan the project deliverables. The project team creates the IT test plan, training plan, and other key planning documents. The project team also finalizes an integrated project plan with stakeholder task assignments so that each stakeholder understands the project schedule and the responsible tasks for completing. Itron will also work with VIWAPA to plan the logistics and content for training users on the delivered Itron solution. Training covers system components and functionality, as defined by the SoW and training plan.

The Network Deployment team completes the required installation standards, reviews and approves the network site survey process, and provides input into the VIWAPA deployment plan (if applicable), and provides first article approval requirements for meters and network hardware.

Design Phase Deliverables

The following table summarizes the Design phase's key deliverables and associated responsibilities.

Item	Deliverable / Activity	Description	Itron	VIWAPA
1	Business Solution Design (BSD)	Upon signature of the BSR, Itron prepares the Business Solution Design (BSD) document. This document maps the requirements to key design decisions. It also outlines the key process designs in maps and narratives.	Prepare and submit for review and sign-off.	Review and sign upon agreement.
2	Technical Architecture Design (TAD)	Upon completion of the Solution Requirements Workshop, Itron prepares the Technical Architecture Design (TAD) document, which documents the necessary environments and provides recommended hardware sizing.	Prepare and submit for internal Itron review and customer review and sign-off.	Review and sign upon agreement.
3	Procurement of Back Office Systems	VIWAPA uses the TAD to procure all required back-office systems needed to support Build Phase. (if applicable)	Assist as needed	Primary
4	Interface Strategy & Design (Migration & Integration)	The Itron Technical Consultant works with VIWAPA administrators to document the data sources, acquisition processes, migration/interface requirements, and method employed. After gathering requirements determining the migration/ integration strategy, Itron documents this information along with a detailed design to include data design, design assumptions, testing requirements, etc.	Prepare and submit for review and sign-off. Note: Itron owns the strategy and design through Design phase and provides support as required for the proceeding phases, unless otherwise noted.	Review and sign upon agreement. Responsible for the migration of the system data using standard Itron formats, unless otherwise noted.
5	Solution Test Plan	After designing the solution, test plans may be prepared. The Solution Test Plan identifies the test approach, participants, schedule, environment setup, test case listing, success criteria, and test problem management process.	Prepare template with functional testing inputs. Support VIWAPA in the completion of the Plan. Review the final document.	Complete the Plan with inputs required for VIWAPA-specific testing.
6	Solution Training Plan	Itron works with VIWAPA to plan the logistics and content for training users on the delivered Itron solution.	Prepare and submit for review.	Review document and initiate activities as identified.
7	Software Cutover Go-Live Plan	Once the solution is designed, the team documents a strategy for Production cutover, including readiness criteria.	Prepare a template and provide support.	Complete and manage Plan.

Build Phase: System Realization (Development and Testing)

In the Itron Advantage methodology, system realization (development and testing) occurs during the Build phase. During the Build phase, the project team procures, builds, installs, and configures the key solution

components and IT environments. The designated stakeholder performs system integration. The project team then trains operations personnel and performs end-to-end system testing in preparation for Go Live.

Build Phase

During the Build Phase, the combined IT project team uses the design documents to install servers and applications, to match the technical architecture specifications for each IT environment. Technical Consultants then set up and configure the system applications based on the approved system requirements and solution design. While the solution is being set up, the Itron team creates the test cases and test environments in preparation for the testing phases.

AMI Network Preparation

VIWAPA begins network field site surveys (with Itron's initial training) that collect technical information and location data to finalize installation locations for the communications network infrastructure, such as field area routers. The network design is updated from these requirements. Meters and other network endpoints will be ordered. Meters and AP configurations are generated within the system, first article equipment approvals are completed, and equipment is ordered for deployment. VIWAPA then prepares the field by providing the network infrastructure sites with the necessary power needed to install the network infrastructure.

System Integration

The designated stakeholders then perform any required integration work between the solution and other back-office systems, develop test plans and test scripts, perform additional training for testers (as needed), and identify any new operational requirements. A SoW will outline the scope and details of the integration requirements.

Go-Live Preparation: System Testing

While the solution is being set up, the Itron team creates the test cases and readies the test environments needed to support the testing phase. During the Build (Realization) phase, the project team performs a battery of tests to ensure proper operation of the solution before the system's Go Live date. The project team performs system testing, then integration testing, then end-to-end testing. Finally, Itron and VIWAPA confirm that User Acceptance Testing (UAT) is complete and confirm readiness for Production Go Live.

Build Phase Deliverables

The following table summarizes the Build phase's key deliverables and associated responsibilities.

Item	Deliverable / Activity	Description	Itron	VIWAPA
1	Develop Base Functional Test Cases	The Functional Test Cases verify accurate setup and configurations. Note: Itron uses standard Functional Test Cases.	Primary	
2	Develop Integration Test Cases	Integration testing verifies that integration-level work and configurations that are critical to the enterprise solution are passing data as expected. Testing validates inter-product capabilities such as APIs, SOAP/WSDL, and database connectivity. Testing also often verifies correct security configurations.	Review completed Test Cases.	Primary
3	Develop Solution "End-to-End" Test Cases	These test cases validate key VIWAPA business requirements and uses cases that can only be evaluated with the entire solution in place.	Review completed Test Cases.	Primary
4	Training Deliverables & Activities	Itron provides the training needed to ensure that VIWAPA approaches the testing activity with the necessary skills and knowledge to confidently write, run, and validate the results of the tests. In addition, VIWAPA personnel learn how to provide Tier 1 support during the testing activity.	Primary	Participate
5	End user training	Itron provides end user training, so that users have the knowledge to operate the system to accomplish the project objectives. See training definition in the Training and Documentation section.	Primary	Participate

Item	Deliverable / Activity	Description	Itron	VIWAPA
6	IT Technical Operational Training	Itron provides training to VIWAPA IT personnel, so they have the knowledge to maintain and operate the solution from an IT perspective. Typical training includes partitioning of the database and purging of data.	Primary	Participate
7	Operational Training	Itron provides training to VIWAPA Operators, so they have the operational knowledge to maintain and troubleshoot the solution and to provide Tier 1 support.	Primary	Participate
8	Complete the first draft of the Product Configuration Design (PCD) document.	Upon completing system configuration and functional testing, Itron can prepare the PCD document. This document outlines the system configuration setups needed to meet the requirements and to operate the system. Note: Itron maintains this deliverable through the end of the project.	Primary	
9	Initiate Transition to the Support Plan. Schedule Meeting with Itron Support Services	Engage with Itron Support Services to prepare for the transition to supporting VIWAPA during the Operate phase It also provides an excellent opportunity for VIWAPA to understand the service levels and protocols associated with the applicable Support Services.	Primary	Review

Deploy/Operate Phase

System Operation and Deployment

The project now enters the Deploy/Operate phase. During this phase, AMI smart grid devices are installed in the field. VIWAPA Operations personnel begin using the system. The project team performs network monitoring and mitigation activities, performs Go Live activities, and provides post-production support.

Field Deployment

During the Deploy Phase, VIWAPA installs and commissions the AMI system's Access Points, meters, communication modules, streetlight controllers, and other devices. The best practice is to install Access Points first, followed by endpoint devices in a **contiguous** area. Completion and saturation by area is very important. While installing the equipment, begin route acceptance procedures and continue them throughout the Deploy phase. Itron provides technical expertise during this phase of the deployment to ensure that the deployment meets the installation schedule.

Initial System Operation

In parallel with the Deploy phase, Itron will operate the headend system to provision meters and to manage meter interrogation requests and data flows. For cloud-based solutions, Itron Cloud Services will perform security and maintenance updates on the applications and system.

System Monitoring and Mitigation

As the equipment is installed, the project team monitors system performance. The team then investigates any reduction in performance and begins mitigation activities to resolve the issue. Mitigation includes both desktop and field investigations of meters that are not performing or that are considered hard to read. The team makes recommendations for mitigation equipment. Follow-up site surveys and equipment installations are completed, as needed. System performance and updates to the network GIS design continue, as needed. The IT teams focus on further testing/support, typically in the areas of integration testing and/or end-to-end system testing. VIWAPA leads these activities with support from Itron in accordance with the agreed testing plan. All of the above activities lead to the success of the final acceptance testing. The Deploy/Operate phase continues throughout the deployment and into the Transfer phase, until project close.

Process Development

As VIWAPA realizes the potential value of the newly available data, they will identify new ideas and potential process improvements. Itron will support business process development throughout the project.

This Deploy/Operation phase will continue throughout the deployment and into the Transfer phase, until the project closes.

Transfer Phase

Upon successful completion of final acceptance testing, the project moves into an operational Transfer phase and support mode. In this phase, the Itron project team provides additional training to VIWAPA personnel on system operations and maintenance to ensure long-term system performance. The Itron project team also works with VIWAPA to perform project closeout activities, such as reviewing user feedback, inventory reconciliation, final billing, and project lessons learned. The final step of the project is for the Itron project team to transfer full operational responsibility of the Itron solution to VIWAPA's Operations team, and to assist with the transition of VIWAPA to the long-term care of Itron's Support Services team. Itron finalizes the standard operating procedures and transfers the system to VIWAPA for ongoing operations and sustainment. VIWAPA then assumes full operation and continues any ongoing field deployment activities, while Itron's Support Services team remains available to provide applicable support per the terms of the Maintenance and Service Agreements. **Note:** Depending on the solution, Itron's transition process can begin as early as the Build phase. This process engages our Support Services team, allowing them to understand the intricacies of the environment and the system configuration. This period also introduces VIWAPA to the individuals in Itron's Support Services team who will provide support upon transition.

Post Go-Live Support

Moving forward, Itron's Support Services team provides ongoing support for the Itron solution through Itron's Maintenance and Service Agreements. Itron Technical Consultants and Business Consultants continue to be available, operating as Tier 2 level support. This level of support ensures that VIWAPA operators become accustomed to day-to-day operational activities and basic system troubleshooting.

Transfer Phase Deliverables

The following table summarizes the Transfer phase's key deliverables and associated responsibilities.

Project Milestone Summary

The following table lists the key activities and milestones for each phase of the Itron Advantage Methodology. Each phase of the project proceeds to the next phase upon reaching each of its milestones and approval of its deliverables. For the sample project plan/timeline, see *Appendix 1 - Schedules*.

Phase	Project Milestone Summary
Define	Kickoff Meeting and Materials As-Is Business Process Diagrams Roles & Responsibilities Matrix To-Be System Architecture Business Solution Requirements (BSR) Document
Design	Data Migration Strategy / Training Document Prod & DR Environ Install (Servers, OS, App Server & DB) Application Install and Base Configuration in Prod/DR Deployment Readiness Plan Test and Training Plans
Build and System Testing	Dev/Test Environ Installs (Servers, OS, App Serv, DB) Business Solution Design (BSD) Document Product Configuration Design Document Transition to Support Plan Test Case Development Functional / System Testing
Integration Testing	Custom Interface Development - (If applicable) Legacy Data Migration – (NA) Training Materials Development Integration Testing
User Acceptance	Train Users Solution Test Complete & Signed Off (UAT)

Phase	Project Milestone Summary
Testing (UAT)	
Operate / Transfer	Production Availability of the Solution Transition to Support Plan Executed Project Completion Sign-Off

Section 5: QA/Prod Environment Requirements

UtilityIQ AMI Software Overview

The solution's **UtilityIQ** headend system is a suite of software applications designed to manage and take full advantage of the AMI network's capabilities. The headend supports electricity, gas, and water metering solutions, and has everything you need to manage the network, devices, read schedules, events, administration, and reporting. Furthermore, it comes pre-configured and optimized to focus on the three most essential use cases—meter-to-cash, remote service dis/connect, and outage detection. The following topics describe each module in the application suite.

Advanced Metering Manager (AMM)

Advanced Metering Manager provides complete support for meter reading, individually or in groups, scheduled or in real time, across a variety of electricity, gas, and water meters. AMM enables the efficient and verifiable collection, management and analysis of consumption, time-of-use and interval data, power quality measures, meter events, meter status logs, and more – delivering market-leading meter reading and meter data management support. Key AMM features include an intuitive web interface or advanced web APIs to allow seamless integration with other mission-critical applications; more accurate billing, near total elimination of manual meter reads, and lower equipment and maintenance costs; and secure management of all types of signals to endpoint devices – whether related to outages, peak pricing, connect/disconnect, load control, or distribution automation.

Network Center

Network Center manages the platform's advanced network communications. Network Center monitors (and alerts) the availability, throughput, utilization, and latency of the Access Points and SocketAPs and associated backhaul service, including cellular backhaul. Network Center also provides visual geographic context by mapping devices using Google Maps, a network tree view to visualize all devices under a specific takeout point, and a traceroute view to show the end-to-end path for a specific device.

Dashboards and Reporting

UtilityIQ and Network Center Reporting put critical information at your Operator's fingertips in an easy-to-read format. Itron's AMI applications come with many pre-defined reports that can be displayed on screen, exported as files for customization, or accessed by external applications through web services. Standard reports and dashboards include:

- » **UtilityIQ reports and dashboards:** Meter Security Report, Interval Gap Report, Event Log Gap Report, Device Inventory Report, Meter Read Report, Last Read Report, and Network Summary Report.
- » **Network Center endpoint management reports:** CPU Utilization, Bandwidth Utilization, Hop Count by Access Point, Meter by Access Point, NAN Utilization, and WAN Availability.

Meter Program Configurator (MPC)

Meter Program Configurator (MPC) enables wireless, remote programming of electricity meters on a mass scale. When MPC successfully configures a meter with a new program and validates it, the meter re-initializes and sends its program to AMM for verification and approval. These over-the-air updates enable utilities to update meter programs to support rate changes or enable TOU or DR programs without onsite visits.

Key MPC features include creation and storage of meter programs for future use; over-the-air transfer of meter programs to eliminate truck rolls for meter updates; management of program approval in

conjunction with AMM; interval width configuration; support for enabling and disabling self reads and off-set times; and automated, recurring audits of meters.

Firmware Upgrader (FWU)

Firmware Upgrader manages remote over-the-air firmware upgrades on NICs, Access Points, SocketAPs, Relays, meters, and other Itron-enabled devices. FWU also audits device firmware versions on a regular basis to ensure compliance. FWU can be configured to automatically upgrade any device found to be running an unexpected version of firmware without further user intervention.

MultiSpeak Integration with Back-Office Applications

UtilityIQ exposes functionality via a well-documented set of web services and JMS queues that allow integration with enterprise applications. Any application can call the web services to perform an action such as a remote disconnect service command, an on-demand read, or an on-demand ping. UtilityIQ has been integrated with a wide variety of customers' CIS, OMS, WOMS, Asset Management, GIS, and SCADA applications. UtilityIQ has also been integrated with most leading meter data management (MDM) systems, including Itron Enterprise Edition MDM, Ecologic Analytics, Oracle Utilities, EnergyICT, and Siemens EnergyIP. The solution supports MultiSpeak 4.1 integration through the Itron MultiSpeak Interoperability Adapter. Current integrations include NISC, MeterSense, Cayenta, and MilSoft, and the adapter can be used for other MultiSpeak back-office applications.

Outage Detection System (ODS) (Optional)

While UtilityIQ provides the outage notification and restoration events transmitted by the meter population, the optional **Outage Detection System (ODS)** does much more. ODS offers a visual presentation of outage severity, location, and restoration, and supports restoration activities by correlating outage and restoration events. Programmable exception policies can also filter and aggregate events by event type or duration. ODS features tight integration with AMM and easy integration with the OMS via secure web services and an enterprise message bus.

Hardware Sample Requirements

The proposed Itron UtilityIQ headend system is designed to run on enterprise class Intel-based servers with accompanying SAN system(s), Red Hat Enterprise Linux operating system, and Oracle Enterprise Edition DBMS. VMware can be used for virtualization. Cisco equipment is recommended for networking support.

For Licensed customers, Itron provides a sizing guide publication for various deployment scopes. Necessary sizing factors include number of meters and meter channels, intervals per hour, data storage requirements, and number and types of environments. For a recent release of UtilityIQ (4.14), a typical medium-size production AMI system would include up to four application servers (8 CPU/64GB RAM/300GB storage each), and one database server (8 CPU/64GB RAM/650GB storage with >500 SAN IOPS); the test environment would include one server (8 CPU/64GB RAM/300GB storage). Recommended terminations routers would include two Cisco 2921 (or latest model) ISRs.

The hardware listed here is indicative and is subject to change depending upon the final deployment architecture, endpoint count, and the software selected. Furthermore, the components are subject to change based upon availability and the technology roadmaps of the underlying vendors. Therefore, to finalize the bill of material upon selection, Itron would like to have an architectural review to finalize the system solution requirements. The proposed system will be similar or equivalent, based on current requirements and component availability. We have included a **sample** bill of materials (BOM) for an AMI system in the table below.

Component	Production Environment / DEV-TEST
Summary	<ul style="list-style-type: none"> Scale up to 1,000,000 endpoints Redundancy, site-to-site and backup options included Standard SLAs apply
Servers	<ul style="list-style-type: none"> 5 Cisco UCS B-200M4 servers, comprised of: <ul style="list-style-type: none"> 3 Application servers with 512GB of memory each 2 Database servers with 384GB of memory each X86 Intel-based CPUs, with 16 cores per server <p>Note: The application servers are configured in a virtual cluster</p> <p>Note: 1 DB server is designated as a bare-metal spare</p> 2 x Cisco UCS 5108 Blade Chassis
Storage	<ul style="list-style-type: none"> Pure Storage FlashArray//M20 <ul style="list-style-type: none"> Up to 43 TB of usable SAN disk space ~100,000 IOPS Data Domain 4200 Backup Appliance 85TB (5:1 compression)
Networking	<p>Cisco Routing Equipment:</p> <ul style="list-style-type: none"> Mix of 10 Gigabyte Ethernet and Fibre Channel networking throughout 2 x Nexus 5K Switches for converged Ethernet and FC routing 2 x Cisco 6248 Fabric Interconnects Cisco UCS 2204 XP I/O modules and SFPs 2 x Cisco ASA 5545X IPv6 enabled firewalls 4 x Cisco 4451 Routers for core and NAN routing 1 x Cisco 2921 Console Router
Infrastructure and Services	<ul style="list-style-type: none"> 2 x Netshelter SX 42U Racks Fully Redundant ServerTech PDUs Three (3) years of Hardware and Software maintenance included Shipping and installation costs included
Third-Party Software	<p>Embedded software licenses:</p> <ul style="list-style-type: none"> Cisco UCS Manager v 2.0 Veeam, Infoblox DNS <p>Not included:</p> <ul style="list-style-type: none"> Oracle Enterprise 12C with Partitioning Tied to Itron Managed Services (software installed on Appliance as part of Managed Services only, but not transferrable): <ul style="list-style-type: none"> VMware VSphere 6.0 and VCenter 6.0 for virtualization Oracle Recovery Manager and VMware Recovery Manager for Backups Splunk logfile management software Assorted open-source software required for system management

Section 6: Requirement Compliance Responses

Itron has included our responses to all individual requirements listed in the requirements attachment (*Appendix A*) in the section below. We confirm the following requirements in the table below in accordance with the instructions in *Appendix J - Section 6: Requirement Compliance Responses*.

Offeror will manage and assist VIWAPA in the ordering of all necessary equipment.	Comply
Offeror will manage all aspects of network deployment including design and surveys, installation and documentation of all network devices, commissioning and verification of connectivity operating as a communication installation vendor or managing a communication installation vendor.	Comply
Offeror will manage all aspects of meter deployment including installation, RTU's (return to utility) and work orders associated with necessary meter service maintenance or replacement as the Meter Installation Vendor (MIV) or managing a sub-contracted MIV.	Comply
Offeror will ensure that no more than 0.5% of the proposed meter exchanges are returned to VIWAPA for their resolution.	Comply
Offeror will be responsible for replacing any meter which does not communicate or fails within 10 days of installation.	Comply
All of VIWAPA's electric meters will be fully covered with the AMI communications or with cellular coverage with a 90% minimum daily data collection performance	Comply
Offeror will operate the solution, AMI as a Service, working in conjunction with and support VIWAPA's AMI Field Operations.	Comply
Offeror technology and components must meet or exceed all ANSI standards and cannot be sourced from China.	Comply

1.2. AMI Functional Requirements

The proposed AMI system and necessary hardware/software components must be capable of supporting all electric meter forms as listed in Appendix F.

Itron Response: Itron supports all meter forms outlined in Appendix F with exception to FM 19S.

Offeror shall provide an AMI Coverage and Capacity Designs that will provide two-way communications to all electric and water meters, as well as any potential distribution equipment, streetlights and selected metering DI (distributed Intelligence) within VIWAPA's service territory. The Offeror is responsible for demonstrating the cellular data coverage for meters and/or network devices is sufficient for the proposed design.

Itron Response: Itron's AMI network coverage design for VIWAPA's service territory is shown above in *Section 2: Network Coverage Plans*.

For all the following requirements, the Offeror shall provide a summary for each requirement as to why the proposed solution Complies or does not comply with the requirements separate from answers provided in the attached Requirements Matrix.

Itron Response: Itron has provided a summary for each requirement listed below describing why our proposed solution for VIWAPA complies or does not comply with the requirements.

1.2.1 Electric Metering / Endpoint Functional Requirements

All electric meters must meet UL2735 at no additional cost to VIWAPA. In addition please provide details of UL Certification, i.e. 3rd party testing labs utilized in the compliance testing.

Itron Response: Our Gen5 Riva singlephase and polyphase meters are UL2735 compliant. See attached certificates of compliance.

All electric meters must support an internal operational temperature of no less than 100C (ideally 125C) and a humidity of 90% non-condensing. Internal components not capable of operating at the proposed minimum temperature must be identified and explanation provided as to how these components are operationally protected through F/W or hardware control. Components in question can include but may not be limited to super capacitors, batteries, temperature compensation devices and LCD.

Itron Response: Gen5 Riva meters support an operating temperature of -40C to +85C.

Itron validates accuracy for the life of the meter through Accelerated Life Testing (ALT). The goal of this Accelerated Life Test program is to assess whether the product meets the required 20-year lifetime and maintains accuracy during this period. ALT testing consists of running the following tests: (The meters are powered with the appropriate voltage (120 or 240 VAC) and current (typically 10A)).

- **Temperature Cycling** – This test condition involves varying the temperature from -40°C to +85°C at a rate of 5 cycles per day. The meters are powered with the appropriate voltage and current.
- **High Temperature High Humidity (“80/80”)** – For this test, the conditions are 80°C and 80% relative humidity for the duration of the test. The meters are powered with the appropriate voltage and current.
- **Meter Farm** – A large number of meters are operated outside, powered with the appropriate voltage, and exposed to the elements. This represents “real-world” field operation.

Accuracy is validated at each read point of the High Temperature, Temperature Cycling and High Temperature High Humidity tests. Meters accuracy must remain within specification at each read point.

All electric meters must comply with all applicable ANSI C12.19 and C12.22 standards, including accuracy class (0.5% for single phase, .2% for Polyphase), data tables, protocols, security including encryption and safety. In the comment section please provide any additional applicable standards that the metering solution meets or complies with such as cellular Cat M1, LTE-M etc.

Itron Response: Gen5 Riva meters comply with ANSI C12.1, ANSI C12.10, and ANSI C12.20. Meters do not support ANSI C12.19 or C12.22. Riva is a global platform that utilizes the IEC 62056 suites of standards commonly known as DLMS/COSEM, which has wider global adoption than ANSI C12.19. Because of the multiple business and technology re-use benefits worldwide, DLMS/COSEM has been chosen as the primary communications protocol for the OpenWay Riva platform. DLMS/COSEM is an application & application transport standard (like C12.19/C12.22) that provides requirements for the data model and data transport to the headend and field tool applications. In October 2019, NEMA's ANSI Accredited Standards Committee C12 completed “identical adoptions” of five IEC TC13 Electricity Metering standards per ANSI's National Adoption Procedures (www.ansi.org/nationaladoption). The DLMS/COSEM standards are published as the following ANSI standards:

- C12/IEC 62056-5-3 ED3 - ELECTRICITY METERING DATA EXCHANGE - THE DLMS/COSEM SUITE - Part 5-3: DLMS/COSEM application layer
- C12/IEC 62056-6-1 ED3 - ELECTRICITY METERING DATA EXCHANGE - THE DLMS/COSEM SUITE - Part 6-1: Object Identification System (OBIS)

- C12/IEC 62056-6-2 ED3 - ELECTRICITY METERING DATA EXCHANGE - THE DLMS/COSEM SUITE - Part 6-2: COSEM interface classes
- C12/IEC TS 62056-8-20 ED 1.0 - ELECTRICITY METERING DATA EXCHANGE - THE DLMS/COSEM SUITE - Part 8-20: Mesh communication profile for neighbourhood networks
- C12/IEC 62056-9-7 ED 1.0 – ELECTRICITY METERING DATA EXCHANGE – Communication profile for TCP-UDP/IP networks

Gen5 Riva polyphase meters meet ANSI standard C12.20 class 0.2 (+/- 0.2% accuracy). Gen5 Riva Singlephase meter meets ANSI standard C12.20 class 0.5 (+/- 0.5%).

DLMS/COSEM provides rapid development based on international standards while allowing flexibility to model any metering and control function or use case. System level integration is easier through the use of standard building blocks. Independent Users Group, such as DLMS UA, help extend the standard, guarantee correct implementation and promote companion specification that guarantee functional interoperability at the object level. DLMS UA provides/endorse a Conformance Test Tool (CTT) that allows DLMS UA members to perform all certification tests and submit a standardized test report to the DLMS UA for issue of a conformance certificate. DLMS/COSEM shows significant benefits when contrasted with ANSI C12 protocol standards in the following areas:

1. Worldwide acceptance - Established presence in Europe and South Africa. Growing acceptance in Asia and strong movement in North America
2. Certification Platform - DLMS UA accreditation using CTT (Conformance Test Tool) to support certification. Not a tool to support ANSI compliance.
3. Testable Interoperability – Support from DLMS UA and IDIS
4. Enhanced Security – Supports all levels of the OSI Model stack. E2E security through 3rd party communications and supporting peer authentication, access rights, multi-layer protection of messages and data security suites, security policies, key management security logs
5. Adaptability/Extensibility – Ease of incorporating new interface classes and OBIS mapping between CIM and DLMS/COSEM
6. Interest Groups Support – IEC, DLMS UA, IDIS, ANSI/USNC TAG13
7. Time to Market – Streamline coding techniques and reuse
8. Efficiency – Lean messaging capabilities; self-describing object modelling; standardized FW image transfer
9. Flexibility – Modern Internet protocol used over any lower layers; mapping to ERP systems
10. Mesh capable – Riva/ACT Platform support via upcoming IEC 62056-8-20 Mesh Communications Profile
11. Proven Multi-commodity support – Electric, Gas, and Water
12. Future Proof

All electric meters must comply with VIWAPAs standards for electric meters, test data, labeling and shipping.

Itron Response: Itron is confident we can meet VIWAPA's meter requirements and standards for test data, labeling, and shipping.

All electric meters must be tested, calibrated and programmed to VIWAPA's Meter Standard prior to being received at the designated VIWAPA or Offerors receiving facility.

Itron Response: Gen5 Riva polyphase meters meet ANSI standard C12.20 class 0.2 (+/- 0.2% accuracy). Gen5 Riva Singlephase meter meets ANSI standard C12.20 class 0.5 (+/- 0.5%). All meters are tested as a unit prior to shipment during our manufacturing process. Below are the details of this process:

The Itron manufacturing process employs a 100% calibration and verification process on all meters manufactured. Additionally, a sample size per lot is sent to a Finished Product Audit (QC Validation) which verifies all calibration readings with an alternate test station. The QC validation also evaluates a fully assembled product from a customer's perspective in regards to programming, firmware, security settings, and customer program parameters, along with any additional information to ensure the meter is working correctly per customer specifications. Below is an overview of meter level testing performed during the manufacturing process.

Polyphase Factory Test

High Potential Testing

- Test Element to Element, Element to N, Element to All Voltage Phases
- Calibration
- Calibrate Voltage, Current, and Energy for each phase
- Calibration points – Unity FL
- Verification Points – Unity FL, Unity LL, 50% Lagging (PF)
- Product Wiring Verification

CES

- Firmware Programming
- Factory Configuration Programming
- Customer Programming
- Ensure no Internal Device errors
- Demand Reset Verification (If applicable)
- Verify Assembly Correctness

Accuracy Verification

- Verify Series FL Accuracy

Final

- Verify Meter Assembly Correctness
- Automated LCD Display Verification
- Verify Network Communications
- Clear Energy Accumulated
- Clear History/Event Logs
- Ensure no Internal Device errors
- *Singlephase Factory Test*
- *Spring Force Testing (if a RD Switch meter)*
 - Verify the RD Switch is applying the proper amount of force on the Line Size terminals
 - Verify the switch opens and closes properly.
 - Internal Resistance Testing (if a RD Switch meter)
 - Verify the resistance from Line to Load of the meter (verify RD Switch to terminal connections are proper)
 - Verify the switch opens and closes properly.
 - High Potential Testing
 - Test Element to Element, Element to N, Element to All Voltage Phases
 - Calibration
 - Calibrate Energy for each phase

- Calibration points – Unity FL
- Verification Points – Unity FL, Unity LL, 50% Lagging (PF)
- Product Wiring Verification
- CES
- Firmware Programming
- Factory Configuration Programming
- Customer Programming
- Ensure no Internal Device errors
- Display Housing - Demand Reset button and RD Switch Button Verification (if applicable)
- Verify Register Assembly Correctness
- Final QA Station
- Verify Meter Assembly Correctness
- Automated LCD Display Verification
- Accuracy FL Verification
- Verify Network Communications
- Verify switch operation (if applicable)
- Clear Energy Accumulated
- Clear History/Event Logs
- Ensure no Internal Device errors

All electric meters must be solid state with no moving parts other than what may be necessary for service disconnect capability. Further the vendor is to provide a detailed overview of their disconnect design, switch reliability, switch rating, testing (include testing under full load), and life expectancy.

Itron Response: The Gen5 Riva meter is a solid state meters with an expected life expectancy of 20 years. The Gen5 Riva meter has no moving parts other than the service switch and when applicable, covers, hangers, and buttons used for operations such as demand reset or service switch user intervention (arming).

The Gen5 Riva service switch is only available for CL200 amp devices and uses an actuator to drive switch operations. The service switch is rated at 5,000 cycles at full load (240V@200 Amps) and 30,000 cycles at now load. A cycle is defined as one (1) open and one (1) close.

All single phase electric meters must support the storage (at least 30 days) and reporting of at least 6 data logging channels of 15-minute data.

Itron Response: Gen5 Riva meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)
- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps

- Minimum
- Maximum
- Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)
- Temperature
- THD/TDD

Interval Length	5 Minutes	10 Minutes	15 Minutes	30 Minutes	60 Minutes
Days of Storage*	60 Days	120 Days	180 Days	360 Days	720 Days
* Note: The days of storage is not dependent on the number of channels selected.					

All polyphase electric meters must support the storage (at least 30 days) and reporting of at least 12 data logging channels of 5-minute data.

Itron Response Gen5 Riva meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)
- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps
 - Minimum
 - Maximum
 - Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)
- Temperature
- THD/TDD

Interval Length	5 Minutes	10 Minutes	15 Minutes	30 Minutes	60 Minutes
Days of Storage*	60 Days	120 Days	180 Days	360 Days	720 Days
* Note: The days of storage is not dependent on the number of channels selected.					

All electric meters must support VIWAPA's current rates and tariffs.

Itron Response: The Gen5 Riva meter, both singlephase and polyphase options, support up to 8 + Total rates for TOU. When the meter is configured with a TOU calendar, all energies and demand values that are selected for measurement will also have the configured TOU rates applied to them. Gen5 Riva also

supports forty-eight (48) rate switches per day, seven (7) daily patterns for a given week, four (4) seasons per year and a 25-year DST calendar supported with 50 holidays/special days.

All electric meters must support the recording of delivered, received and net (delivered - received) energy (kWh, kVARh, kVAh, Power Factor) registers as well as interval data with a granularity of at least 1 Watt-hour or 1 VAR-hour).

Itron Response: Meters are programmable to support up to 20 energy registers. The following energy registers are available in singlephase and polyphase meters:

- Watt hours (Wh): delivered, received, unidirectional, net
 - Per-phase on polyphase in addition to registers above
- Volt-ampere hours (VAh): delivered, received, net
 - Per-phase on polyphase in addition to registers above
- Volt-ampere reactive (VARh): delivered, received, net, Uni, Q1, Q2, Q3, Q4
 - Per-phase on polyphase for delivered, received, net and uni-directional.

Meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)
- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps
 - Minimum
 - Maximum
 - Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)
- Temperature
- THD/TDD

Energy and profile quantities meet the 1-unit hour resolution requirement.

All polyphase meters must support the recording of 4 quadrant energy registers and intervals with a granularity of 1 Watt-hour, 1 VAR-hour or 1 VA-hour.

Itron Response: Meters are programmable to support up to 20 energy registers. The following energy registers are available in singlephase and polyphase meters:

- Watt hours (Wh): delivered, received, unidirectional, net
- Per-phase on polyphase in addition to registers above
- Volt-ampere hours (VAh): delivered, received, net
- Per-phase on polyphase in addition to registers above

- Volt-ampere reactive (VARh): delivered, received, net, Uni, Q1, Q2, Q3, Q4
- Per-phase on polyphase for delivered, received, net and uni-directional.

Meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)
- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps
 - Minimum
 - Maximum
 - Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)
- Temperature
- THD/TDD
- Energy and profile quantities meet the 1-unit hour resolution requirement.

All residential (Single phase) electric meters must support 5-, 15- and 60-minute data logging. Support of multiple LP channels should be explained in detail.

Itron Response: Gen5 Riva meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)
- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps
 - Minimum
 - Maximum
 - Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)

- Temperature
- THD/TDD

Interval Length	5 Minutes	10 Minutes	15 Minutes	30 Minutes	60 Minutes
Days of Storage*	60 Days	120 Days	180 Days	360 Days	720 Days
* Note: The days of storage is not dependent on the number of channels selected.					

All polyphase electric meters must support 1-, 5-, 15- and 60-minute data logging.

Itron Response: Gen5 Riva meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)
- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps
 - Minimum
 - Maximum
 - Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)
- Temperature
- THD/TDD

Interval Length	5 Minutes	10 Minutes	15 Minutes	30 Minutes	60 Minutes
Days of Storage*	60 Days	120 Days	180 Days	360 Days	720 Days
* Note: The days of storage is not dependent on the number of channels selected.					

All electric meters must support the logging and delivery of voltage and current (average, instantaneous, minimum and maximum) data with 5-, 15- and 60-minute data logging.

Itron Response: Meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)

- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps
 - Minimum
 - Maximum
 - Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)
- Temperature
- THD/TDD

Today, meters support whole number resolution for instantaneous data. Itron has roadmapped decimal precision of instantaneous data in a 2024 system release.

All electric meters must capture power quality information and make this information available, based on configuration, through the AMI Network and AMI HES as data and alarms/events.

Itron Response: Support for power quality is standard in all Itron Gen5 Riva meters.

All electric meters must automatically capture a midnight snapshot of all register reads and make them available for retrieval for the 24 hours after midnight.

Itron Response: The meter stores up to 12 self reads.

UtilityIQ AMM interval read schedules run multiple times per day. If a meter is not read on one run of the interval schedules, the next time the schedule runs, AMM will pick up all reads that have not yet been retrieved. For both register data and interval data, there are automatic background recovery schedules that read only the unread meters. These jobs can be configured to run at a specified time, or times.

All electric meters must be capable of recording “rolling” and “block” demand values. Rolling demand subintervals shall include resolution as small as 5 minutes.

Itron Response: Both the Gen5 Riva Single-phase and Polyphase meters support block and rolling demand intervals. Gen5 Riva single-phase meters support the following demand registers:

- Max Watts (delivered, received, net and uni-directional)
- Max VA (delivered, received)
- Max VAR (delivered, received, net, Q1, Q2, Q3 and Q4)
- Min Power Factor (delivered, received)
- Configure up to 6 based on selected energy registers
- Cumulative, Continuous Cumulative, Present, Previous, and Projected supported for each max demand selected
- Min PF includes Present, Previous and Projected
- Block or Sliding Demand: 5, 10, 15, 30, 60-minute intervals supported

All electric meters must reliably manage and support the remote reset of the demand register on a scheduled (e.g. on billing cycle, daily, etc.) or adhoc basis and must record and report the successful reset of demand including time and date of last reset and number of demand resets.

Itron Response: The demand reset schedule is driven by the billing calendar. To change the reset date for a meter, simply change the billing cycle assigned to the meter and stored in the meter attributes in

AMM. This can be done either via the UI or by a web service call. A demand reset can be performed in the field by using the field tools.

All VIWAPA electric meter forms must be either directly supported or a reasonable and suitable alternative be provided. Please refer to Appendix F for list of current meters.

Itron Response: Itron supports all meter forms outlined in Appendix F with exception to FM 19S.

All single phase self-contained electric meters (Forms 1S, 2S (Class 200 and Class 320) and 12S/25S) must support the option of a remote disconnect/reconnect switch that does not derate the class amps or impact temperature characteristics in any way. The disconnect switch must have a safe and reliable operating mechanism which will maintain state during a power outage and have the ability to record the last commanded state.

Itron Response: Gen5 Riva meter Forms 1S CL200, 2S CL200, and 12S/25S CL200 Network are available with a factory-installed optional 200A service switch that allows for remote, fast-response disconnect and reconnect of the customer load to and from the service. The switch is integrated into the meter at time of manufacture. A service switch is not available on auto-ranging voltage meter forms.

The switch is a fully rated 200A switch and supports 30,000 mechanical switches (0A load) and supports 5,000 electrical switches (200A load) @ unity power factor (PF=1).

All single phase electric meters equipped with remote disconnect/reconnect switch must be able to sense and report load side voltage and provide the current state of the switch to the head-end system.

Itron Response: Gen5 Riva meter load side voltage is determined by continuously monitoring the presence of AC voltage on the load side voltage terminals. A request can be sent to the meter to determine the presence of load side voltage. The meter also indicates the presence of load side voltage under the following conditions:

- A command has been sent to request the switch to connect and load side voltage is detected.
- A command has been sent to request the switch to disconnect and after disconnect load side voltage is detected.

All electric meters equipped with disconnect/reconnect switch must report the successful and unsuccessful operation of the switch on the display and through the AMI network.

Itron Response: Itron Gen5 Riva meter, the following switch messages are programmable for the display:

- dSOFF - Meter is disconnected with no load side voltage present
- dSLOAD - Meter is disconnected and load side voltage is present
- dSrEADY - Meter is ready for reconnection and load side voltage is not present
- dSrdYLd – Meter is ready for reconnection and load side voltage is present
- dSErr – Switch error detected

UtilityIQ will report successful and unsuccessful operation of the switch and the state of the switch upon request.

All electric meters must support remote upgrade/reprogramming of any firmware resident in the meter including communications, metrology, HAN, and any other resident firmware. Please provide details in a one- or two-page attachment as to how the communications module can update any meter, regardless of manufacturer, or if it is possible at all.

Itron Response: The Gen5 Riva meter supports updating register and communication firmware but does not support metrology firmware updates remotely.

Firmware Upgrader (FWU) manages over-the-air firmware upgrades on Itron devices and partner meters. FWU supports both code push and code float operations, upgrade management, firmware image management, and upgrade project history.

FWU upgrades firmware on individual or groups of devices directly, or through a scheduled audit job. The audit job includes a group of Network Interface Cards (NICs) or meters to audit, the target firmware image to look for, and the frequency of the audit (e.g. daily, weekly, monthly). Devices that fail the audit (i.e. are not running the required version of firmware) can be automatically added to a new upgrade job.

For NIC and Meter firmware upgrades, FWU uses a seeding method, and a small percentage (usually 3%) of NICs is “seeded” with the new firmware image. The remaining NICs receive a copy of the firmware image from the seeds. This process of distributing firmware to all devices is known as the “code float.” Once all NICs have received the image, each is restarted and reboots into the new firmware. This process is known as the “code flip.” In case of any errors encountered during upgrade, the NIC automatically reverts to the previous version.

For all upgrades, the FWU acknowledges, logs, and tracks upgrades, allowing the operator full transparency into the status of each device on the network. Firmware upgrade traffic is done as a lower priority process, so it will not affect normal network performance.

All electric meters and programmable endpoints must provide verification of success or failure for any configuration change (meter program) or firmware upgrade.

Itron Response: The Gen5 Riva meter supports verification of success or failures for any configuration change or firmware upgrade.

Firmware Upgrader (FWU) manages over-the-air firmware upgrades on Itron devices and partner meters. FWU supports code push and code float operations, upgrade management, firmware image management, and upgrade project history.

FWU upgrades firmware on individual or groups of devices directly or through a scheduled audit job. The audit job includes a group of Network Interface Cards (NICs) or meters to audit, the target firmware image to look for, and the audit frequency (e.g., daily, weekly, monthly). Devices that fail the audit (i.e., are not running the required firmware version) can be automatically added to a new upgrade job.

For NIC and Meter firmware upgrades, FWU uses a seeding method, and a small percentage (usually 3%) of NICs is “seeded” with the new firmware image. The remaining NICs receive a copy of the firmware image from the seeds. Distributing firmware to all devices is known as the “code float.” Once a NIC has received the image, each is restarted and rebooted into the new firmware. This process is known as the “code flip.” If errors are encountered in the code float, the NIC will not use the proposed image and will log an error. FWU will recognize the error and attempt another upgrade.

For all upgrades, the FWU acknowledges, logs, and tracks upgrades, allowing the operator full transparency into the status of each device on the network. Firmware upgrade traffic is a lower-priority process, so it will not affect normal network performance.

Meter Program Configurator (MPC) enables remote over-the-air programming and auditing of electricity meters on a mass scale. MPC securely distributes meter program files following either the meter’s native programming format or XML. Using code push or point-to-point distribution, MPC can be configured to reprogram individual meters, meter groups, or the entire meter population.

When Meter Program Configurator successfully configures and validates a meter with a new program, it automatically notifies UtilityIQ of the change. To ensure the new program is secure, the meter sends its updated program to UtilityIQ for verification and approval.

All electric meters must be capable of being reconfigured remotely (over the air by the AMI HeadEnd System) with respect to data logging, register collection, event reporting, event threshold, etc. Please provide details in a one- or two-page attachment as to what remote configurations result in a loss or reset of data in the meter.

Itron Response: All meters are capable of being reconfigured remotely using Meter Program Configurator (MPC). Meter programs are created using Itron Device Configuration Manager and pushed over the air via MPC. MPC enables remote over-the-air programming and auditing of electricity meters on a mass scale. MPC securely distributes meter program files following either the meter's native programming format or XML format. Using code push or point-to-point distribution, MPC can be configured to reprogram individual meters, meter groups, or entire meter populations. When MPC successfully configures and validates a meter with a new program, it automatically notifies AMM of the change. To ensure the new program is secure, the meter sends its updated program to AMM for verification. Meter reconfiguration does not cause a loss or reset of data unless billing attributes are changed.

All electric meters must have a temperature sensor and generate high temperature alerts with the ability to detect hot socket issues and send error messages/flags accordingly. Vendor is to provide a 1- or 2-page attachment describing how the temperature sensor is used, the location of the temperature sensor within the meter, the algorithm and configurations available to determine that a high temperature alert should be generated and one or two reference utilities where the temperature sensing capability is deployed and in use.

Itron Response: The Gen5 Riva meter is equipped with temperature sensor located on the metrology. The meter monitors its temperature and reports to the head end when it exceeds the configurable threshold so that the system can identify meters that have potential overheating conditions. If the meter has a service switch it can be disconnected remotely by a command from the utility company. The configuration includes two temperature thresholds (°C) for event and alarming purposes. When a threshold is exceeded, the meter logs an event and sends an alarm to UtilityIQ. The configuration includes user defined hysteresis (°C), to prevent excessive event logging. Hysteresis defines the number of degrees the temperature must fall below Threshold 1 before returning to normal condition. When the meter's temperature falls below this hysteresis value it records a temperature restored event and sends an alarm. The configuration includes a randomization period. This is the number of seconds that must elapse before a new event is logged.

Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

All electric meters must have the capability to “arc” detect. Please include a 1-page attachment on the ability to detect arcing and how the event is identified and reported to the head-end system.

Itron Response: Gen5 Riva meters also come standard with Arc Detection. This feature allows you to monitor arc conditions, while providing early awareness, so corrective actions can be taken. When an arc is detected at the meter socket, the event is captured with a date/time stamp and if configured, sends an alarm. When the event is cleared, it is captured with a date/time stamp and sends a subsequent alarm.

When the number of arcs detected in a block (controlled by Arc Recognition time) exceeds the Arc Recognition Threshold for several contiguous blocks (controlled by Number of consecutive time period), the meter captures an arc detection triggered event and sends an alarm up to UtilityIQ. The arc detection algorithm remains in the triggered state until it receives an acknowledgment from UtilityIQ. Once an arc

detection has been acknowledged, the arc detection state moves to the "clearing" state. Additionally, the applicable counters continue to increment in the triggered state. When the meter no longer detects arc incidents in excess of the Clear Recognition Count Threshold for several contiguous blocks, the arc detection algorithm is deactivated from the "clearing" state, and the meter logs a corresponding cleared event and returns to the enabled state.

Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

All electric meters must sense and report the electric phase serving the meter and alarm if the phase(s) change as part of the site monitoring or diagnostics.

Itron Response: Gen5 Riva meters support voltage monitoring and profiling of average, instantaneous, minimum and maximum voltage for all phases, as applicable for the meter form. Meters are also programmable for average voltage high and low thresholds. When these thresholds are enabled, the interval data for each phase is compared with the configured thresholds at each EOI. If it is below or above the configured average threshold, corresponding events are recorded, and alarms are sent to the headend.

Voltage monitoring also supports the monitoring of RMS instantaneous voltages with programmable high and low voltage thresholds. When enabled, the meter monitors instantaneous voltages and tracks minimum and maximum voltages for each phase. If the minimum voltage is below the desired RMS voltage low threshold or above the maximum RMS voltage high threshold, it will log an event and send an alarm to the head end.

In addition, the polyphase meter includes SiteScan diagnostics that can continuously monitor the site for metering installation or tampering problems through the system and installation diagnostic checks. The following programmable diagnostic checks can be enabled by the system:

- Diag 1 – Cross phase, Polarity, Energy Flow Error
- Diag 2 – Phase Voltage Deviation Error
- Diag 3 - Inactive Phase Current Error
- Diag 4 – Phase Angle Displacement Error

All electric meters must identify which substation is serving the meter and if the substation changes.

Itron Response: Itron's AMM system can be populated with a utility's grid topology to identify which meters map to a particular substation, phase, or transformer. This capability utilized by Itron's optional OO product or using the DI Location Awareness application on a Gen5 Riva meter.

The AMI electric meters must not require any manual configuration during discovery or provisioning.

Itron Response: Itron has adopted a "hang and run" approach to its solution, meaning the deployment and maintenance of the network requires little to no human intervention. At the network level, the RF mesh network is self-configuring, self-optimizing, and self-healing. All devices auto-provision and require no configuration in the field as part of the installation process.

Meters are preconfigured and tested at the factory. The installer mounts and energizes the new meter, waits for the meter to signal or display its network connectivity, then proceeds to the next meter install.

AMM has visual representations to watch endpoint lifecycle from discovery through the various states to become active on the network. This fully automated discovery process significantly reduces meter installation costs as each installation can be accomplished in minutes.

All electric meters will be supported but Meter Tools suitable for meter shop and field use with the ability to interrogate, program or functionally test the meter metrology and communications.

Itron Response:

Meter tools – Field Service Unit (FSU) is a secure and compact handheld device that uses radio frequency to communicate with any Itron-enabled network devices. When used with the PC-based applications such as FDM Tools and Communications Tester. Itron provides portable field tools for network equipment and endpoint maintenance and troubleshooting. Itron's offering includes network field tools as well as software-based tools for the meter shop.

For mains-powered device support, Itron provides FDM Tools for secure local access to meters for incoming inspection, installation, and maintenance activities. A Field Service Unit (FSU) is used in conjunction with Field Service Unit-Secure Access Manager (FSU-SAM) to obtain security material to ensure a secure the connection with Gen5 Riva devices. FDM Tools uses only the security credit feature of the FSU device and communicates to Gen5 Riva devices via a 2.4Ghz Wi-Fi connection.

Network tools – Field Service Unit (FSU) is a secure and compact handheld device that uses radio frequency to communicate with any Itron-enabled network devices. When used with the PC-based application Communications Tester, the FSU enables authorized field staff to perform a full range of diagnostics, configuration, meter reads, firmware upgrades and other troubleshooting features.

All AMI electric meters must support Distributed Intelligence apps which can be downloaded remotely to the meter.

Itron Response: Comply. Itron's Gen5 Riva meter proposed for VIWAPA fully supports DI today, while Aclara and Honeywell are working to integrate our DI NIC into their metering hardware.

1.2.2 AMI Communications Network

All communications equipment must meet the applicable FCC standards for the frequency of operation.

Itron Response: All mesh radios comply with FCC Part 15.

Itron's network communications equipment operates within the unlicensed 900 MHz ISM band, a frequency range that is regulated by the Federal Communications Commission (FCC). The operation of our system does not necessitate an FCC license as it adheres to the stringent requirements set forth by the FCC for this specific band.

All network equipment must meet applicable ANSI and NEMA standards. Vendor is to provide a list of all applicable and compliant standards.

Itron Response: The Itron Gen5 Network Interface Card (NIC) meets all the requirements outlined in NEMA SG-AMI 1-2009 sections 3.4, 3.5, 3.6, and all of section 4. APs and Relays are IP65.

All communications equipment must provide two-way communications to all levels of the network.

Itron Response: APs provide two-way connectivity between metering endpoints and the headend system. APs offer multiple paths to each endpoint. Sophisticated mesh network routing ensures greater reliability and redundancy. APs also provide WAN connectivity through IP-based wireless (e.g., Cellular, WiMAX) or ethernet backhaul.

The AMI communications network, if based on open communications standards, must fully comply with the standard. Vendor shall describe all standards supported for both present and future releases of the network.

Itron Response: Itron supports the following industry standards:

- IP Addressing: IPv6, IPv4; Simultaneous support for large address space, multi-homing, stateless auto-addressing, prioritization, legacy systems, and WAN connectivity
- Networking Protocols: IEEE 802.15.4g, MAC/L2: TIA TR-51 (Wi-SUN)
- IP protocols: UDP, TCP, PPP, DHCP, DNS, NTP, IPsec, SNMPv2/3, ICMP, CoAP, and more
- DA Protocols: DNP3 (IEEE Std. 1815-2012), IEC 60870-104, IEC 61850, Modbus serial, TCP/IP
- Meters: DLMS/COSEM, ANSI
- Home Area Networking: G3, ECHONET Lite, ZigBee via 6LoWPAN, ZigBee SEP 1.1, IEEE 802.15.4 radio at 2.4 GHz, IEEE P1901 (participant)
- Interfaces: Serial (RS-232), Ethernet (RJ45)
- Back-office Applications: Standard web services interfaces or APIs; Web services are defined in a Web Service Description Language (WSDL), which is based on XML; Data formats supported include MultiSpeak, CIM, SOAP, XML, HHF, IEE, and delimited. In addition, the solution uses a Java Messaging Service (JMS) queue where other applications, third-party systems, or an Enterprise Service Bus (ESB) can subscribe and consume application messages from the queue.

The AMI communications network must cover 100% of VIWAPA's meters/endpoints and selected alternative meters: refer to the attached document for meter types and forms.

Itron Response: SLA's and Read Rate performance requirements will be agreed upon together with VIWAPA at contract negotiations. As shown in the proposal response *Section 2: Network Coverage Plans*, our AMI communications network will cover 100% of VIWAPA's meters/endpoints.

The AMI communications network must cover 100% of VIWAPA's electric meter population; refer to the meter locations within VIWAPAs service territory.

Itron Response: See answer to the question above.

Vendor is directed to provide a 2 or 3 page write up describing how the proposed network will support communications to all applicable endpoints at the required performance levels as specified in this requirements section. VIWAPA expects that any AMI meter will be discovered as quickly as possible after its installation and will perform at a minimum performance level within 24 hours of installation. Include any limitations of the communications network which preclude meeting this requirement.

Itron Response: Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

Vendor is directed to provide utility references and a subsequent reference plan indicating how the vendors technology supports similar meter deployments in a similar island environment supporting rural and urban network design.

Itron Response: See *Section 3: Customer References and Experience* above for utility references.

The AMI Communications network must be scalable to meet VIWAPA's data and growth needs including the potential strategic deployment of 5% DI meters if so desired at some point in the future. Describe how the proposed network can scale to support regional or localized growth and any potential limitations that could negatively impact the proposed design.

Itron Response: Itron has designed VIWAPA's AMI system to meet this requirement. Itron provides a true multi-application, high-performance, and scalable solution. As VIWAPA's needs grow, the network can easily scale to meet future requirements. Itron has a proven track record of system scalability with more than 40 million GenX devices deployed around the world and performing to stringent requirements. Itron has demonstrated the scalability of more than 5.5 million connected devices on a single network.

- **Network:** One key benefit of the Itron solution is its ability to scale horizontally. At the network level, additional Access Points can be strategically added for additional capacity. Frequency-hopping Spread Spectrum (FHSS) technology and standards-based mesh networking allow efficient spectrum reuse.
- **Back Office:** Back-office software is also readily horizontally scalable, allowing additional components to be added to cater to larger numbers of devices. For example, multiple instances of the module responsible for meter data collection (Global Meter Reader, GMR) can be deployed to cater to millions of devices.
- **Backward Compatibility:** Nearly every customer using this platform has seamlessly integrated multiple hardware generations over time with no stranded assets or forced upgrades. Itron has many customers with second-generation hardware operating in mixed networks with third-, fourth-, and fifth-generation hardware. Customers like FPL have had Itron hardware in the field for over 16 years and do not plan to retire the older hardware.

The AMI Communications network must support remote firmware upgrade and electric meter program to all endpoint devices and all network devices. Provide additional details on the firmware upgrade process, the management of upgrades via HES or other means and the safeguards in place to prevent endpoint or network equipment upgrade failures. Vendor is instructed to provide a 1-2 page attachments describing firmware upgrade capabilities of the network and how this process recovers from outages during the download, or installation process.

Itron Response: Itron AMI solutions support firmware download operations to endpoints both over-the-air using headend software as well as onsite using field tools. All methods provide success or failure verification of the firmware upgrade process.

For Gen5 network endpoints, FWU manages over-the-air firmware upgrades on Itron devices and partner meters. FWU is part of the UtilityIQ suite and supports both code push and code float operations, upgrade management, firmware image management, and upgrade project history. For NIC and Meter firmware upgrades, FWU uses a seeding method, and a small percentage (usually 3%) of NICs is "seeded" with the new firmware image. The remaining NICs receive a copy of the firmware image from the seeds. FWU acknowledges, logs, and tracks upgrades for all upgrades, allowing the operator full transparency into the status of each device, including success or failure, throughout the process.

In addition to managing firmware upgrades, FWU includes an audit function. Audits are network jobs that query and compare the NICs for the current Meter Firmware version to the required version. Audits can be configured to automatically launch an upgrade job to remediate any devices that are running the wrong firmware version. FWU software component provides Deployment Summary, Audit Job details, Audit History, Upgrade History, and Alerts to help manage the upgrade process.

Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

The AMI Communications network must support real-time events or alarms from all endpoint devices. Please describe how the events and alarms are prioritized and routed. How does the AMI system deal with large outages, for example island wide outages or

Itron Response: Meters and network devices collect a variety of events and alarms including tamper, reverse energy, outage and power restoration, temperature monitoring, and arc detection (supported on single-phase and polyphase meters). The meters automatically send these events and alarms to the UtilityIQ headend system, which records, stores, and exports them for historical analysis. Events configured as alarms are immediately sent upstream and available in standard reports. Web services and message queues can share alarms with relevant upstream systems. Normal (non-alarm) events are bundled and sent to the AMI headend system with the next scheduled read job (e.g. every four hours).

When power is lost, meters send a power outage notification, or "last gasp" message to a neighbor node, which forwards the message to an Itron event handler in the head end. To ensure that outage messages arrive at the back-office, the node forwarding the outage message will continue to relay its message until the back-office software acknowledges receipt. This forwarding node will also bundle received last-gasp messages for more efficient transmission, which reduces congestion on the network and increases the percentage of last gasps reaching the head end.

When power is restored to a node, a similar process takes place. The restored node immediately sends a power restoration notification to a neighboring node (which is still powered and registered on the network). The receiving node forwards a restoration message that the headend must acknowledge. Acknowledgments and retries, in both cases, significantly increase the likelihood of successful message delivery, even in the harsh network environment of an ongoing outage. This helps eliminate uncertainty and allows utilities to efficiently direct crews on the ground to complete all restoration work while still in an affected area. This outage detection and restoration architecture also eliminates the need to sweep the network with pings to discover restored nodes, since notifications are reliably sent as soon as network infrastructure can deliver them.

The AMI Communications network must support message prioritization and ensure that firmware upgrades do not impact the network availability for data collection, endpoint control and endpoint events. Provide message prioritization hierarchy, example startup vs last gasp vs reads vs remote disconnect/reconnect.

Itron Response: During the firmware download process, message priority maintains reliability for normal metering operations like meter reading, outage reporting, and connect/disconnect operations. For example, firmware upgrade messages are configured to be a lower priority, while service disconnect events are configured for a higher priority. This ensures that when disconnect events are issued, they are processed before the firmware upgrade messages and get priority in the outgoing queue at each node in the mesh.

During the actual firmware upgrade process, the image upgrade and subsequent flip to a new image do not impact meter reading, outage reporting, and restoration operations. Specifically, if a device loses connectivity because of an outage during the image download, the system still boots on the current configuration without any impact, rejoins the network, and downloads the image again. No device ever boots on bad firmware when getting the image from a network. Meter readings are always protected.

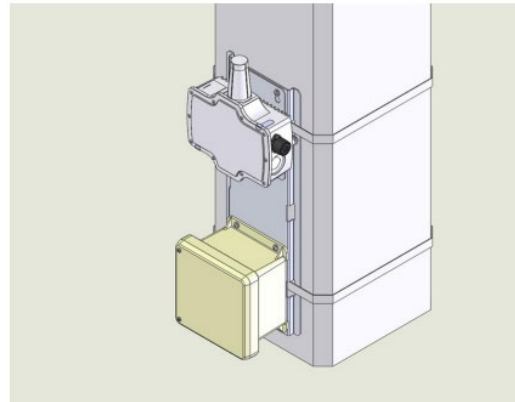
All AMI Communications network devices must continue to operate for at least a minimum of 6 hours following a power outage. Please provide a 1- or 2-page overview of your battery backup solution, mounting requirements and provide an overview and timeline for maintenance requirements for both deployed and in storage network devices.

Itron Response: The APs and Relays all have several options for battery backup. The standard battery will operate the AP for a minimum of 8 hours. The exception is the SocketAP, where the battery is built in

and will run for ~10 minutes. SocketAPs provide the most cost-effective solution to meet the network performance, coverage, and use case goals.

UtilityIQ remotely supports device management and can actively monitor battery life in battery powered devices. The standard battery backup for APs or Relays, have a replacement cycle of 5 - 7 years for lead acid batteries or 10 years for Lithium Itron Phosphate batteries is typical. These batteries utilize "quick connect" connections to the AP or Relay and are easily field replaceable.

Traps are sent when these devices go on battery power, and when AC Power is Restored. On battery power, there are two low battery warnings – 50% approx. charge and then 20% approx. charge. The images below show an AP, backup battery pack, mounted to a pole via a saddle mount bracket and pole mount bracket.



Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

What happens if these batteries die? Does a truck need to roll?

Itron Response: The APs and Relays are equipped with an eight-hour battery backup. The minimum battery operation time is eight hours, but batteries often last much longer. Battery health is monitored in Network Center, and alerts are sent when a Relay or AP is near 50% and again when it is critically low (near 20%). When the battery reaches end-of-life, it will need on-site replacement.

The Communications network must support QoS. Please provide details on how the QoS derived i.e. link quality and signal strength. If the proposed solution supports BER metrics, please provide additional details.

Itron Response: Itron supports QoS in the mesh by prioritizing either different Differentiated Service Code Points (DSCP) for encrypted (IPSec) traffic or the destination port for unencrypted traffic. Differentiated services implementation works by mapping a utility-specified DSCP value to one of three-layer two mesh priorities. In this manner, outbound traffic (to the mesh) is prioritized according to priorities set by other applications or routers. Inbound traffic (to the back office) can be prioritized similarly.

The AMI Communications network should provide for the daily collection of registers and intervals at better than 99.5% reliability (e.g. 99.5% of the registers (midnight snapshot) and 99.5% of the intervals from yesterday must be received and available at the AMI HES by (6:00AM) today). Please provide a 2-to-3-page description, as an attachment of the daily collection of data from all proposed endpoint devices. This description should provide an architecture description of all data flows and transports along with timelines and specifics for retries and data gap filling.

Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

The proposed communications network must support, at a minimum, 98% of On-Demand reads, Demand resets and/or Disconnect/Reconnect commands being successfully completed within 30 seconds. Please describe how the proposed network will support this operation within the required time frame.

Itron Response: The mean response time to a single on-demand meter read request or command depends on the time to traverse the network and the time for the meter to perform the requested operation. For the VIWAPA network design, the time to traverse the network is typically under one second. However, the time to perform the operation depends heavily on the type of meter and command. Typically, most meters are read in less than seven seconds. In that case, the total time of the read operations is under eight seconds. For some meter types and commands, the time to perform the operation can vary significantly - some meters take 15 seconds, while a few meters take 30 seconds and sometimes more.

1.2.3 AMI Head End System Operational Requirements

The AMI Head End System must operate with virus protection software.

Itron Response: Itron incorporates virus detection capabilities with software platforms and solutions at risk of virus exploits. Virus signatures are updated daily over the Internet directly from the antivirus software vendor and are validated by the vendor. Our application UtilityIQ runs on the Red Hat Linux platform, which does not have anti-virus software installed as part of our standard implementation, but because the headend will be hosted by Itron, VIWAPA can optionally request AV software be installed.

Itron's internal security controls are based on security industry best practices derived from ISO 27002. These controls include physical and environmental security, operational security, security of third parties, system security, virus and malicious code protection, network security management, media handling, backups, monitoring, access control, vulnerability and patch management, and incident management.

The AMI Head End System must have application-level alerts.

Itron Response: The proposed Itron AMI system complies with standards-based logging guidelines documented in NIST SP 800-92. Several facilities, including a JMS message queue for security events, security event reports, Syslog, and SNMP traps, exist that can direct security data to centralized log hosts and Security Information and Event Management (SIEM) systems to provide 24X7 security monitoring and alerting. Itron's Network Center application - which serves as the NMS for the AMI network - provides audit capabilities that allow system operators to verify the integrity of meter configuration and monitor the availability and performance of meters in production.

The Itron AMI system provides real-time asynchronous alerts from all the RF mesh devices via the UIQ application. VIWAPA's SIEM can subscribe to the UIQ trap service and collect these traps in real-time for analysis. The AMI application also collects event logs retrieved from all the end devices periodically. The event logs can be set up to generate security reports (exports) or generate feeds into VIWAPA's SIEM.

The AMI Head End System software must include sufficient documentation and training to allow VIWAPA to operate without use of Vendor professional services.

Itron Response: As part of the offering, Itron is proposing a hybrid SaaS deployment model where VIWAPA would purchase a perpetual license for the software application(s), but Itron builds, owns, and manages the back-office infrastructure and software at an Itron secure data center. VIWAPA would own and maintain the meters and network elements. With this option, software licenses (and associated

software maintenance) are unbundled from the monthly SaaS fee, leaving only an ongoing managed services fee for hosting and maintaining the applications.

All Itron products come with thorough user documentation via online and printable PDF documentation. Examples include installation guides, System Architecture and Sizing Guides, user manuals, and online help.

All HES data must be stored in database. Use of flat files or other non-database mechanism for storage of AMI data is unacceptable.

Itron Response: Comply. The proposed UtilityIQ HES utilizes an Oracle database.

The AMI HES must include standard reports and dashboards for the monitoring and reporting of the data collect and communication performance and exceptions, as well as the operational status of each metering or network device. Vendor must provide list of standard reports, preferably with examples or screenshots.

Itron Response: UtilityIQ provides many pre-defined system management reports that can be displayed on screen or exported as files or accessed by external applications through web services. Many of these reports can be customized, such as modifying the frequency with which they run, device groups to run against, device types as in electric, gas, and water, etc. The following standard reports are available:

- Meter Security Report
- Interval Gap Report
- Event Log Gap Report
- Meter Last Read Report
- Remote Service Management Report
- Device Inventory Report
- Meter Read Report
- Full Device Synch Report
- Gas Excess Flow Report
- Low Battery Report
- Network Summary Report
- Device Success Report

In addition, device data can be readily exported for processing and analysis within other tools. UtilityIQ comes with the following Dashboards:

- Daily Data Collection: Load Profile and Register Read
- Completed/Upcoming Schedules Dashboards
- Completed/Upcoming Billing Cycles Dashboards
- Demand Reset Statistics
- Network Status
- Backbone Status
- Firmware Upgrader Dashboards - Active Audit Jobs, FW
- Deployment Summary, Alerts
- Meter Program Dashboard

Itron's Network Center provides a comprehensive toolset for remote network monitoring. Background jobs monitor the communications health and operational status of all devices on the network and provide results in the form of alerts, reports, and dashboards. There are also automatic (and configurable) ping jobs that monitor the status of Active and Unreachable devices on a frequent basis. Deployment status is

displayed on the UtilityIQ AMM Network page. In addition, Network Center can report on hop counts, AP to endpoint relationships, round trip times, packets in flight, and many more.

The AMI HES must support network-monitoring capability. In a 1- or 2-page attachment provide details on the network monitoring capability and how network performance is monitored on a daily basis.

Itron Response: Comply. Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

The AMI HES must have rules-based login capabilities with privileges. The AMI HES must integrate with VIWAPA's standards/ solution for the assignment of such rules. HES must support single sign on using Active Directory out of the box.

Itron Response: UtilityIQ is accessed through an intuitive web client interface. Users, with roles and privileges, are created and maintained in a Central Authentication / Authorization Service (CAAS). Roles and privileges limit what a services a user may see or commands and data a user can access and execute. VIWAPA can tailor users to very specific privileges and needs. Within the screens the user has access to, the screens themselves are not customizable by the user.

The CAAS does support active directory. The active directory is supported for the authentication portion of the solution. This allows a single password to access the Itron solution and the utilities internal applications. The authorization portion must still be provisioned so that users are given permissions to only use certain portions of the AMI solution. Single sign on only applies to the Itron applications within Utility IQ.

The AMI HES must support the automated device discovery and configuration of installed devices.

Itron Response: The Itron Gen5 AMI network takes a “hang and run” approach to its solution, meaning the deployment and maintenance of the network requires little to no human intervention. At the network level, the RF mesh network is self-configuring, self-optimizing, and self-healing. Devices, once installed and powered up, auto-provision and require no configuration in the field as part of the installation process.

From the back-office, UtilityIQ AMM has visual representations to watch an endpoint lifecycle from discovery through the various states to become active on the network. An “Active” meter means that AMM has all necessary information for that meter and it has been found to be communicating on the network. Once a meter becomes active, it gets added to the appropriate dynamic groups in AMM triggering the inclusion of the meter in the automated data collection process.

While AMM helps to track deployments through the device status and details tables, the information displayed relates to provisioning flow and is device centric. For an overall deployment view, Network Center provides detailed network-centric feedback.

- Network Center dashboard provides at-a-glance summaries of total devices deployed (by type), aggregate WAN bandwidth utilization, and aggregate hop count / path cost distributions.
- Report visualizations in Network Center are specifically engineered to expose outliers - median hop count / costs across Access Points (APs) display easily on one page, so relative differences stand out.
- Network Center geographically displays meters by Access Point (or set of APs) by hop count or by path cost.

The AMI HES must include the complete database schema to allow custom reports and queries to be developed against the system.

Itron Response: Because UtilityIQ's AMM database is a critical operational component of the application, allowing users to query the database is not recommended. Doing so can cause issues with business-critical processes, such as meter readings and exports. All of the data from AMM is available via web services for Customers to build reports after subscribing to its preferred IT tools of choice. If customers insist on direct access to the database, the database provisioning must be modified to allow for overhead, and an ongoing statement of work is required to receive support from the Solution Architect team. Itron offers a query-runner service to assist utilities with building custom database queries.

The AMI HES must support integrations through MultiSpeak Version 4.1 and must maintain compatibility with the any upgrades. Vendor must provide a complete manual of standards interfaces supported including the supported version of MultiSpeak (versions, web methods, etc.).

Itron Response: UtilityIQ AMM exposes functionality via a well-documented set of public web services as well as MultiSpeak 4.1 interfaces that allow integration with enterprise applications such as OMS, GIS, and SCADA. Itron has a number of customers integrated with NISC via MultiSpeak 4.1 for MDMS/CIS and anticipates testing OMS integration with NISC for an upcoming MultiSpeak release.

The AMI Solution must support the integration to Harris MeterSense MDMS as well as Naviline CIS (please provide a list of billing systems supported).

Itron Response: Itron's solution supports integration via MultiSpeak 4.1, XML, CMEP, and other protocols. Current integrations into both CIS and MDMA systems include Milsoft, NISC, Meridian/SEDC, Harris MeterSense, Cayenta, and others. Integration to CIS, MDMS, and other utility systems is typically accomplished by the CIS/MDMS provider and tested in cooperation with Itron Delivery Services.

The AMI HES must manage the associated AMI network equipment providing configurable reports on system status, health, and connectivity though all levels of the network.

Itron Response: Itron's Network Center and UtilityIQ applications provide a comprehensive toolset for remote network monitoring. Background jobs monitor the communications health and operational status of all devices on the network and provide results in the form of alerts, reports, and dashboards. There are also automatic (and configurable) ping jobs that monitor the status of Active and Unreachable devices on a frequent basis. Deployment status is displayed on the AMM Network page.

In addition, UtilityIQ AMM has meter read reports, backbone status reports, and traceroute reports to provide indications of connectivity. Network Center can report on hop counts, AP to endpoint relationships, round trip times, packets in flight, and many more.

The AMI HES must include tools to monitor performance of AMI Network and overall AMI solution in order to identify baseline performance and recognize any performance deterioration.

Itron Response: Itron's included UtilityIQ component Network Center provides a comprehensive toolset for remote network monitoring. Background jobs monitor the communications health and operational status of all devices on the network and provide results in the form of alerts, reports, and dashboards. There are also automatic (and configurable) ping jobs that monitor the status of Active and Unreachable devices on a frequent basis. Deployment status is displayed on the AMM Network page.

In addition, Network Center can report on hop counts, AP to endpoint relationships, round trip times, packets in flight, and many more.

The AMI HES must manage firmware versions, initiate upgrades, and validate results.

Itron Response: Firmware and new configurations can be downloaded to the meter through the network from the headend via the Firmware Upgrader (FWU). Register and communications firmware are supported. The meter logs an event and optionally sends an alarm when a firmware image has been successfully downloaded. The meter also logs an event and sends an alarm if a firmware download fails. Meters validate the firmware hash for firmware download logging. The meters and system support the ability to abort the firmware download, log an event, and, optionally, send an alarm when a download is aborted. If a firmware download is aborted or fails, the meter recovers from this and resumes normal operations with the firmware running in the meter before the failure or abort. Failed upgrades will be reported, and the devices will not boot to the new firmware image.

Firmware Upgrader (FWU) manages over-the-air firmware upgrades on Itron devices and partner meters. FWU supports code push and code float operations, upgrade management, firmware image management, and upgrade project history.

FWU upgrades firmware on individual or groups of devices directly or through a scheduled audit job. The audit job includes a group of Network Interface Cards (NICs) or meters to audit, the target firmware image to look for, and the audit frequency (e.g., daily, weekly, monthly). Devices that fail the audit (i.e., are not running the required firmware version) can be automatically added to a new upgrade job.

For NIC and Meter firmware upgrades, FWU uses a seeding method. A small percentage (usually 3%) of NICs is “seeded” with the new firmware image. The remaining NICs receive a copy of the firmware image from the seeds. Distributing firmware to all devices is known as the “code float.” Once a NIC has received the image, each is restarted and rebooted into the new firmware. In case of any errors encountered during an upgrade, the NIC will not boot to the proposed image but will instead log an error.

The AMI HES must support grouping of devices for the purposes of specific operations such as outage management, voltage optimization, etc. The AMI HES must have interfaces, tools and services to manage these groups.

Itron Response: Devices can be grouped either as a list of specific devices (static group) or logically based on device attributes (dynamic group). A static group is an explicit list of devices. The operator manually adds and removes devices via the UI or bulk import file. Dynamic device groups include all devices that meet a configurable list of specific attribute values such as All Active Meters. All devices that meet those attribute values automatically belong to the group.

For example, an “Active” meter is one for which AMM has all necessary information and which was found on the network and is, therefore, ready to read. The default meter read schedules are set up to read all meters in the “Active Meters” group. As new meters become active, they automatically join the group and are therefore automatically on the meter read schedule.

As meters are replaced, perhaps because of maintenance, they automatically leave the group (and therefore are automatically removed from the meter read schedule). The AMM operator does not need to remember to add meters to meter read schedules or remove meters from them.

AMM read schedules (e.g. power quality read, voltage read, bellwether metering, etc.) can be setup against specific groups of devices setup by the users.

The AMI HES must have the ability to autonomously monitor the health of the system and provide messaging or alarms to VIWAPA’s personnel in the event of operational issues.

Itron Response: As part of the offering, Itron is proposing a hybrid SaaS deployment model where VIWAPA would purchase a perpetual license for the software application(s), but Itron builds, owns, and manages the back-office infrastructure and software at an Itron secure data center. VIWAPA would own

and maintain the meters and network elements. With this option, software licenses (and associated software maintenance) are unbundled from the monthly SaaS fee, leaving only an ongoing managed services fee for hosting and maintaining the applications.

Itron also proactively monitors the field network 24x7 and reports on miscommunicating network backbone devices for the customer's on-site remediation. Plus, network uptime is safeguarded through Read Rate SLAs.

VIWAPA will have access to UtilityIQ and Network Center applications, which provide a comprehensive toolset for remote network monitoring. Background jobs monitor the communications health and operational status of all devices on the network and provide results in the form of alerts, reports, and dashboards. There are also automatic (and configurable) ping jobs that monitor the status of network devices on a regular basis.

APs, Relays, and intelligent endpoints autonomously monitor the health of the mesh and provide messaging and alarms to the headend system. The mesh is dynamic and will automatically reroute around failures.

Events are displayed in UtilityIQ in an intuitive event viewer user interface. The user interface provides a simple workflow for assigning events to users for investigation and resolution. For more complex workflow management, web service interfaces allow integration with external workflow management systems.

The AMI HES must provide tools for the detection and management of misconfigured or orphaned endpoints.

Itron Response: The headend system can detect misconfiguration of endpoints via auditing of the configuration in the meter. If the meter configuration is changed, the headend system can be configured to generate a tag discrepancy for an authorized user to audit and correct. In addition, the headend system can be configured to handle these automatically either by honoring the meter's configuration and updating the headend system to match its new configuration or by automatically re-configuring the meter to match the headend record of configuration for that meter.

Communication issues with meters (orphaned endpoints) can be tracked directly using reachability measures or the associated read data. The Unread Meters page enables you to perform several tasks, the most important of which is to interpret data displayed in the UI to determine where problems may lie.

The daily data collection statistics can identify if there is a significant issue in the network, such as multiple access points going offline.

In AMM, if communications to a meter have been unsuccessful for an extended time (configurable with a default of 48 hours) the device will be moved into the "unreachable" state.

The AMI HES must accurately maintain system time synchronization across all devices to ensure accuracy of data.

Itron Response: Itron uses a hierarchical time synchronization strategy to ensure consistent and accurate time throughout the network. The software applications get time from the server on which they are installed. These servers are typically synced with a trusted NTP server to within 15 seconds of NIST. Access Points also sync with a trusted NTP server. Other devices with Itron NICs synchronize with the Access Points on a regular basis. The NIC compares its time with the meter's time approximately every four hours. If the meter time is out by more than 5 seconds (configurable), the NIC will update the meter's time. If the time drift exceeds a certain threshold (30 minutes by default), the meter time will not be updated and an event will be logged.

The AMI HES must support a configurable and programmable schedule for communicating with all endpoints. Different schedules may be utilized in support of VIWAPA's customers.

Itron Response: AMM provides easy-to-use, highly configurable meter read schedules. Additionally, AMM features highly configurable network ping schedules, data export schedules, and background jobs.

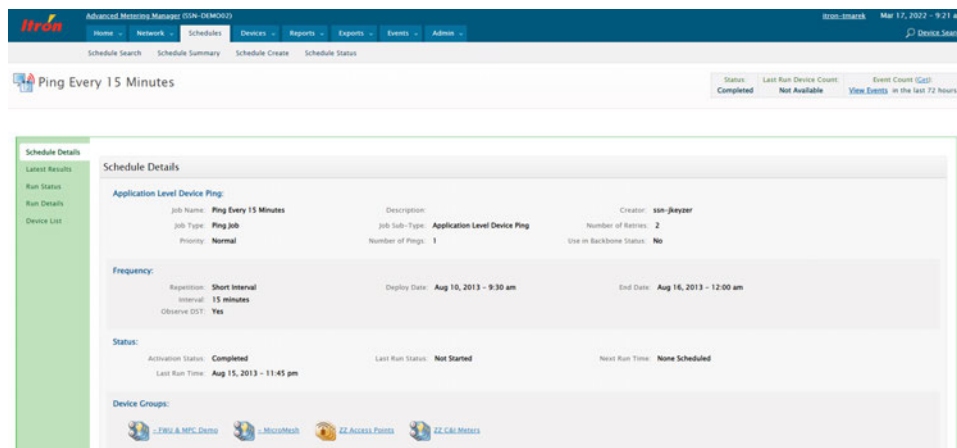
Meter Read Scheduling

It is essential to note the difference between the scheduling of when interval reads or daily self-reads are taken at the meter/NIC, and when the headend (AMM) retrieves those recorded reads from the meter/NIC via the RF network. The meter might record 15-minute intervals, but AMM might retrieve those reads every 4 hours. These schedules are configurable.

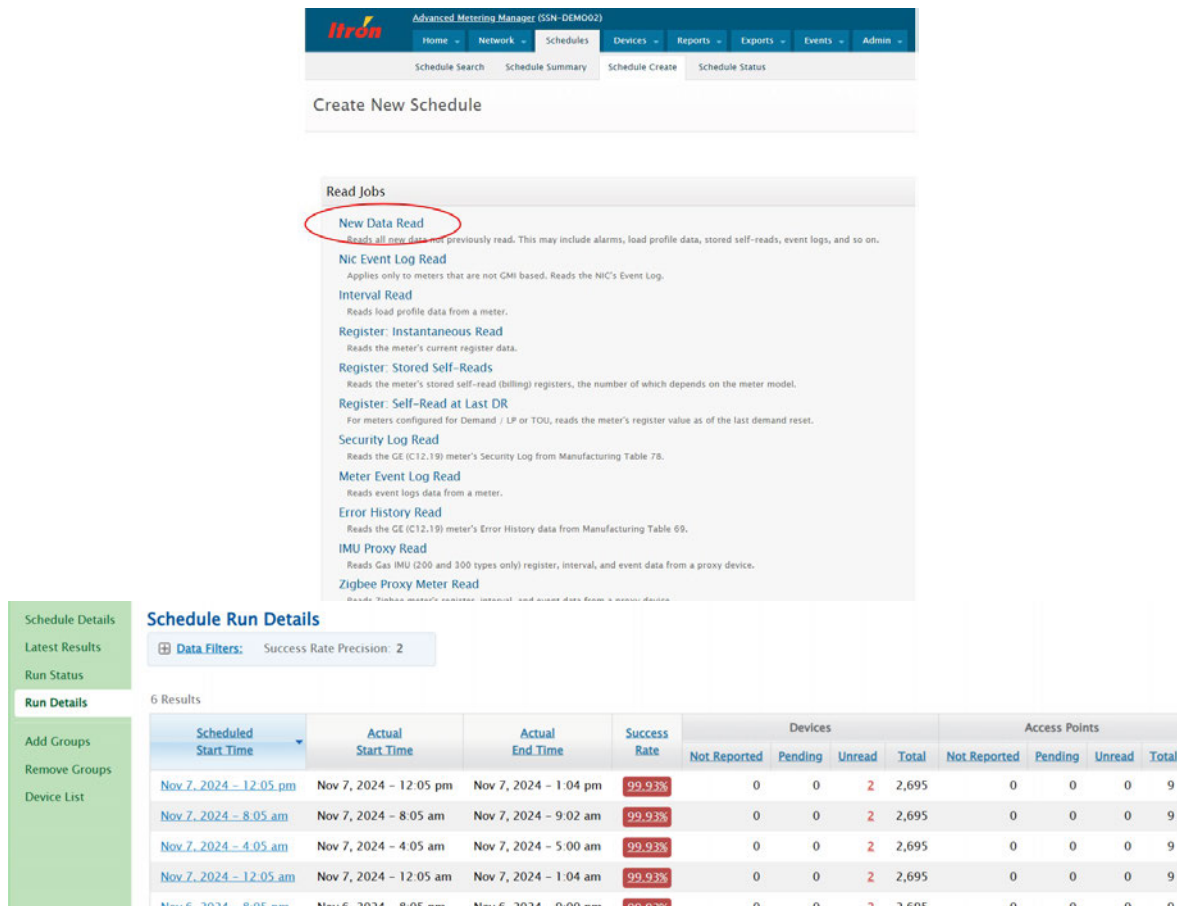
The meter program determines how often it will record interval reads. In this case, AMM can support whatever the meter supports. This configuration can be changed over the RF Network at any time. Daily register self-reads can be configured to run at a specific time (such as 12:01 am).

AMM manages the scheduling for retrieving meter reads. VIWAPA can create custom read schedules to meet business needs, for example, residential meters being read every four hours, C&I customers can be read every hour, and power quality reads can be done every 30-minutes. Read schedules can run every 15 or 30 minutes, every 1, 2, 4, 6, or 12 hours, once daily, or once weekly. The AMM operator can set exactly when these schedules run. For example, a 2-hour read schedule can be set to run at 12:05, 2:05, 4:05 etc., or 1:30, 3:30, 5:30 etc. Also, any number of meter read schedules can be set up (though it is obviously useful to plan these appropriately to make the most efficient use of the network). AMM is installed with several default meter read schedules and network ping schedules that simply need to be activated. This illustrates one of AMM's core design principles – that operation should require as little manual intervention as possible.

A related point is that meters do not need to be explicitly added to meter read schedules. AMM provides dynamic device groups. AMM automatically maintains these groups' membership according to the devices' specified properties. For example, one device group that gets used a lot is the "Active Meters" group. An "Active" meter is one for which AMM has all the necessary information from the endpoint and is, therefore, ready to read. The default meter read schedules are set up to read all meters in the "Active Meters" group. As new meters become active, they automatically join the group (and are, therefore, automatically on the meter read schedule). As meters become inactive, perhaps because of maintenance, they leave the group and are automatically removed from the meter read schedule. The AMM operator does not need to remember to add or remove devices from read schedules.



The screenshot displays the Itron Advanced Metering Manager (AMM) interface. The top navigation bar includes links for Home, Network, Schedules, Devices, Reports, Experts, Events, and Admin. The main content area shows a schedule titled "Ping Every 15 Minutes". Below this, a "Schedule Details" section provides information about the "Application Level Device Ping" job, including its name, type, priority, frequency, and status. The status is "Completed" with a last run time of "Aug 15, 2013 - 11:45 pm". The interface also shows a list of device groups associated with the schedule, including "FNU & MEC Demo", "MicroMach", "EZ Access Points", and "EZ CAL Meters".



Read Jobs

- New Data Read**
Reads all new data not previously read. This may include alarms, load profile data, stored self-reads, event logs, and so on.
- Nic Event Log Read**
Applies only to meters that are not GMI based. Reads the NIC's Event Log.
- Interval Read**
Reads load profile data from a meter.
- Register: Instantaneous Read**
Reads the meter's current register data.
- Register: Stored Self-Reads**
Reads the meter's stored self-read (billings) registers, the number of which depends on the meter model.
- Register: Self-Read at Last DR**
For meters configured for Demand / LP or TOU, reads the meter's register value as of the last demand reset.
- Security Log Read**
Reads the GE (C12.19) meter's Security Log from Manufacturing Table 78.
- Meter Event Log Read**
Reads event logs data from a meter.
- Error History Read**
Reads the GE (C12.19) meter's Error History data from Manufacturing Table 69.
- IMU Proxy Read**
Reads Gas (IMU (200 and 300 types only) register, interval, and event data from a proxy device.
- Zigbee Proxy Meter Read**
Reads Zigbee meter's register, interval, and event data from a proxy device.

Schedule Run Details

Data Filters: Success Rate Precision: 2

6 Results

Scheduled Start Time	Actual Start Time	Actual End Time	Success Rate	Devices			Total	Access Points				
				Not Reported	Pending	Unread		Not Reported	Pending	Unread	Total	
Nov 7, 2024 - 12:05 pm	Nov 7, 2024 - 12:05 pm	Nov 7, 2024 - 1:04 pm	99.93%	0	0	2	2,695	0	0	0	0	9
Nov 7, 2024 - 8:05 am	Nov 7, 2024 - 8:05 am	Nov 7, 2024 - 9:02 am	99.93%	0	0	2	2,695	0	0	0	0	9
Nov 7, 2024 - 4:05 am	Nov 7, 2024 - 4:05 am	Nov 7, 2024 - 5:00 am	99.93%	0	0	2	2,695	0	0	0	0	9
Nov 7, 2024 - 12:05 am	Nov 7, 2024 - 12:05 am	Nov 7, 2024 - 1:04 am	99.93%	0	0	2	2,695	0	0	0	0	9
Nov 6, 2024 - 8:05 am	Nov 6, 2024 - 8:05 am	Nov 6, 2024 - 9:00 am	99.93%	0	0	2	2,695	0	0	0	0	9

As explained, the system is highly configurable but changes to how often the data is retrieved depending on the network infrastructure that is in place. As part of this RFP, Itron has proposed two network designs and the schedules that each network design supports. We will be happy to discuss this further with VIWAPA. See *Section 2: Network Coverage Plans* above for more information.

The AMI HES must support the configuration of collection schedules and delivery schedules to collect selected data (e.g. voltage, kWh) from one to all AMI in near real-time (e.g. collect data every 15 minutes and deliver data every 15 minutes). Please describe any limitations the HES may have in the real-time data collection or real-time data delivery requirements.

Itron Response: Comply. Please see previous response for further information.

The AMI HES must receive and forward any event or alarm, including power outage and power restoration alarms, initiated from the AMI meters and transmitted through the AMI network with no delay and no data loss.

Itron Response: When power is lost, meters send a power outage notification, or "last gasp", message to a neighbor node, which in turn forwards the message to an Itron event handler in the head end. To ensure that outage messages arrive at the back-office, the node forwarding the outage message will continue to relay its message until the back-office software acknowledges receipt. This forwarding node will also bundle received last gasp messages for more efficient transmission, which reduces congestion on the network and increases the percentage of last gasps reaching the headend.

When power is restored to a node, a similar process takes place. The restored node immediately sends a power restoration notification to a neighboring node (which is still powered and registered on the network). The receiving node forwards a restoration message that must be acknowledged by the headend. Acknowledgements and retries, in both cases, significantly increase the likelihood of successful message delivery, even in the harsh network environment of an ongoing outage. This helps eliminate uncertainty and allows utilities to efficiently direct crews on the ground to complete all restoration work while still in an affected area. This outage detection and restoration architecture also eliminates the need to sweep the network with pings to discover restored nodes, since notifications are reliably sent as soon as network infrastructure is capable of delivering them.

To state that the outage notifications will be received with no delay is not possible - there will be necessary network transit time from the moment the last gasp is sent from the meter to the time at which it is received at the head end. There are also cases whereby a large outage occurs and not all last gasp messages will be received at the head end system due to a meter's location within the mesh. If a meter is located in the middle of a large outage area, and no battery backed devices are able to hear that last gasp and at the same time no neighboring meters retain power, it is possible that last gasp message will not be received at the head end.

The Outage Detection System (ODS) provides additional outage features on top of that which is described above. The ODS application provides filtering of outage and restoration data to provide a reliable feed to the OMS. Filters are included for momentary outages, meter maintenance, duplicates, suspect devices, etc.

The AMI HES for each coverage plan must have sufficient data processing performance to support the requirements of each coverage scenario.

Itron Response: Comply. UtilityIQ has sufficient data processing performance to support the requirements of each coverage scenario outlined in *Section 2: Network Coverage Plans* above.

The AMI HES must have sufficient data processing performance to support the every 5- minute handling of voltage measurements from 5% of the electric meters.

Itron Response: Voltage readings can be collected every five minutes with a properly constructed Gen5 NAN, assuming the 5% of endpoints are evenly distributed across the APs. Refer to the two options proposed for Network Design for this RFP in the Network Design Document. As a more efficient option, the Active Transformer Voltage Monitoring DI application provides voltage measurement information (the transformer number, its phase, and Vmin, Vmax, Vave) at a 1 to 5-minute interval.

The AMI HES must have sufficient data processing performance to support the every 15- minute handling of 15 minute consumption data from 100% of the electric meters.

Itron Response: Comply. The AMI HES is sized according to the VIWAPA provided Network Design Criteria. Refer to proposed Network Design for supported scenarios for this RFP. Itron will be happy to discuss further options.

The AMI HES must support typical demand response applications. Please describe demand response applications which your solution has supported.

Itron Response: The Itron field area network supports multiple applications such as AMI, DA, DR, and Street Lighting – all on the same platform.

IntelliSOURCE, Itron's optional modular demand response and distributed energy management software, manages the provisioning of demand response devices on the utility network, such as load control

switches and thermostats. IntelliSOURCE can target DR/DLC events to specific groups or grid nodes, monitor events, monitor devices in near real time; and forecast available load for future events. The application utilizes multiple variables such as past event performance, weather, time of day, and customer opt out projection to forecast load available for control.

Vendor to provide complete documentation of system including an “as built” document.

Itron Response: Documentation of system devices is included in this proposal response. For the as-built, yes. Itron's field network design is as follows:

1. *RFP Response (Preliminary Network Design)* – determines the quantities of network devices to meet customer RFP requirements and which are used for pricing. Network device locations are very high-level placeholders at this stage.
2. *Initial Design (Post Contracting)* – detailed RF modelling completed resulting in the number and locations of recommended network devices to be surveyed in the field. Outputs of the initial design are based upon refreshed meter data, mounting asset standards, SLA performance requirements, and any other customer specific recommendations.
3. *Enhanced Design* – incorporates findings from field surveys of network communication device locations, analyzes any changes to RF coverage as a result of the field surveys, and provides the final list of locations of network communication devices to be installed in the field.
4. *Final Design* – performed after deployment and performance optimization is complete to document the final “as built” design.

1.2.4 Outage Management

Vendor is to provide a 2- or 3-page detailed overview of how an outage restoration with your AMI solution works in totality (i.e. from the point of outage detection to the point where all outages are cleared using the criteria as defined above for a small and large scale outage in both a rural and urban setting for the proposed network solution). Please provide how the remaining 5 or 10% of the meters are cleared and the associated timeline. Additionally, the vendor is asked to provide this information in scenarios where the network equipment has remained operational due to battery backup and where the network has powered down due to an extended outage.

Itron Response: Please see Attachment – VIWAPA Supplemental Information for additional information requested.

The AMI HES must provide a standards-based (MultiSpeak 4.1) interface for delivery of outage and restoration alarms for verifying power restoration/status. Please provide a 1- or 2-page attachment explaining your current outage process and standards implementation.

Itron Response: Please see Attachment – VIWAPA Supplemental Information for additional information requested.

AMI HES must provide integration to Milsoft Dispatch OMS –need to expand

Itron Response: Itron has integrated with Milsoft's OMS at a variety of locations via the MultiSpeak 4.1 interface.

The AMI Solution must provide filtering of momentary and "false" outages. The AMI HES must receive and store these filtered outages, but not deliver a notification. Please provide a 1- or 2-page attachment on how the proposed solution will allow momentary or false outages to be configured to VIWAPA's own requirements.

Itron Response: Filtering is available both at the meter and at the headend.

At the meter: The Standard Last Gasp (SLG) or the Extended Last Gasp (ELG) Power Outage Notification process includes two time windows for filtering non-sustained outages. (ELG is an optional component and does not provide configurable filtering).

- Transient Outage Filtering - Less than one second window to confirm outage before initiating outage detection process.
- Momentary Outage Filtering - Ten seconds for SLG or sixty second window for ELG to filter out power line actions such as re-closure toggling to clear outages.

At the head end: UtilityIQ ODS, identifies outages and supports restoration activities by correlating outage and restoration to connectivity patterns and providing a visual presentation of outage severity, location, and restoration. UtilityIQ ODS maintains these outage detection and restoration activities even during automated switching activities. Programmable exception policies enable filtering and aggregation by event type or duration. Utilities can also configure settings regarding momentary outages – UtilityIQ ODS then filters out these momentary outages, allowing operators to focus on sustained outages. Finally, ODS filters events based on the meter state from AMM. Using the device state to indicate planned outage or service order activity enables the utility to prevent such outages from being passed to the OMS or other upstream applications.

Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

The AMI Solution must support the capture and delivering of blink, or momentary outage, counts. In a one- or two-page attachment please provide a detailed explanation of how blinks counts are identified, recorded, and reported for the proposed solution.

Itron Response: Comply. Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

The AMI Solution must meet the outage performance of >90% successful receipt and delivery of outage events in small scale outages (less than 20 meters). Provide the anticipated performance or timeframe for the detection of outage in this classification.

Itron Response: While Itron cannot predict with 100% accuracy, and given that every network and terrain is different, our customers experience rates similar to the ones in the table below. ELG meters take a minimum of 60 seconds. For this scenario, Itron estimates the last gasp message receipt to be less than two minutes.

	Extended Last Gasp	Standard Last Gasp	Standard Last Gasp + Grid Aware*
Single Meter	98% to 100%	96% to 100%	96% to 100%
Transformer (~2 – 10 meters)	75% to 95%	30% to 60%	50% to 80%
Fuse (~11 – 100 meters)	70% to 90%	20% to 40%	50% to 75%
Feeder (~101 – 1,000 meters)	65% to 75%	10% to 20%	10% to 20%
Multi-Feeder (1001+ meters)	55% to 65%	5% to 15%	5% to 15%

*Grid Aware does not apply to ELG devices

- Percentages indicate typical ranges from simulated outages at several North American utilities in suburban areas.
- Percentages can be higher or lower based on the shape/size of the outage and the grid topology.

The AMI Solution must meet the outage performance of >60% successful receipt and delivery of outage events in large scale outages (more than 5,000 meters). Provide the anticipated

performance or timeframe for the detection of an outage in this classification and how the network will handle the influx of messages.

Itron Response: While Itron cannot predict with 100% accuracy, and given that every network and terrain is different, our customers experience rates similar to the ones in the table below.

Itron would expect that the outage message mechanism will identify outages of every size. Depending on the size of the outage, last gasp percentages are expected to range from 50% to 99% when equipped with Itron's Extended Last Gasp (ELG) feature. The vast majority of messages would get to the headend in less than two minutes depending on outage size and shape. However, Itron would expect the delivery of the last gasps to have a small tail, where a small number of meters would require more than two minutes to get their messages into the headend. The nature of this tail is dependent on the size, hop counts, and geographic layout of the outage.

	Extended Last Gasp	Standard Last Gasp	Standard Last Gasp + Grid Aware*
Single Meter	98% to 100%	96% to 100%	96% to 100%
Transformer (~2 – 10 meters)	75% to 95%	30% to 60%	50% to 80%
Fuse (~11 – 100 meters)	70% to 90%	20% to 40%	50% to 75%
Feeder (~101 – 1,000 meters)	65% to 75%	10% to 20%	10% to 20%
Multi-Feeder (1001+ meters)	55% to 65%	5% to 15%	5% to 15%

*Grid Aware does not apply to ELG devices

- Percentages indicate typical ranges from simulated outages at several North American utilities in suburban areas.
- Percentages can be higher or lower based on the shape/size of the outage and the grid topology.

Adding Grid Aware to non-ELG devices improves the success of outage messages. Grid Aware is a technique that allows meters to send their last gasps to meters on a different transformer or lateral, so they are less likely to lose power simultaneously. Itron can provide additional information on Grid Aware upon request.

Last Gasp Receipt Percentage With Grid Awareness (no supercaps)							
	No Awareness	Transformer Awareness	Fuse Awareness	Feeder Awareness	Restore	Restore Time	OMS Predicted
Service Outage	100%	100%	100%	82%	100%	60 sec	Yes
Transformer Outage	44%	75%	73%	71%	100%	300 sec	Yes
Fuse Outage	30%	36%	74%	71%	100%	300 sec	Yes
Feeder Outage	13%	12%	27%	45%	100%	300 sec	Yes

The AMI Solution must meet the outage performance of >95% successful receipt and delivery of restoration events in small scale outages (less than 20 meters). Provide the anticipated performance or timeframe for the outage restoration notification to be delivered for this outage classification.

Itron Response:

Case	Estimated Restoration Success Rate
Restoration (>1000 endpoints)	Due to the restoration message process (restore messages need to be acknowledged by the headend), Itron would expect to receive close to 100% of restoration messages for large outages, with 90% of messages arriving in less than 10-15 minutes.
Restoration (<100 endpoints)	~100% of restoration messages will be received, with greater than 90% arriving in less than 60 seconds.

The AMI Solution must meet the outage performance of >90% successful receipt and delivery of restoration events in large scale outages (more than 5,000 meters). Provide the anticipated performance or timeframe for the outage restoration notification to be delivered for this outage classification.

Itron Response:

Case	Estimated Restoration Success Rate
Restoration (>1000 endpoints)	Due to the restoration message process (restore messages need to be acknowledged by the headend), Itron would expect to receive close to 100% of restoration messages for large outages, with 90% of messages arriving in less than 10-15 minutes.
Restoration (<100 endpoints)	~100% of restoration messages will be received, with greater than 90% arriving in less than 60 seconds.

The AMI Solution should maintain power during a power outage to allow the effective transmission and delivery of messages. Please describe the "holdup" time of the AMI meters and AMI network under a power outage condition. Please describe how messages are repeated or retried by the AMI meter and within the AMI network to maximize the successful delivery of outage messages.

Itron Response: When power is lost, meters send a power outage notification, or "last gasp", message to a neighbor node, which in turn forwards the message to an Itron event handler in the head end. To ensure that outage messages arrive at the back-office, the node forwarding the outage message will continue to relay its message until the back-office software acknowledges receipt. This forwarding node will also bundle received last gasp messages for more efficient transmission, which reduces congestion on the network and increases the percentage of last gasps reaching the head end.

When power is restored to a node, a similar process takes place. The restored node immediately sends a power restoration notification to a neighboring node (which is still powered and registered on the network). The receiving node forwards a restoration message that must be acknowledged by the head end system. Acknowledgements and retries, in both cases, significantly increase the likelihood of successful message delivery, even in the harsh network environment of an ongoing outage. This helps eliminate uncertainty and allows utilities to efficiently direct crews on the ground to complete all restoration work while still in an affected area. This outage detection and restoration architecture also eliminates the need to sweep the network with pings to discover restored nodes, since notifications are reliably sent as soon as network infrastructure is capable of delivering them.

To state that the outage notifications will be received with no delay is not possible - there will be necessary network transit time from the moment the last gasp is sent from the meter to the time at which it is received at the head end. There are also cases whereby a large outage occurs and not all last gasp messages will be received at the head end system due to a meter's location within the mesh. If a meter is located in the middle of a large outage area, and no battery backed devices are able to hear that last gasp and at the same time no neighboring meters retain power, it is possible that last gasp message will not be received at the head end.

ODS provides additional outage features on top of that which is described above. The ODS application provides filtering of outage and restoration data to provide a reliable feed to the OMS. Filters are included for momentary outages, meter maintenance, duplicates, suspect devices, etc.

Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

The AMI Solution should have filtering capabilities to reduce or eliminate reporting of false outages. Please describe all filtering available within the AMI Solution, including.

Itron Response: Filtering is available both at the meter and at the head end.

At the meter: The Standard Last Gasp (SLG) or the Extended Last Gasp (ELG) Power Outage Notification process includes two time windows for filtering non-sustained outages. (ELG is an optional component and does not provide configurable filtering)

- **Transient Outage Filtering** - Less than one second window to confirm outage before initiating outage detection process.
- **Momentary Outage Filtering** - Ten seconds for SLG or sixty second window for ELG to filter out power line actions such as re-closure toggling to clear outages.

At the headend: UtilityIQ ODS identifies outages and supports restoration activities by correlating outage and restoration to connectivity patterns and providing a visual presentation of outage severity, location, and restoration. UtilityIQ ODS maintains these outage detection and restoration activities even during automated switching activities. Programmable exception policies enable filtering and aggregation by event type or duration. Utilities can also configure settings regarding momentary outages – UtilityIQ ODS then filters out these momentary outages, allowing operators to focus on sustained outages. Finally, ODS filters events based on the meter state from AMM. Using the device state to indicate planned outage or service order activity enables the utility to prevent such outages from being passed to the OMS or other upstream applications.

The AMI Solution (HES, Network and Meters) must be able to ping up to 3,000 meters and get a response in less than 5 minutes.

Itron Response: The Gen5 solution alleviates the need for automatic pinging of meters after power restoration. Itron ensures reliable restoration message delivery through multiple acknowledgements and retries. This method significantly increases the likelihood of successful message delivery, even in the harsh network environment of an ongoing outage. However, a job can be created in AMM to ping a subset or a group of meters.

Competitive offers require pinging meters because their restoration messages are unreliable.

The AMI Solution must deliver outage duration information with any outage or restoration message.

Itron Response: Comply.

Showing 31-35 of 35							
Device ID	From ▼	To	Duration	Declared At	Cleared At	Outage Type	Notification
EI0346278174	11-07-2024 07:51:42	11-07-2024 07:59:09	00:07:27	11-07-2024 07:53:44	11-07-2024 08:01:48	Sustained	VSO Opened VSO Closed
EI0346096077	11-07-2024 07:51:42	11-07-2024 07:59:09	00:07:27	11-07-2024 07:53:44	11-07-2024 08:01:40	Sustained	VSO Opened VSO Closed
EI0346096077	11-07-2024 07:51:42	11-07-2024 07:59:09	00:07:27	11-07-2024 07:53:44	11-07-2024 08:01:40	Sustained	VSO Opened VSO Closed
EI0346096087	11-07-2024 07:51:42	11-07-2024 07:55:14	00:03:32	11-07-2024 07:53:44	11-07-2024 07:57:51	Sustained	VSO Opened VSO Closed
EI033537742	11-07-2024 07:51:42	-	-	11-07-2024 07:53:44	11-07-2024 07:56:11	Sustained	VSO Opened VSO Closed

Itron's solution provides near real-time outage detection and restoration events that can be used to enhance VIWAPA's outage management capabilities.

Raw outage notifications ('Outage' and 'Power Restore') messages are immediately sent as traps from meters. These events can be delivered as JMS messages in 'real-time' to the Enterprise Service Bus (ESB). The ESB can then provide the messages to any required back-office system.

While outage notifications from the endpoints improve outage scoping ability, the restoration notifications generally deliver the most significant operational savings. By allowing VIWAPA's operations center to see the effect of restoration efforts in the field in real time, dispatchers can better manage the field resources. For example, a dispatcher can direct field crews to the remaining issue before leaving the site by identifying nested outages not resolved as part of a more extensive restoration. Further, analysis of momentary outages can be used to identify failing infrastructure or the need for vegetation management.

ODS filters outage and restore data to provide a reliable feed to the OMS. Filters are included for momentary outages, meter maintenance, duplicates, suspect devices, etc. For more information on ODS, please see the Itron Outage Detection System Datasheet included with this proposal.

The AMI Solution (HES, Network and Meters) must be able to receive all restoration messages within 5 minutes of the power restoration, regardless of the number of meters impacted.

Itron Response: Partial Comply. Assuming there is a communication path available, restoration messages for individual meters typically happen in less than two minutes. More extensive outage restorations can take several minutes. One unique feature of the Itron Gen5 system is that the meter's restoration messages must be acknowledged by the headend. This ensures that every restored meter continues to report its restoration until the headend is confirmed to be aware of it, resulting in very high restoration messaging success rates. Typical restoration statistics and timing are below:

Case	Estimated Success Rate
Restoration (>1000 endpoints)	Due to the restoration message process (restore messages need to be acknowledged by the headend), Itron would expect to receive close to 100% of restoration messages for large outages with 90% of messages arriving in less than 10-15 minutes.
Restoration (<100 endpoints)	~100% of restoration messages will be received with greater than 90% arriving in less than 60 seconds.

1.2.5 Asset Management

The AMI Solution must capture and monitor the configuration, including firmware, of all endpoint and network devices.

Itron Response: Comply. MPC enables remote over-the-air programming and auditing of endpoints on a mass scale. MPC securely distributes meter program files following either the meter's native programming format or XML format. Using code push or point-to-point distribution, MPC can be configured to reprogram individual meters, meter groups, or the entire meter population.

When MPC successfully configures and validates a meter with a new program, it automatically notifies AMM of the change. To ensure the new program is secure, the meter sends its updated program to AMM for verification and approval.

The AMI Solution must provide a standard interface to an Asset Management System to monitor, verify and change device configuration, firmware version and status. If such interfaces are not available, please indicate when these standard interfaces will be available.

Itron Response: Comply. Currently numerous optional integration paths exist that can accommodate bidirectional integration with Asset Management Systems supported today. Clearly, the utility goals and environment dictate which specific integration model. Applications like location awareness, advance transformer load and voltage monitoring, high impedance, and anomaly detection all have significant contributions to asset health, maintenance planning, and improved system resiliency. These applications

also need to consume data from systems like GIS, other asset reference databases, and or utility data lake environments.

The AMI Solution should support the delivery of information to an Asset Management System. Please describe all interfaces and capabilities of the capture and delivery of endpoint device configuration, programming (Program ID), firmware version and status. Please provide a brief discussion on your solution's philosophy for management of endpoint device configuration by the AMI HES vs. an external asset management solution.

Itron Response: Network management and device management is supported through UtilityIQ and OO network operations. This provides dashboards and tools to monitor, generate reports, and troubleshoot network communications. This solution also supports a suite of APIs allowing for this data to be shared with other subscribing systems. Similarly, the Itron EAC allows DI application administrators to monitor the performance and state of the various distribution DI applications. This allows for tracking of distributed applications across all devices, generates performance data, and allows users to define various groups for distribution management. It also allows for CIS integration to allow meter swap outs to automatically port the existing applications that were already in use at the specific premise location. Similarly, EAC also allows for APIs to share and import data relative to the core use cases.

The AMI Solution should manage the endpoint and network devices. Please describe the asset management capabilities of the AMI HES relative to endpoint configuration, endpoint firmware and any applicable endpoint security.

Itron Response: Comply. The solution proposed supports these functions. Network management and device management is supported through Itron UtilityIQ, OO, and EAC with all providing the ability to support monitoring and managing the network and devices on it with UtilityIQ and OO all for monitoring of communication, track device versioning, firmware, read rate reliability, link budgets, latency, firmware, and more. The EAC supports the same as it relates to the DI side of the devices and the various application versions.

The AMI Solution, in coordination with the MDM or Naviline will support the provisioning of new AMI meters. Provisioning is the automated process of identifying newly installed AMI meters, or removed AMI meters and the interaction with the AMI head end to ensure that the meter and system are correctly configured to deliver the required data on the required schedule. Describe your system's automated processes, flexibility and exception management in support of this activity. Include one reference (for each of the indicated MDM) where this automated provisioning process is in production.

Itron Response: Itron's understanding is that VIWAPA has a MDM in MeterSense that is in place today. Without knowing the existing architecture, it is our opinion that the most efficient path would be to integrate UtilityIQ with the MDM to support streamlining the core AMI processes. Then, as the MDM is updated UtilityIQ is updated in parallel and all the meter functions like installs, removals, disconnect, reconnect etc. are sync with that environment in real-time through API integration and automation. Itron would be happy to support an integration workshop to better understand what VI WAPA existing environments look like to finalize a solution approach.

1.2.6 Distribution Operations

The AMI must support the collection and delivery of voltage and power quality data from all, or selected, AMI meters.

Itron Response: Gen5 Riva meters are programmable to support up to 20 energy registers. The following energy registers are available in singlephase and polyphase meters:

- Watt hours (Wh): delivered, received, unidirectional, net
 - Per-phase on polyphase in addition to registers above
- Volt-ampere hours (VAh): delivered, received, net
 - Per-phase on polyphase in addition to registers above
- Volt-ampere reactive (VARh): delivered, received, net, Uni, Q1, Q2, Q3, Q4
 - Per-phase on polyphase for delivered, received, net and uni-directional.

Demand:

Gen5 Riva singlephase meters support 6 demand registers while polyphase meters support 12. They are also programmable to support block and rolling demand and also support a programmable demand reset lockout time. The following demand registers are supported:

- Max Watts (delivered, received, net and uni-directional)
 - Per-phase on polyphase in addition to registers above
- Max VA (delivered, received, and net)
 - Per-phase on polyphase in addition to registers above
- Max VAR (delivered, received, net, Q1, Q2, Q3, and Q4)
 - Per-phase on polyphase for delivered, received, net and uni.
- Min Power Factor (delivered, received)
- Date/Time of occurrence as well as Cumulative, Continuous Cumulative, are presented for each demand value selected. The meters support block and sliding demand and intervals lengths of 5, 10, 15, 30 and 60 minutes.

Profile:

Meters support 48 profile channels broken down into Profile 1, Profile 2 and Profile 3. Each profile is configurable for 16 channels, and each is programmable to support 5, 10, 15, 30 or 60-minute intervals. Each profile is configurable to support the following quantities:

- Watt hours (Wh): delivered, received, unidirectional, net (per-phase supported in polyphase)
- Volt-ampere hours (VAh): delivered, received, net (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): delivered, received, net, Uni, (per-phase supported in polyphase)
- Volt-ampere reactive (VARh): Q1, Q2, Q3, Q4
- Instantaneous Volts (Per-Phase)
- Minimum Volts (Per-Phase)
- Maximum Volts (Per-Phase)
- Average Volts (Per-Phase)
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps
 - Minimum
 - Maximum
 - Average
- Power Factor (per-phase polyphase only)
- Frequency
- Voltage Phase Angle (polyphase only)
- Current Phase Angle (polyphase only)
- Temperature
- THD/TDD

Meters are also programmable to support up to 25 Power Quality Read registers.

- Available Quantities
- Present, Previous, and Projected demands for Watts (delivered, received, net and uni-directional), VA (delivered, received), VAR (delivered, received, net, Q1, Q2, Q3, and Q4), and Power Factor (delivered, received).
 - Quantities supported on the max demand registers selected in the program file.
- Instantaneous (Total and Per-Phase) Watts, VAR, VA, Amps, Voltage
- Instantaneous Power Factor
- Instantaneous Frequency

All voltage and power quality collected must be delivered via standard interface (Multi-Speak or IEC 61968-9).

Itron Response: UtilityIQ can be integrated directly using a number of standard web services and file exchange formats or via an adaptor that supports MultiSpeak. Both methods provide for easy integration of the platforms. Itron's MultiSpeak Adapter supports MutliSpeak v4.1.

The AMI Solution must provide real-time configurable and field updatable alerts for high and low voltage situations at any AMI meter.

Itron Response: Voltage monitoring, when configured, logs events for voltage sags and swells. The upper and lower RMS limits are configurable in the Itron Device Configuration Manager (IDCM) and can be reconfigured OTA or locally at anytime. The thresholds are designated as a percentage of the nominal voltage and range from +20% to -20%. In addition, to configurable thresholds there is also a configurable Instantaneous Voltage High/Low Latency time, which can be configured from 0-100 seconds, inclusive.

Additionally, the meter can be configured to record up to 16 channels of voltage profile. The meter retains 16 channels of five minute voltage profile data for a minimum of 60 days before its initiates a FIFO. The meter stores a minimum of 60 days of voltage profile regardless of the interval length or the number of channels.

- Available quantities:
 - Instantaneous Volts (Per-Phase)
 - Minimum Volts (Per-Phase)
 - Maximum Volts (Per-Phase)
 - Average Volts (Per-Phase)
- Supports intervals of 5, 10, 15, 30 or 60 minutes

UtilityIQ allows alerts to be sent over the AMI network for voltage sags or swells. These alerts as well as voltage reads can be pushed to the appropriate upstream system or third-party applications for analysis.

The AMI Solution must support the capture and delivery of instantaneous, peak, high and low voltage measurements from any AMI meter every 5 minutes. Describe, in a 2- or 3- page attachment, the voltage measurement and accuracy. The AMI Solution must support this 5-minute requirement for at least 5% of the installed AMI meters.

Itron Response: Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

1.2.7 Distributed Intelligence

Itron has included supplemental DI information in *Appendix 2 - Distributed Intelligence* below in this proposal response, giving greater detail to the benefits to VIWAPA for DI.

VIWAPA has an interest in the next 3 to 5 years, in making sure that the proposed solution can grow and expand to meet their grid modernization needs throughout the expected life of the system. As such the Offeror, in this section (no more than 10 pages), should describe their existing capabilities and future roadmap for Distributed Intelligence (DI), or Edge Computing, including but not limited to:

Current electric meter platforms (both Proposer manufactured meters and alternate supplier meters) that support DI.

Itron Response: Itron is proposing the latest generation Gen5 Riva meter with DI or edge compute capabilities. The capability for DI is standard on Itron Riva electricity meters, Edge Gateways, and Itron Riva DI network interface cards (DI-NICs). Note that the DI-NIC allows both communications and DI capabilities to other third party devices. Itron's DI platform currently comes standard on the following devices:

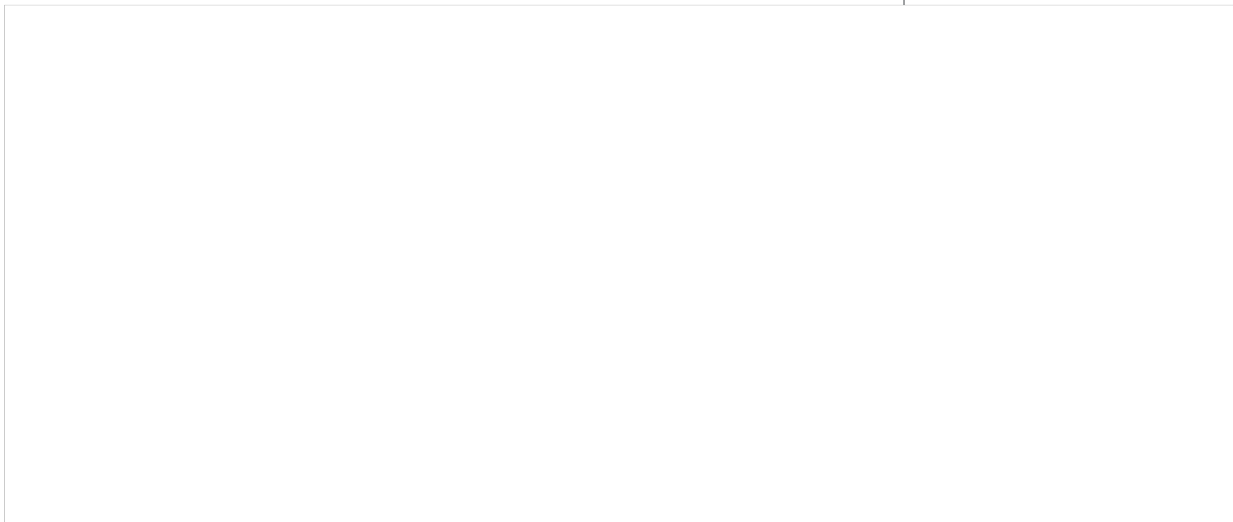
- Itron Gen5 Riva Singlephase and Polyphase Electricity Meters.
- Itron OpenWay Riva Singlephase and Polyphase Electricity Meters.
- Itron Edge Gateway, which enables DI applications to support distribution automation.
- Itron DI NIC supports Itron non-metering devices and third-party meters and devices. For example, Itron is currently working with Aclara and some other devices, like communicating Fault Circuit Indicators (FCI) vendors.

Future electric meter platforms that are planned to support DI, and the development roadmap for these

Itron Response: Detailed in the figure below is the existing DI applications integrations and Itron's planned 2025 DI development roadmap.

The Grid Edge Realized

DI applications and integration portfolio



Application platform on which DI is based (operating system, development environment, etc.)

Itron Response: Itron implements DI apps within Linux containers, using LXC technology, to both isolate and manage app resources on the device. Each DI app operates independently of the host device's operating system, metrology, and billing register code.

Apps installed on the Itron Gen5 Riva meter (Itron's DI-capable meter) have real-time access to the meter's metrology data (including 1-second data, and 2, 4 and 32KHz waveform data), and implement data analysis algorithms directly on the device. Results of local analysis can trigger decision making and action directly on the device or on a collection of local devices, or they can trigger deliver alerts and analysis results to the back office for further analysis, decision making, and action.

The DI platform's Linux container model enables utilities to deploy new apps at any time without the extensive regression testing of all functions on the meter that was traditionally required when implementing new functions directly on core device firmware. As a proof point, one of our utility customers with extensive experience with Itron DI technology now only requires 3 weeks of system testing before deploying a new app because they have learned while a given app may have defects, as with any software, it cannot affect other device functions.

Description of how applications are managed in the meter or communications module.

Itron Response: Each DI app operates independently of the host device's operating system, metrology, and billing register code. By leveraging a separate environment to accommodate the ability to modularly add DI applications without burdening the core functionality of the meter provides a path for utilities to accelerate innovation and rapidly deploy new application to support new use cases as business needs evolve. Regarding communications, it is paramount utilities evaluate the appropriate peer to peer capabilities of DI capable hardware to ensure they can cover all the desired Grid Edge AMI 2.0 use cases. With the Itron Riva platform, the meter supports both 900Mhz and PLC to accommodate peer to peer communications in support of a host of real time grid monitoring and control use cases.

Description of how applications are managed in the HES.

Itron Response: The UtilityIQ headend suite includes a number of components to contributing to DI, with the two main components including IAP (Itron Analytics Platform) and Enterprise Application Center (EAC). IAP is used to display dashboards and outcomes generated by the various Itron DI applications, in addition to providing the data feed from all DI data to DataHub for distribution across all utility and third-party subscribing systems. EAC is used for the management and distribution of all DI applications across the population of meters. In this environment the ability to manage applications by configurable groups as well as troubleshoot and monitor DI application performance is enabled.

Description of HES APIs for external applications to manage the applications.

Itron Response: In addition to managing DI apps via its user interface, EAC provides an API for managing DI applications across all targeted devices. This API allows other business systems to manage and monitor DI apps. The API functions for DI app management includes:

- Create target group of devices
- Initiate app download to target group
- Monitor app download to target group (status)
- License app on target group
- Unlicensed app from target group
- Utility web experience

For all functions above, the “target group” can be an individual meter.

Regarding access to outcomes, events or other DI generated data API from Datahub can be leveraged to provide a path to supporting both utility and third-party data subscribing applications.

List of applications currently deployed.

Itron Response: The existing commercial apps currently deployed are detailed below:

- **DI Safety Bundle**
 - *High Impedence Detection* - This application identifies and alarms on poor electrical or failing assets such as bad jaws, failing conductor or bad barrel splices etc. Outputs from this application can be used to support conductor identification and analysis as well as EV readiness analysis studies. This application is in use at TECO, Xcel, CNP, Avangrid, ComEd, and PG&E.
 - *Active Temperature Monitoring* - This application use of impedance, loading and temperature to qualify hot sockets. This application is in use at TECO, Xcel, CNP, Avangrid, and ComEd.
 - *Meter By-Pass Theft* - This application continually examines the changes in voltage waveform measurements as compared to current and identifies when a consumer directly by-passes all or a percentage of their service.
- **Location Awareness** - This application allows the meters to autonomously qualify and assign their electric connectivity. Key features in this application are the use of PLC coms to qualify meter to transformer mapping, meter to phase identification, and meter to feeder and/or distribution substation mapping. This application is in use at TECO, Xcel, Avangrid, and ComEd.
- **EV Awareness** - This application is a grid management load disaggregation style app designed to support the identification of both level 1 and 2 charger sites, capturing various charging events start and stop times and tracking the maximum demand and energy usage associated with each of the charging events. The purpose is to provide better visibility to distribution planners of existing EV locations and the associated burden on the distribution infrastructure. This application is in use at TECO, Xcel, CNP and Avangrid.
- **PV Awareness** - Similar to EV Awareness, the purpose of this application is to identify any distributed generation injection point on the grid. It also captures the various generation events start and stop times, tracks the max. demand and energy usage associated with each generation event. The purposes are to provide better visibility to distribution planners of existing DG (distribution generation) locations and the associated burden on the distribution infrastructure. This application is currently limited in availability and is in early stages of testing at TECO and will be in qualification (i.e. parallel meter testing) later in the year (Q3 2023) at SMUD.
- **Active Transformer Monitoring Bundle** (This application is getting deployed at Avangrid in Q2 2023 at Avangrid, TECO and SMUD in Q4 2023)
 - *Active Transformer Voltage Monitoring* - Provides a full voltage profile (Vmax, Vmin, Vave) for each transformer at a 1 min interval, and supports reporting by exception when meters are outside the operating voltage band. This application can also provide near real-time integration into ADMS or DERMs via the proposed Itron VRTU software gateway supporting Modbus, DNP 3.0, SunSpec2 (2030.5), IEC61850 and GOOSE protocols.
 - *Active Transformer Load Monitoring* - Leveraging the Location awareness applications meter to transformer mapping, this application provides loading data (KW,KVA,KVAR, and data elements) for each transformer at a 1 min interval, and also supports reporting by exception when a transformer is critically loaded, or experiencing accelerated loss of life. This application can also

provide near real-time integration into ADMS or DERMs via the proposed Itron VRTU software gateway supporting Modbus, DNP 3.0, SunSpec2 (2030.5), IEC61850 and GOOSE protocols.

- HAN agent that uses IEEE 2030.5 to share energy and watts data over wifi to support consumer energy notification, this is current deployed on all meters at Xcel and will be deployed on all meters at Avangrid in Q4 2023.

Description of DI dashboards or reporting capability.

Itron Response: Itron has generally available dashboards that support real-time monitoring and operational analytics.

Description of any DI related analytics capability and why the DI application is best suited for the proposed analytics.

Itron Response: Itron's DI apps' real-time, high-resolution access to data yields higher accuracy and lower latency results and information than traditional back-office analytic models. Further, Itron's DI platform has several differentiators that set it apart from standard analytics. These include:

- Foundationally, several functions are simply not capable with traditional networking and grid analytics. If the utility desires to support these functions it will only be possible with DI. Examples below include:
 - Real-time management of behind the meter assets, as it relates to customer panel schedule, service conductor, or transformers limitations. If the value to the utility is to control (for example) an EV charger and the customer incentive is not requiring a panel upgrade by letting it be autonomously controlled by demand triggers, the decision making to throttle charging before a breaker operation requires subsec functionality. No centralized communication media, and control loop logic would support this except for local control.
 - Similarly, specific PQM signatures and local calculations can be derived at the premise level requiring subsec data. Attempting to send this process and make decisions is not scalable from a centralized resource standpoint even when utilizing fiber and cellular solutions. For example, accurate high impedance data and transient fault data require local processing in the subsec realm. These outputs result in flipping to a targeted and informed preventative maintenance model that lands trouble resources on the specific assets ahead of critical failure.
 - Data resolution by monitoring loads in the subsec ranges grant the ability to not only detect the use of relevant loads, (i.e., HVAC, driers, EV chargers, inverters (DER), water heaters, etc.) but also the ability to profile their contribution to system loading, allowing target consumer energy behavior programs to be paired with surgical DR initiatives.
 - Finally, the battleground from an energy management standpoint based on today's market is at the distribution transformer, secondary bus, and premise level. In environments that are capacity constrained with a heavy mix of renewables coming online, the need for dynamic management at the edge in real time is required. All of the above needs for edge analytics apply to support Grid Edge DERMs functionality allowing for local optimization (this cannot be managed centrally at scale).
- Itron's DI platform offers a dedicated infrastructure and ecosystem for developers to create, test, and certify edge computing applications.
- VIWAPA can deploy DI apps directly onto targeted meters and devices, thus distributing real-time analysis and decision-making capabilities across devices and where they are most needed.

- The platform's supporting back-office analytics offers the visibility and insights VIWAPA needs for nuanced understanding, decision making, and action.
- DI apps minimize data transport, processing, storage cost, and complexity. They process the high-resolution data locally, and then deliver only the useful data and information needed for centralized analysis and management.
- Itron's new DataHub offers a clearinghouse for authorized data sharing between data producers and data subscribers.

Description of how the proposed DI application may use multiple events or data to derive potential grid edge failures or events.

Itron Response: Where a sequence of events can trigger an event/alarm or specific monitoring processes, most DI applications running on the meter are continually processing data as it relates to a specific neural network model. This allows the various agent/applications to learn premise-specific normal and abnormal environmental characteristics. From this information gathered, relevant information based on the specific use case/application as it relates to the site specifics is leveraged for both the consumer and grid side applications.

Regarding control applications, hard control constraints or triggers that close loop logic will be leveraged to protect both consumer and utility assets (i.e. voltage, load, etc.). These limits are typically use as a safety catch-all and which integration of control systems distribution of software dynamic limits can also be facilitate. (This requires Itron Grid Edge Flex Capacity Management and ADMS integration)

Description of how data created by DI applications is incorporated into regular data collection and delivery activities including the possible utilization of data channels or customer events and alarms.

Itron Response: By design, there exists separation of traditional AMI data and DI data from a network and solution management standpoint. As the AMI solution evolves, some use cases require different data handling models. In an effort to avoid over burdening AMI data collections primary functions this was separated. Itron DataHub provides a path to share various data channels i.e. *AMI Data* - standard reads, events, and alarms; *DI Data* - waveform snapshot, DI event data, DI profile data, etc; and streaming customer data via customer Wi-Fi connection. This allows any utility system to subscribe to APIs for data to support its core business functions regardless of the operational path the data traverse.

Description of how the deployment of DI applications can impact the overall bandwidth of the AMI network and potentially impair regular data collection and what control mechanisms are in place to reduce or eliminate any bandwidth contention.

Itron Response: Where potential future DI use cases may drive richer WAN requirements in the future, operationally we have not seen that to date. The primary benefit of DI is the data processing occurs locally and removing the need to have regular back and forth communications to make decisions which overwhelmingly reduces the amount of network traffic. Further, most heavily data dependent applications tend to be related to consumer disaggregation and notification type of use cases which leverage customer Wi-Fi and have a negligible effect on overall AMI networking requirements. While this future is clearly still being defined, the Itron GenX network maintains the ability to support micro mesh to incrementally add capacity. When and if the time comes to support future use cases this is already supported within the technology and solution proposed to VIWAPA.

Description of any safeguards the overall solution has to prohibit network saturation.

Itron Response: If bandwidth saturation is ever approached, it is resolved by adding additional APs to the existing network infrastructure, as required, thereby increasing the available bandwidth in the given area.

Description of the typical process for downloading a DI application to a single meters or a group of 5,000 meters including timings of the process.

Itron Response: Before a utility can install an app, the following conditions must be met:

- The app must be available and licensed by the utility.
- A utility tester must have approved the app and version for use by that utility.

To install a DI app, a utility operator will use the EAC to do the following:

1. Select an application and version.
2. Select a target device or target group of devices.
3. Execute the download.
4. Use the EAC's standard tools to monitor the download process and remedy any discrepancies.

DI app activation times depend on several factors and specific utility goals. The network is optimized to support pushing DI apps to the targeted endpoints without impacting high-priority network traffic and associated capacity. Therefore, the network's QoS model places a low priority when pushing DI agents relative to high-priority AMI data, alarms, events, and DA traffic. When deploying DI apps to only a handful of devices, apps can be operational within a few hours. If deploying a full-scale delivery (i.e., multiple apps over the entire meter population) the system-wide deployment can be fully operational in as little as four weeks under normal operating conditions. Note: Individual applications can be deployed over minutes or even a day or two depending on size of the application and network dependencies.

Description of any application certification or testing process that is provided to validate that the application is not harmful to overall operation or security.

Itron Response: From the very beginning, a key strategy for the DI platform has been to encourage an environment driving collaboration and innovation. For this reason, we created our **Partner Enablement Program**, which provides a framework for utilities and third-party solution providers to independently develop an ecosystem of applications for the DI platform.

Third-party developers can utilize the Itron Software Developer Kit (SDK) and Hardware Developer Kit (HDK) to build and test their various apps. Details about Itron's developer program are available at <https://na.itron.com/developers/itron-developer-program>.

A Virtual Developer Kit (VDK) was also recently released allowing resources to test their edge apps on a virtual meter. This was developed to accelerate app development and reduce barriers of entry for interested parties.

Regardless of the development path, all apps are required to go through a certification process. This certification process validates the edge app does not violate the development rules in the SDK and the code itself undergoes third-party security inspection to validate it is safe before being published into the EAC. Once in the EAC, apps can be purchased and distributed based on the associated utility's needs. Note: The EAC also provides an environment for auditing the performance of each app as it relates to individual meters. Any event related to the management and support of distribution or performance of the apps will be highlighted on the EAC performance dashboards.

Description of any remote recovery/reset process in the meter that would allow remote recovery of a meter that might have been rendered non-functional due to a DI application.

Itron Response: This question pertains more to traditional firmware upgrades and was one of the foundational reasons DI environments are isolated completely from the rest of the meter. Each DI application operates in its own container on the meter and can only access data via local API calls to the DI message bus on the meter. The agent monitor residing on the meter tracks the performance of the various applications in their own containers against the design specifications. If the application is operating out of tolerance the monitor will reboot the application. Upon the third violation the monitor will remove the application from the meter. Additionally, before any application is made available in a production environment it goes through code inspection process and certification to validate no bad actor software exists on the application. Finally, the application is tested on a DEV/test environment to ensure no harm before final certification and publishing into the EAC for application distribution. In the event a new agent update is not working as intended, the EAC can revert that application to an older version.

Description of any DI user's group or application sharing forum that the Proposer may be facilitating.

Itron Response: Itron has a Grid Edge Innovation Conference twice a year, one adjacent to the annual Itron Inspire Conference (Fall) and one in the Summer. This event is for all customers interested in the Grid Edge portfolio of projects, Grid Edge DERMs, DI (edge applications), OO (Analytics), and MetrixIDR (Forecasting). These events are technical in nature and solicit direct feedback from all utility users to steer solutions to meet key business needs of all utilities. Further, a DI user group meets at both of these events to detail product road maps that are shared and discussed with the group. Utilities also share successes in leveraging the applications and associated data as well as discussing strategies related to implementation at scale to meet specific organizational goals.

1.2.8 AMI Tools

The AMI Solution must include tool(s) for the Meter Shop to test and configure all proposed AMI meters, modules and endpoints.

Itron Response: The Gen5 Riva electric meter does not make use of optical ports or traditional fixed meter passwords for allowing local meter access. This represents a decision by Itron to improve our solution from past generations of AMI electric endpoints that previously made use of the optical port. Itron provides portable field tools for network equipment and endpoint maintenance and troubleshooting. Itron's offering includes network field tools as well as software-based tools for the meter shop.

For direct meter access, the Gen5 Riva meter provides Wi-Fi in place of the optical port for in-field access. This provides a few key advantages including Wi-Fi access "From the Truck" and a higher level of security and reliability for local access. Using Wi-Fi access, a field technician can securely access the device to perform critical field operations including endpoint configuration, firmware upgrades, local data collection, and other diagnostic activities.

For network communications test and configuration, the Gen5 Riva uses the Itron Gen5 NIC. The tools used for testing/configuring/troubleshooting fall into these two categories:

Network tools –FSU is a secure and compact handheld device that uses radio frequency to communicate with any Itron-enabled network devices. When used with the PC-based application Communications Tester, the FSU enables authorized field staff to perform a full range of diagnostics, configuration, meter reads, firmware upgrades and other troubleshooting features.

Meter tools – For mains-powered device support, Itron provides FDM Tools for secure local access to meters for incoming inspection, installation, and maintenance activities. A Field Service Unit (FSU) is used in conjunction with Field Service Unit-Secure Access Manager (FSU-SAM) to obtain security

material to ensure a secure the connection with Gen5 Riva devices. FDM Tools uses only the security credit feature of the FSU device and communicates to Gen5 Riva devices via a 2.4Ghz Wi-Fi connection.

The AMI Solution must include ruggedized tool(s) for the Meter technicians to troubleshoot, configure and read AMI meters, disconnect/reconnect endpoints in the field.

Itron Response: Both the FSU and IMR are designed to handle rugged work conditions and harsh environments.

The AMI Solution must include ruggedized tool(s) for the RF Field technicians to troubleshoot, configure and read all proposed AMI network equipment in the field.

Itron Response: Both the FSU and IMR are designed to handle rugged work conditions and harsh environments.

The AMI Solution must include ruggedized tool(s) for AMI RF field personnel to troubleshoot, interrogate, and analyze the AMI communications network and provide coverage information, i.e. links, signal strength, and performance.

Itron Response: The tools used for testing/configuring/troubleshooting fall into these two categories:

Network tools –FSU is a secure and compact handheld device that uses radio frequency to communicate with any Itron-enabled network devices. When used with the PC-based application Communications Tester, the FSU enables authorized field staff to perform a full range of diagnostics, configuration, meter reads, firmware upgrades and other troubleshooting features.

Meter tools – For mains-powered device support, Itron provides FDM Tools for secure local access to meters for incoming inspection, installation, and maintenance activities. A Field Service Unit (FSU) is used in conjunction with Field Service Unit-Secure Access Manager (FSU-SAM) to obtain security material to ensure a secure the connection with Gen5 Riva devices. FDM Tools uses only the security credit feature of the FSU device and communicates to Gen5 Riva devices via a 2.4Ghz Wi-Fi connection.

Some examples of the capabilities of the field network tools are the ability to measure the RSSI of all detected neighbors, determine the receive and transmit success rate, and many others. In addition, from the headend, Network Center, a centralized Network Monitoring component of the AMI solution being proposed, provides a broad range of functions related to monitoring and control of performance, the configuration and health of mesh nodes, and secure access to assets on the network, including the following capabilities:

- Display device configuration, location, and system variables.
- Monitor the responsiveness of devices and view the route between APs or Relays and devices, including the history for both.
- Report generation for AP child count, Access Point churn count, AP downtime, and devices without a secondary AP.
- Visualization of various network performance parameters in the Gateway dashboard.

The AMI communications tools must support the decryption and encryption of endpoint devices and network devices as necessary to perform troubleshooting, RMA and configuration. Please provide a 1- or 2-page attachment on field tool security and how the security is implemented to meet current and if possible known future requirements.

Itron Response: The FSU is equipped with a smart chip that generates and stores the FSU's unique, private key securely and counts, in hardware, the number of secure associations it sets up with a device

in the field. When the count reaches a configurable threshold, the FSU seizes operation until the key is updated.

FSU-Secure Access Manager (FSU-SAM) makes it possible to personalize the FSU to VIWAPA, issue appropriate certificates with a desired role, and refresh the counter. A role corresponds to a certain privilege level, and currently, there are two roles that can be assigned to the FSU: one with the ability to remote disconnect and one without. There are two types of FSU-SAM users: administrators who are privileged to personalize the FSU and set the counter threshold, and users who can only refresh the counter. These users may be authenticated and authorized against the UtilityIQ database. Alternatively, they may be authenticated against a Central Authentication Server (CAAS), such as Active Directory, and authorized against UtilityIQ. The FSU receives a limited number of tokens for field operations, and its keys from a certificate authority.

Remote troubleshooting is done via the use of the FSU by the meter technician in combination with the network software tool (CATT) or the meter software tool (FDM Tools). If the FSU key is not valid or expired, these tools will not be able to make a secure connection to the device and therefore will not be able to encrypt and decrypt the information to and from the endpoint devices and network devices.

Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

The AMI Tool Solution must support the ability to operate the service switch on-site at or near the meter and determine the switch position with the appropriate field tool.

Itron Response: Local operations can be done via the FSU and FDM software.

The FSU is a secure Itron radio with a USB interface used in conjunction with a laptop by field technicians for secure local device access. The FSU can locally disconnect or connect a switch-equipped meter. The Field Service Unit communicates wirelessly with the meter over the 900mHz mesh.

The FSU operates in a secure mode in which it exchanges appropriate certificates for authentication and authorization, establishes secure associations for communications with these endpoints, and limits the number of secure associations it can make. Each FSU contains a Smart Card and generates a key pair. The private key in each Smart Card is protected by configuring its use to a specified number of times, after which a technician must refresh it. The FSU Secure Access Manager (SAM) personalization process configures the Smart Card in the FSU to add credits. It also signs and inserts the certificate with the appropriate FSU role associated with a Smart Card to enable communication with meters.

Operators set up the FSU Certificate Authority (CA) certificate either to issue the FSU role with Remote Disconnect or without it. The configuration of the certificate appropriately determines whether or not SAM is enabled to delegate remote disconnects.

The AMI Solution must provide updates to tool(s) for future products such as those that might be needed to support new sensing endpoints such as feeder monitors, transformer monitoring, etc. Please provide a 1- or 2-page attachment on how field tool development and release is synchronized with product release or new product development.

Itron Response: Please see *Attachment – VIWAPA Supplemental Information* for additional information requested.

1.3 AMI Technical Requirements

Bidder shall provide detailed hardware, software and networking requirements for their proposed solution. These requirements should include storage requirements to maintain on-line access for

3 months of meter data for the configuration as described below. Fully describe any third party software necessary but not supplied as part of the software license. Fully describe all third party software included in the software license and any specific terms of use governing the included third party software. Identify options for delivering proposed solution as a service or hosted via cloud service providers. For the purposes of sizing, Bidder should assume the following mix of meters and meter data and should describe the ability to support real-time meters:

Itron Response: See Section 5: QA/Prod Environment Requirements above for sample hardware, software, and networking requirements in addition to the Pricing Matrix included with this proposal response.

1.4 AMI Security Requirements

The AMI Solution must provide a security implementation certified by the vendor that the following standards are met or provide a roadmap to the implementation of such standards or sub-bullets as outlined. The AMI Solution must be reviewed and certified by a third party on an annual basis.

Itron Response: AMI Solution must provide a secure upgrade process for hardware, software, communication messages and endpoint devices, including PKI lifecycle management and scanning for malicious files and detection of viruses.

Authentication and authorization throughout the AMI system is handled via an X.509-compliant Public Key Infrastructure (PKI). Basic key management functionality is built into the Itron AMI application suite. This allows the network to use the PKI to automatically establish symmetric session keys for a secure association between the mesh devices and back-office applications, such as AMM, Network Center, etc. Symmetric session keys have a maximum lifetime of 90 days with a typical lifetime of 64 days. Certain critical certificates in the PKI must be periodically renewed. For hosted (SaaS) and managed Customers, this is performed by Itron.

Itron incorporates virus detection capabilities with software platforms and solutions at risk to virus exploits. Virus signatures are updated daily over the Internet directly from the antivirus software vendor and are validated by the vendor. It should be noted that our application UtilityIQ runs on Red Hat Linux platform, which does not have anti-virus software installed as part of our standard implementation.

Itron internal security controls are based on security industry best practices derived from ISO 27002. These controls include physical and environmental security, operational security, security of third parties, system security, virus and malicious code protection, network security management, media handling, backups, monitoring, access control, vulnerability and patch management, and incident management.

AMI Solution must provide an authentication process to verify the originator of a transmission or message in the event of message spoofing, “man in the middle” or replay messaging attacks.

Itron Response: Integrity is checked on every command and response between Itron software (such as UtilityIQ AMM) and Itron devices in the field as part of the application layer communications protocol. The cryptographic algorithm is keyed-HMAC SHA2-256, where the symmetric key is negotiated using ECDH (Elliptic Curve Diffie-Hellman). Besides the application-layer security, which applies end-to-end to every packet exchanged between the back-office and the field endpoint, all routing traffic is checked for integrity within the RF mesh Field Area Network (FAN). This integrity check occurs at the Data Link Layer (Layer 2 in the OSI model) and applies to any link-layer packet exchanged between Itron devices. The mechanism is the same (keyed-HMAC-SHA2-256), with a key negotiated with ECDH.

Integrity is additionally checked over the WAN, where IPsec tunnels also integrate integrity-checking. These techniques protect against spoofing, modification, and replay. All firmware images are also checked for integrity as they are signed by a private key that is held securely by Itron. This signature on the image is verified by a secure bootloader in every device before it boots up from the firmware. The firmware signing protects over-the-air upgrades, protecting against spoofing, repudiation, and modification

AMI Solution must provide an authorization process to validate any individuals “right of access” to the system Head End or subsequent control and monitoring screens.

Itron Response: UtilityIQ is accessed through an intuitive web client interface over a secure VPN connection. Users with roles and privileges are created and maintained in a Central Authentication / Authorization Service (CAAS). Roles and privileges limit what services a user may see or commands and data a user can access and execute. VIWAPA can tailor users to very specific privileges and needs. Within the screens the user has access to, the screens themselves are not customizable by the user.

CAAS does not directly support 2FA/MFA but can indirectly support it via AD/LDAP integration.

AMI Solution must provide an authorization process to validate communications on the AMI Network at all levels (WAN, LAN, & HAN). Any unauthorized or rejected messages should be logged.

Itron Response: Itron enforces role-based access control (RBAC) using principles of least privilege to restrict user privileges to those privileges essential to a particular user's work. For example, a backup user does not need to install software: hence, the backup user's rights are restricted to running backup and backup-related applications. Any other privileges, such as installing new software, are blocked. The principle applies also to a personal computer user with a general user account and is allowed to open a privileged, password-protected account (i.e., Superuser) only when essential. User logins to the application are also logged. Attempts by users assigned roles without sufficient privileges to do any given transactions are prohibited and the attempt and failure logged.

Itron Communications Modules monitor security transactions, authentication and authorization results, and secure association history and record it in their logs. Application have to create a secure association with the endpoint using certificates with proper roles encoded in them in order to have authorization to execute an issued command. Whenever an attempt is made by an unauthorized entity to perform certain operations, the attempt will be detected, flagged and not allowed, even if their certificate is valid. For example, if a compromised meter Communications Module tries to send a remote-disconnect command to another meter's Communications Module, the command will fail, and the module will detect an event.

AMI Solution must provide an environment sufficient to warrant the confidentiality of information to ensure that data is not exposed to unauthorized persons, processes (interfaces), and or devices.

Itron Response: The security architecture of the Itron network requires both applications and components to mutually authenticate. Cryptographic authentication and authorization mechanisms guard against any rogue device from joining the network and participating in the routing of data.

To join a radio mesh, a device must successfully authenticate via its Birth Certificate, an X.509 certificate that is set during manufacturing, and obtain a "Driver's License" which requires the device to be recognized via a whitelist. Unauthorized devices are neither able to join the mesh or communicate with the back-office.

The GenX application layer security protocol provides end-to-end encryption using AES-256 and performs authenticated integrity-checking via keyed HMAC-SHA2-256. Mutual authentication by digital certificate is required before an application layer secure association can be formed and the secure session negotiation completed. Traffic is additionally encrypted using either AES-128 or AES-256 over the backhaul link from the Access Points to the data center termination point. Application UIs will negotiate TLS encryption based on the capabilities of the browser/client.

The AMI Solution must provide for data integrity to provide assurance that data as transmitted, displayed, or received by an end-device has not been tampered with.

Itron Response: Integrity is checked on every command and response between Itron software such as UtilityIQ AMM and Itron devices in the field used keyed-HMAC-SHA256, for which the symmetric keys is negotiated using ECDH (Elliptic Curve Diffie-Hellman). This technique protects against spoofing, modification, and replay.

Besides the application-layer security, which applies end-to-end to every packet exchanged between the back office and the field endpoint, all routing traffic is checked for integrity within the RF mesh (FAN). This integrity check occurs at the data link layer (layer 2 in the OSI model) and applies to any link-layer packet exchanged between Itron devices. The mechanism is the same (keyed-HMAC-SHA256) with a key negotiated with ECDH.

Integrity is additionally checked over the WAN, which are protected by IPsec tunnels.

All firmware images are digitally-signed by a private key that is held securely by Itron. This signature on the image is verified by a secure bootloader in every device before it boots up from the firmware as well as during over-the-air upgrades, protecting against spoofing, repudiation, and modification.

The AMI Solution must provide the sender of data proof of delivery while the recipient of such data is provided the senders identity as a form of non-repudiation.

Itron Response: All communications between head-end applications and mesh devices use the application layer communication protocol and must occur within the context of a secure association, which requires mutual authentication via digital certificate and provides for encryption and authenticated integrity-checking, providing non-repudiation. All messages are acknowledged, providing proof of delivery.

The AMI Solution must be encrypted from end to end and must be compliant with current NERC standards as set forth in The National Electric Reliability Council (NERC) Urgent Action Standard 1200 – Cyber Security.

Itron Response: The security architecture is described in the following points:

1. *Application traffic flowing across the network.* End-to-end layer protection provides a secure association for all back-office controls and applications that send commands to the network interface card (NIC) in each device. X.509 certificates with encoded roles enable a secure association to occur between both ends. Unique key pairs are formed for each secure association, and keys for each link are automatically renewed regularly, with key renewal staggered across the network. The data that is exchanged is encrypted using AES-256, with an integrity check that uses keyed HMAC with SHA-256. Devices in the field use public keys to verify firmware authenticity and integrity at boot time and periodically at run time.
2. *Firmware upgrades sent from the back-office.* Firmware code-signing ensures that all firmware images released by Itron have a digital signature. The NIC uses public-key cryptography for

verifying firmware, and each firmware load is digitally signed and is verified before control is transferred. Without the private key (which is stored securely by Itron on its premises) to sign the firmware, no valid firmware can be created by an intruder or loaded on to the NIC for boot-up.

3. *Wide area network (WAN) backhaul.* IPsec protection over WAN is enabled by securing access from the backhaul network. A VPN tunnel is created with a static key, hashed, and filters are applied to the tunnel to pass only the intended traffic.
4. *Network communications within the Itron RF Mesh.* Link-layer security with EC-based certificates and HMAC SHA-256 ensures that a device cannot participate fully in the network until it has been authenticated by the back office.
5. *Access by any device, including external tools.* Itron uses Public Key Infrastructure (PKI) with a managed Certificate Authority (CA) for digital certificate management with standards-based X.509 certificates. Role-based access control is built into the endpoints.
6. *Certificates and keys.* Hardware security modules (HSMs) protect certificates and keys. Cryptographic key management rules are enforced to assure the security of the contents of the HSMs. HSMs provide FIPS 140-2 level 3 compliant secure key storage in the back office and field. The HSM and KeySafe enable “Configure and Forget” policy enforcement that cannot be bypassed like software. Any attempt to “hack” or tamper with the device in the field by accessing the HSM will result in the “zeroization” of the keys, removing the device from the network, and preventing the injection of malicious traffic into the network.
7. *Network access.* Link-layer security is achieved with Driver’s License Certificate Authority (DLCA), which issues a driver’s license to each node allowed to participate in the network.
8. *Privacy.* Itron protects and secures customer information from unauthorized access, disclosure, and/or destruction using multiple layers of security. Access to the customer Streetlight.Vision application environment is via secure LAN-to-LAN (L2L), Business-to-Business (B2B) Virtual Private Network (VPN) using IPsec technology. Access to the application is implemented by employing SSL encryption for session privacy for the web-based user interface.
9. *Role-based access.* UtilityIQ and SLV provides the functionality for cities to create roles and assign privileges according to the business process policies. Application components require the proper roles and policies, enforced via digital certificates (X.509 format), to be presented to the controller to allow them to run specific operations (such as configure, disconnect, firmware upgrade, reads, etc.) Only the highest privilege is allowed to change policy mappings on the system. The system also enforces role-based access for users with privileges being granted to only the appropriate user role.

Itron recognizes that system security, and policy, is a large area, and this summary is far from comprehensive. Itron would welcome the opportunity to discuss this in more detail with VIWAPA's appropriate team.

The AMI Solution should be regularly subjected to penetration and other security audits from a reputable third-party security firm and reports made available to VIWAPA.

Itron Response: Penetration tests occur throughout the year, every year, by Itron staff, Itron contracted third parties, customers, and customer-contracted third parties. All results are triaged, and responses aligned to a risk-based scoring system as to timing and priority. Communications of any open issues are provided to customers through a Product Information Letter (PIL) and/or in Product Release Bulletins (PRB).

Itron uses a risk-based scoring model from NIST (NVD - CVSS v3 Calculator ([nist.gov](https://nvd.nist.gov))) to determine planning and response to penetration or audit related items. Itron uses standard governance over all such

activities when executed by customers or third-party firms. That governance requires specific and detailed proof of concept, step by step instructions to reproduce and verify any reported issues or concerns.

Our Security Consortium includes many of the world's leading utilities, joining forces with Itron to create a forum for ongoing third-party penetration testing, and to collectively exchange best practices on emerging threat monitoring, operational methodology, etc. VIWAPA's inclusion in this group would provide tremendous benefits to all parties, and we eagerly await the opportunity to welcome you to it.

The AMI Solution and bidder should address additional security standards as follows:

Itron Response:

IEC 62351 Parts 1-8 Information Security for Power System Control

The Itron solution complies with the applicable portions of IEC 62351

IEEE 1686-2007 Security for Intelligent Electronic Devices (IEDs)

The Itron solution complies with the applicable portions of the IEEE 1686-2007 standard.

End-point and communications security.

Itron provides endpoint security and end-to-end communications security. Please see the Security attachment for additional details.

NERC CIP 002-009 Cyber Standards for the bulk power system.

Yes. Itron leverages the ISO/IEC 27001/27002 standards as a basis for building a security controls framework in compliance with utility-related standards, such as NERC CIP 002-009 and NISTIR 7628. Certifications are maintained to ISO/IEC 27001/27002, SOC 1 and SOC 2 Types 1/2, SSAE-16/18. Itron's security management program is reviewed annually.

NIST Special Security Publication SP 800-53 & NIST SP 800-82. Cyber Security Standards and guidelines for Federal Information Systems for application in Bulk Power System.

The solution being proposed conforms to the standards noted here for NERC CIP, NIST SP 800-53, 800-82 and FIPS 140-2.

As it relates to IEC 62351 Parts 1-8, Itron's Gen5 AMI network exceeds the specifications that apply to communications and information storage and supports DNP3 communications bridging.

Itron employs the strictest security standards throughout the proposed solution. The operating controls conform to well known standards and certifications, including ISO 27001/2 and NIST 800-53. The Itron solution specifically conforms to FIPS 186-2 for digital signatures; FIPS 197 for encryption; FIPS 140-2 Security Level 2 and 3 for specific hardware security modules; and FIPS PUB 198 for cryptographic hash functions.

FIPS140-2 Security Requirements for Cryptographic Modules

The Itron solution complies with FIPS PUB 198 for cryptographic hash functions.

1.5 AMI Non-Functional Requirements

The AMI Solution must support communication standards, such as WiSun, IPv6, 802.15.4e and 802.15.4g, cellular Cat M1, etc.

Itron Response: The Itron Gen5 network utilizes a Wi-SUN-compliant mesh radio based on IEEE 802.15.4g and PHY certification from the Wi-SUN Alliance. The Gen5 radio has been certified as Wi-SUN

FAN 1.0 compliant by the Wi-SUN Alliance. All Itron wireless mesh devices will be upgraded over-the-air (OTA) to full Wi-SUN compatibility.

The mesh supports IPv6 at every point in the network from the head end to the end device. In the WAN (cellular network), when IPv6 is not supported, Itron supports RFC-2893 to transport IPv6 inside an IPv4 packet. This is accomplished using IPv6-over-IPv4 encrypted tunnels. If the WAN supports IPv6, the Itron network uses IPv6 end-to-end.

Itron's Cellular AMI solution ensures robust and reliable data communication for AMI endpoints using a two-way LTE-M Cat-M1 cellular network. This network operates over licensed cellular bands from major Mobile Network Operators (MNOs) like Verizon and AT&T, utilizing private APNs for secure direct connections to supported head ends.

Wi-Fi along IEEE 2030.5 also provides a robust HAN platform, with many residential and commercial energy assets, such as solar inverters, batteries, and electric vehicle charging stations, participating on the same Wi-Fi network, enabling critical consumer engagement-based use cases.

The AMI Solution must support MultiSpeak standards (and provide a roadmap for future MultiSpeak version compliance).

Itron Response: Itron currently supports MultiSpeak Adapter v4.1. as well as MultiSpeak 3.0. Itron maintains compatibility between the MultiSpeak adapters and versions of AMM. In addition, Itron continues to work with customers and partners on requirements for future Multispeak versions based on customer and partner demand.

The AMI Solution should be easily integrated with VIWAPA's current and future enterprise system landscape.

Itron Response: The cornerstone of Itron's architectural design philosophy is a solution that is open, modular, and extensible, allowing integration with any other open system design using standard APIs (Multispeak 4.1). This approach ensures compatibility with Itron systems as well as other vendor solutions, including AMI collection systems and upstream business applications (OMS, CIS, WMS, DRMS, etc.). This approach enables the utility to incorporate best-of-breed applications and helps ensure the viability of the solution far into the future.

The AMI Solution should be easily integrated with or provide engineering reports and easy data extractions in support of the distribution network or need for AMI analytics for the purpose of planning and operations.

Itron Response: The UtilityIQ systems provides multiple methods for collection and distribution of 'engineering reports'. Different reports are available from different system sources including AMM Reports and Network Center reports. Itron also offer services that provide extensive sets of aggregated reports such as OO. Itron also offers additional products targeted toward grid planning/

The AMI Solution must be user friendly to support access by internal users with the appropriate security settings for access or management of access based upon operational department or individual need.

Itron Response: The Itron GenX solution includes several authentication and authorization mechanisms, operating at distinct layers and used for specific, distinct purposes:

- Central Authentication and Authorization Service (CAAS) is used to access back-office applications, including both human interactive users and automated system accounts.

- PKI-based digital certificate authentication between back-office applications and mesh devices and between mesh devices.
- Native authentication mechanism for application databases.

CAAS performs centralized authentication, authorization, session management, and single sign-on services across the UtilityIQ suite's applications. All attempts to connect to the user interfaces or APIs of UtilityIQ applications are brokered by CAAS, which requires successful authentication to gain access and successful authorization of every command issued.

User accounts in CAAS are authenticated against a local database and/or a remote LDAP repository. Each account is assigned one or more roles in CAAS, directly or via LDAP group membership, which determines what actions the user is authorized to perform (role-based access control). CAAS monitors and logs all user authentication attempts, successful and unsuccessful.

For applications communicating with mesh devices or mesh devices communicating with each other, mutual authentication is performed via digital certificates underneath the Itron GenX PKI. Both applications and devices must have a unique identity and be issued signed digital certificates distinct to the deployment that chain to a mutual, deployment-specific root of trust. The digital certificates also contain role information included in the certificate as metadata, which allows the parties to perform granular role-based authorization of all requests/commands.

The AMI Solution must contain no feature which cannot be configured, reset or resolved with only Vendor interaction.

Itron Response: Comply. Other than the core configuration of the access point that is done at time of manufacture, customers can configure and reset hardware in the field. VIWAPA will have the ability to add functionality to devices with firmware upgrades and meter program updates.

2 AMI Services Requirements

2.1.1 Program Management and Solution Implementation

Develop and maintain a detailed “turnkey” project plan and controls for the implementation and acceptance of the AMI Solution and all integration necessary to fully implement the AMI network. This includes implementing procedures for project control, project tracking and reporting of progress.

Itron Response: Comply. See Section 4: Project Deployment/Installation above regarding our turnkey project plan and controls for implementation and acceptance of the AMI solution, including integration.

Manage the ordering of the required meters including the meter configuration, meter labeling, communication modules and the integration of such if and as required to meet VIWAPA’s metering requirements.

Itron Response: Comply.

Assist in the receipt, inspection and testing of new AMI meters, AMI communication modules and AMI network equipment.

Itron Response: Comply.

Assist in the ordering and sizing of any applicable servers and databases required to support VIWAPA’s AMI Solution requirements. This should include a detailed and comprehensive Server

and Database Deployment Document that completely defines the hardware, software and configuration specification of all servers comprising the AMI Solution.

Itron Response: Itron will be responsible for building out a scalable production environment based off Itron Engineering compute and storage specifications. Itron Engineering specifications are derived from years for historical testing against read and performance metrics to deliver a robust and highly scalable to hosted customers.

Post contract signing and prior to endpoint deployment, Itron will document the production and lower-tiered environments to maintain configuration and version control and for continuity purposes. Itron will share design documents including diagrams and environment configuration information with VIWAPA.

2.1.2 System and Network Analysis

Develop a detailed coverage plan for the AMI communication (per section 2.3.2.2) network, which ensures that any meter installed in VIWAPA's service territory, will meet the AMI performance requirements (Section 3.3). This network plan or plans must include the number and location of any communication devices and is expected to be accurate within 5% (in other words, the Offeror will guarantee that the amount of network equipment will not exceed the plan by 5%). The Offeror must update this network plan during deployment and provide a final "as built" Coverage and Capacity Plan representing the finally deployed network. Offeror should perform detailed RF propagation studies on VIWAPA's service territories in developing its response.

Itron Response: Comply. Refer to Section 2: Network Coverage Plans above for Itron's detailed coverage plans for VIWAPA.

2.1.3 HES and Integrations

Assist in the development of environment and architecture design and documentation. This should include support for the deployed AMI network including but not limited to theory of operation, backhaul requirements, network capacity, network propagation studies, contingency, and Disaster recovery planning. This backup and recovery plan should include detailed disaster recovery plans for the loss of the AMI head end system. This should also include plans for how the AMI solution performs configuration management and configuration restoration. Provide disaster recovery plan and recovery time to fail over site for failed head end system—since its hosted.

Itron Response: Itron is bidding a production AMI system that will support a stated number of endpoints and meet performance metrics that are outlined in contractual SLAs. The specifications of the production environment are dictated by Itron's engineering teams from which exhaustive testing has been facilitated to state a standardized architecture for a give AMI tier size based on a number of endpoints.

Itron will also be responsible for documenting the architecture and configuration of the environments and these design related diagrams and supporting information will be provided to VIWAPA upon acceptance of the system. The same level of documentation will be outlined for the disaster recovery (DR) solution in which Itron will outline the architecture, failover mechanism, associated processes, and production applications in a customer specific method of procedure (MOP). Only customers that purchase DR will receive documentation and continuity related to the DR environment.

Requirements development and documentation. Offeror should conduct workshops with VIWAPA to establish detailed functional, integration and architecture requirements for.

Itron Response: Itron will work with the customer to assess the need for specific configuration and back-office integration. Itron will first examine the existing environment, systems, and capabilities against business and functional requirements. Itron resources will work with the customer to develop business requirements including initial data gathering, validating scope, and assessing capabilities. Itron will then develop an UtilityIQ High Level Design document. This High-Level Design will identify major systems in scope, system interaction diagrams, integration use cases, and any project assumptions. After review, Itron will develop a detailed design focused on detailed data mapping, timing of data flows, and dependencies on system activity. Failure modes are identified, and exception processing is designed and documented for both automated and manual process handling.

Itron will configure UtilityIQ to meet the business requirements and work with the customer and/or 3rd party system integrators to plan and build out requirements for the integration. Itron will not perform the actual system integration on customer-owned back-office systems. Itron will instead act as a UtilityIQ expert in defining data flows, formats as well as configuring the UtilityIQ system. Finally, Itron will work with the customer and/or third party integrators to test and troubleshoot the customer environment.

Assist in setup and configuration of QA and Production environments. VIWAPA requires the creation of a QA environment of the required AMI hardware and server software configuration at VIWAPA's facility of choice. The QA environments will emulate the ultimate production system and can be used for on-site training and meter configuration or meter testing. VIWAPA will utilize these environments and the respondent should provide initial system installation and training.

Itron Response: Itron will be the number and sizing requirements of any lower-tiered environment deemed necessary by VIWAPA. Typically, lower-tiered environments are sized for 1,000 endpoints but Itron does have an option for a full-size test environment (FSTE) that is same the scale of production and matches the compute and storage specifications of the production environment. This FSTE QA environment would be hosted with the production environment and other lower-tiered environments but would have logical separation from these environments to create a security perimeter.

Itron will be responsible for designing, documenting, implementing and supporting all lower-tiered environments as well as the production environment in the VIWAPA hosting compartment.

The Offeror must provide and support the performance of test procedures, any applicable simulation or propagation studies and monitoring methods to demonstrate proper functioning of the AMI Solution with VIWAPA systems through both QA testing and actual live production. Such support will include the development of the test plans and test scripts, supply of any test harnesses and test data sets, regular testing status reports, final test report, defect tracking and resolution, on-site assistance by the Offeror's engineering and IT experts during the testing to ensure troubleshooting and knowledge transfer that occurs in a timely and efficient manner.

Itron Response: Itron will work with VIWAPA to develop Acceptance test plans as part of the Program. Itron is committed to performing all required acceptance testing as outlined in this RFP, including, Functional Testing, Performance/Capacity Testing, Endpoint Acceptance, Sector Acceptance and Final System Acceptance upon completion of all sectors.

Functional Testing: This testing will verify operating characteristics of the solution including but not limited to connects, disconnects, demand resets, firmware download, integration requirements, etc.

Performance/Capacity Testing: This testing will verify both solution scale as well as system performance requirements for timing/success metrics for key operational commitments. This includes speed of communications/transactions for core business requirements such as on demand reads, disconnects, reconnects, etc. as well as firmware delivery and other business requirements.

Endpoint Acceptance: For this testing Itron will prove to VIWAPA each meter deployed meets agreed upon performance requirements. Itron will provide regular reports for all meters deployed, including those meters accepted and those unaccepted. Any unaccepted meters will be field investigated by Itron or Itron's installation subcontractor to ensure peak operational performance.

Sector Acceptance: Itron will administer Sector Acceptance as outlined by VIWAPA to prove the operational whole of each sector meets VIWAPA performance requirements. Itron will be constantly monitoring performance and optimizing for performance in parallel with deployment. Upon saturation of each sector, Itron will conduct testing and provide supporting metrics to VIWAPA for signoff.

Final System Acceptance: Itron will conduct Final System Acceptance in coordination with VIWAPA after the last sector is accepted. This testing will verify the operational performance of the fully deployed AMI solution confirming performance across the solution is verified prior to Program completion.

VIWAPA may conduct extensive security and intrusion testing on the Test environment. The Offeror will resolve any security issues identify as a condition to acceptance.

Itron Response: Comply.

2.1.4 Network Deployment or Communication Equipment Installation Services

Overall proposed network deployment plan.

Itron Response: See *Section 4: Project Deployment/Installation* above for more information regarding Itron's network deployment plan.

Warehousing of equipment on each island and the associated logistics of receiving, testing, and installation of all proposed network devices.

Itron Response: Itron's installation subcontractor, TMD, will source two warehouses approximately 5,000 square feet that will be a multi-purpose facility capable of providing cross-dock, warehousing, and office space to facilitate loading and unloading of AMI network equipment and electric meters as well as warehouse capacity to securely store the AMI network and electric meters. Also, the office space will provide training and offices for the project manager and supervisors to conduct project management and training activities. Our team will centrally locate the warehouse to facilitate the most efficient routing for installation crews.

Installation Rate including month-by-month installation projections starting with St. John and ending with St Croix.

Itron Response: Itron and TMD plans on executing a 12-month deployment, meaning we will have 12 months from the first installation of mass deployment to complete the balance of required installations. If other timing options are selected (18 month and 24 month) they will revert to the same based on the selected project window.

TMD will establish two (2) warehouse facilities, one in Saint Thomas and another in Saint Croix and have budgeted up to 5,000 SF for each. The project will begin with the pilot on Saint John's that will take approximately a month to complete, TMD has included pricing for lodging on the island for our crew for a month. After ISAT, TMD will begin Mass Deployment (beginning the overall 12-month deployment timeline) on Saint Thomas. Once complete TMD will transition to Saint Croix where we have scheduled six (6) months to complete the deployment. Hassle Water will only take a day or two to complete and can be included in either section of the project (St. Thomas or St. Croix). Month-by-month installation projects are shown below:

- *St. John* – Plans to deploy 3,566 meters in a month on St. John.
- *St. Thomas* – Plans to deploy 25,476 meters over a 6-month period which is approximately 4,246 per month.
- *St. Croix* – Plans to deploy 26,390 meters over a 6-month period which is approximately 4,398 per month.
- *Hassle Water* – Plans to install 141 meters in a day.

Handling all network device failures (RMA's)

Itron Response: Should a device fail during installation, our team will note the work order and tie the device to the failure in the work order. TMD will make the material available for pick up or we can ship the material back to Itron. Additionally, we will replace the failed device with a new device at the given install rate and can trouble shoot the failed device upon development of a process with Itron. TMD would develop a written process with Itron for review and approval. If the device were dispositioned unrepairable, TMD would scrap the device per the salvage process. Itron would be required to provide TMD with an expected network device failure rate to accurately price trouble shooting and salvage activities as these are not currently included in the pricing provided.

Handling all RTU's and exceptions during the deployment process (Offeror should include their assumptions for the # and type of RTU's).

Itron Response: TMD will perform a minimum of two (2) fully documented attempts to gain access to a customer premise to install the meter/endpoint as follows: Two (2) initial attempts shall be via physical visits to the premise on separate dates and times. TMD will perform one (1) attempt via call to the customer to schedule an appointment. Any attempt to provide an appointment that is missed by the customer will be turned over as an RTU regardless of what attempt this takes place on the meter access steps. At accounts where obvious obstructions or impediments prevent access, those accounts will be turned over to the call center after the first attempt to begin scheduling appointments.

If 15 days after the final call is made, and TMD is still unable to complete the work, then TMD will return the work order to the VIWAPA as "Return to Utility (RTU)". Full documentation of attempts to access meters will include date, time and method of attempts will be provided.

TMD will complete a meter exchange as promptly as possible, and within 30 days, after a first failed attempt. TMD will provide at least 2 documented field attempts on 2 separate days, with each field attempt a door hanger will be left for the customer, and 1 documented telephone attempt to attempt to complete each installation, following which TMD will return the applicable meter exchange/AMI Endpoint to Utility as promptly as practicable. The exchange will be skipped if TMD cannot complete the installation due to the inability to enter the Customer's premises or the meter is inaccessible.

Handling any storm related issues such as deployment stand down.

Itron Response: Force Majeure events are currently defined in the current agreement that TMD and Itron have been working under on previous projects. Should deployment delays occur that are not Force Majeure events, TMD will seek to recuperate actual project costs for these delays.

Installation rate including month by month installation projections,

Itron Response: See question above for more information regarding installation projections, in addition to *Section 4: Project Deployment/Installation* above.

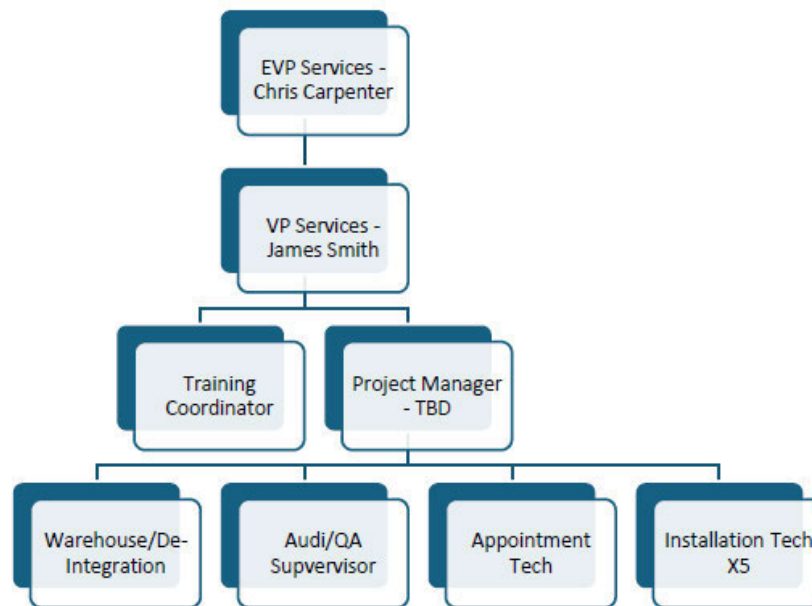
Outline of the suggested network deployment team.

Itron Response: The following roles are typically involved in the management of the deployment for the utility. These are roles and not necessarily individual personnel required:

- **Project Sponsor** – Utility Executive or upper management responsible for the successful execution of the entire project.
- **Project Executive** - Utility Executive to work with TMD Executive to resolve issues that could not be resolved at the project level.
- **Project Manager** – Utility primary point of contact for project operations.
- **Safety & Quality Representative** – Utility personnel responsible for implementing utility safety plan and quality control.
- **Customer Service** – Primary contact for customer account or customer service-related issues or questions.
- **Billing Representative** - Utility Personnel with customer billing governance.
- **Field Support** – Primary contact for hot sockets, infrastructure issues, dangerous situations, etc.

Project Manager / Safety Manager / Installation Auditor / Documentation Lead/ Installation Crews.

Itron Response: TMD will organize the VIWAPA AMI deployment project under the leadership of Chris Carpenter, EVP Services and James Smith, VP Services. TMD will have a full-time on-site project manager who will manage the AMI electric meter exchange team. The organizational chart on the following page depicts the key personnel and project organization approach.



Number of crews expected to be assigned to the project on a month-by-month bases to support projected installations.

As shown in *Section 4: Project Deployment/Installation*, TMD will provide a full project schedule depicting the installation requirements each month. The required technician count for each option is provided below:

- 12-Month - 8 working techs, 1 supervisor/auditor, 1 PM

- 18-Month - 5 working techs, 1 PM to fulfill audit and supervisory duties
- 24-Month - 4 working techs, 1 PM to fulfill audit and supervisory duties

Example documentation set to be provided to VIWAPA per installation.

Itron Response: At the conclusion of the installation project, our Team will deliver a project closeout report that will contain a collection of all the various deliverables and documentation of the project. Including a record of all safety and key performance indicator data.

Any warehousing recommendations with respect to maintaining inventory (Offeror or Contractor warehouse).

Itron Response: Itron and TMD will provide additional warehousing recommendations following contract award.

An initial inclement weather plan

Itron Response: TMD builds into each deployment schedule the forecasted runout and reviews geographical weather patterns and makes a logical estimate to determine the annual amount of weather days that may affect the deployment schedule. TMD takes total annual installation requirements and calculates the runout in workable days on the project and then applies utility holidays and weather days to the deployment schedule to ensure we account for any inclement weather that may cause the deployment team to stand down.

Pricing - The Offeror shall submit the proposed cost schedule for installations, as part of the attached pricing spreadsheet, for all necessary activity including make-ready, pole installation, permitting, required flagging, documentation, and other expenses. Pricing is requested on a per activity basis with the acknowledgement that each site will have to be surveyed to understand the full amount of activities necessary to complete the installation.

Itron Response: Comply. See Appendix C – AMI Pricing Spreadsheet with this proposal response.

The Offeror should describe the required roles and responsibilities for VIWAPA's team members to support the network equipment deployment.

Itron Response: Itron and TMD will be happy to provide further information regarding VIWAPA roles and responsibilities following contract award.

2.1.5 Endpoint Deployment or Endpoint Installation Vendor Services

Technology and implementation planning, describing how each of the electric meters will be ordered, received, tested, deployed, handled in the event of an RTU or exception and RMA'd if required.

Itron Response: Should a device fail during installation, TMD will note the work order and tie the device to the failure in the work order. TMD will make the material available for pick up or we will ship the material back to Itron. Additionally, we will replace the failed device with a new device at the given install rate and will trouble shoot the failed device(s) upon development of a process with Itron. TMD would then develop a written process with Itron for review and approval. If the device(s) were dispositioned unrepairable, TMD would scrap the device(s) per the salvage process. Itron would be required to provide TMD with an expected network and meter device failure rate to accurately price trouble shooting and salvage activities as these are not currently included in the pricing provided.

Warehouse setup, timing, expected number of warehouses required to cover St. Thomas, St. John and St Croix.

Itron Response: TMD researched available properties on both St. Thomas and St. Croix, and while there are units available for lease there are few that meet the deployment needs (only one or two on each island and most are north of \$35 per square foot per year). We will work with the Utility and ITRON as deployment approaches to find facilities that will work for our use. Ideally, we need space that allows for new inventory, staging, and legacy storage with at least a single bay door. Travel crews will be allowed to take their vehicles home to reduce the need for finding a warehouse to accommodate parking needs.

As shown above, TMD will source two warehouses, one on St. Thomas and one on St. Croix, approximately 5,000 square feet that will be a multi-purpose facility capable of providing cross-dock, warehousing, and office space to facilitate loading and unloading of AMI network equipment and electric meters as well as warehouse capacity to securely store the AMI network and electric meters. Also, the office space will provide training and offices for the project manager and supervisors to conduct project management and training activities. TMD will centrally locate the warehouse to facilitate the most efficient routing for TMD installation crews.

Integration of meter deployment Installation Management System to VIWAPA CIS.

Itron Response: Comply. Itron will use EnSight+ integration capabilities to integrate into VIWAPA's CIS.

Individual Meter exchange workflow definition.

Itron Response: Please see Appendix C Itron's Attached *Implementation SOW* for workflow definition. These procedures are subject to change pending negotiations and initial process workshops

Meter exchange high-level workflow to include retries and customer communications and appointment scheduling.

Itron Response: Please see Appendix B Itron's Attached *Implementation SOW* for call center procedures. These procedures are subject to change pending negotiations and initial process workshops.

Meter incoming inspection and testing requirements including first Article Acceptance for meter program verification, labels, nameplate, etc.

Itron Response: The WOMS will utilize barcode scanning for all inventory. This barcoding will allow the WOMS to track each piece through the following inventory cycles:

1. Scanned Received/Quarantined – Meters and AMI endpoints are scanned into TMD warehouse and immediately put into a quarantined location within the system. This fulfills the requirement of all meters and AMI endpoints to be quarantined until testing is complete. They remain here until the utility approves them through their asset management system or through sample testing or both.
2. Scanned RTUs – Meter and AMI endpoints that fail out of the box are scanned into RTU status and prepped for communication back to the utility.
3. Released to Inventory/Production – Quarantined meters and AMI endpoints are transferred out of quarantine and into inventory to be deployed once accepted by the utility. At this point they are moved out of the physical quarantine location and into the physical inventory location.
4. Scanned Staging – Meters and AMI endpoints are scanned out of inventory into an issued status as they are assigned to a technician.
5. Scanned Installed – The technician scans the meter at installation recording the serial number and barcode and tying it to the installation order.

6. Scanned Returned to Inventory – Meters and AMI endpoints that are not deployed during the deployment route for the day are scanned as returns to inventory, are captured into the WOMS, and physically located back into inventory.

The WOMS will not allow duplicates of installed meters. Meters and AMI endpoints installed must come from the list of issued meters and AMI endpoints to the technician or the system will not allow the technician to continue with the exchange. TMD tracks and reconciles inventory daily. Every legacy meter and AMR/AMI endpoint is placed in a box by the installation technician, dated and initialed to be palletized and cataloged for future customer inquiries. This makes the meters and AMR/AMI endpoints easier to find for testing, sorting, and managing the inquiry. These reports can be provided daily, weekly, monthly or any combination depending on the recipient and level of frequency required.

Inventory management and quality control.

Itron Response: See to answer to question above.

Projected number of installers over the life of the deployment

Itron Response: See *Section 4: Project Deployment/Installation* for more information.

Meter installer hiring practices including utilization of local personnel

Itron Response: TMD chose to quote a travel crew to complete the deployment because we anticipate some difficulty in sustaining a local workforce. A 2019 Workforce Development Issues in the Virgin Islands report by OMB cited several issues for acquiring technical labor that suggests there is a significant gap in workforce readiness for hiring a sustained local workforce for this project. TMD researched unemployment and labor participation rates on the Islands to reach this conclusion. A relatively low unemployment rate (3.5% according to US Census data) coupled with a low percentage of labor participation lends itself to completing the work with outside labor. Further, utilizing an experienced team that are familiar with TMDs standards, processes and expectations will yield a much higher daily installation rate per technician and provide captive labor which leads to stability. As such, the calculated installation rate per technician per day is 28 units.

Installer training program and quality control.

Itron Response: See *Section 4: Project Deployment/Installation* for more information.

Field audits of installed meters.

Itron Response: WOMS software is a forced march application where each step of the workflow must be completed before moving to the next step. These steps include advancement with validation control; as an example once at the physical address, the technician must validate and check the box validating the address is correct, the next step forces the technician to enter the meter number associated with the order/address, where the technician enters the meter number from the nameplate of the meter (meter number is not shown on the screen), if the meter number matches, the next screen is available in the work flow. If the meter number was incorrectly entered, or is a wrong number, the technician cannot advance to the exchange screen and either re-enters the number or codes the work order with the wrong meter number.

TMD will conduct inspections for 100% of the sites worked on by new technicians for the first 10 days. Any failures will be brought up to the technician immediately. After this term and the development of proficient results, the inspection sites will be reduced to 5%. If issues are found at any time during the initial inspection period, the term will be extended, and the technician will be retrained on the points of failure.

If at any period of the inspection process the technician fails to grasp the level of proficiency required, they will be reassigned or removed from the project. All issues found in the field that are a direct result of TMD failure to follow expected procedures defined in the statement of work will be immediately addressed and corrected by TMD.

Meter recycling.

Itron Response: TMD will remove the meter specified in the Service Order and perform the exchange. The meter technician will take the old meter and place it in the meter box that the new meter was in. The meter technician will draw a 4-quadrant cross on the meter box and write the last 4-digits of the old meter in the 4-quadrants (one digit in each quadrant).

At the end of each day the meter will be stored in the TMD warehouse for 60-90 days per the contract in case an issue arises where we need to validate the last read. After the 60-90 days period the meter will be dispositioned for recycling or salvage and shipped back to TMD's warehouse in Waco, TX.

TMD will inspect all meters removed to disposition as reusable or salvage. These meters will be purchased for an agreed upon amount. The remaining meters will be sold for salvage by weight. TMD will retain the salvage money to cover the cost of meter inspections.

TMD will store the old meters, meter boxes and pallets for the approved number of days at each of the Utility's service centers. When sold for salvage a certificate of destruction will be provided to ensure all nameplates & registers are destroyed to avoid possible reuse. The recycling strategy can be based and designed around the utility's "GREEN" requirements.

Overall deployment KPI's

Itron Response: See *Attachment – Sample KPI Reports* for more information.

Customer's Meter Service Repair (Electrician Requirements).

Itron Response: TMD will contract with a local licensed electrician to provide meter pan and socket repair services as required.

The Proposer shall include three high-level schedules, with milestones and checkpoints, for the deployment representing a 12-month, 18-month and 24-month meter installation period.

Itron Response: See *Appendix 1 – Project Schedules* below for a high-level schedule representing a 12-month, 18-month, and 24-month deployment.

The Proposer should describe the suggested roles and responsibilities for VIWAPA's team members as well as a recommended structure for the team and the expected level of support these team members would need to provide. Any requirements or resources that VIWAPA needs to provide to achieve the schedule should be identified in this section, including estimates of time required from VIWAPA personnel by level (i.e., executive, IT, functional groups). This description should highlight any staffing differences between a VIWAPA-hosted versus SaaS implementation.

Itron Response: Itron has deployed many environments for utility clients. Due to the unique requirements at each utility, no two deployments are alike. Required resources can differ due to the knowledge and versatility of the utility's staff, subcontractors, governing mandates, scope and solution requirements, and other factors. Itron strongly recommends meeting with members of VIWAPA's staff for a pre-deployment assessment of current staff to develop a specific support staffing plan.

Required roles to support the proposed AMI system at may include System, Database, SAN/Storage, Backup and Application Administrators, Technical Project Manager, Tools Developer, Security and

Compliance Engineers, Business Analyst, and Data Center and AMI Business Operations. Please note that most of these roles shift to Itron in a Managed Services or SaaS deployment option.

Although many of the IT roles listed here may currently exist within the utility, it is important to note that the amount of workload introduced by any smart grid deployment is significant. Careful consideration should be taken when allocating this work to existing groups without adding properly skilled resources, as this increases risk to the project.

2.1.6 Training and Documentation

Offeror must provide appropriate system manuals and documentation. Offeror must provide a plan to properly train specified utility internal personnel how to install, maintain and operate the AMI Solution. Further, the Offeror must provide training on how to use all applications and functions within AMI Head End Software for on-going operations and maintenance. Offeror should include a description and syllabus for all available and future training courses, and indicate whether such training is provided on-site.

Itron Response: Itron has a formalized Instruction and Education organization and staff who prepare and provide training for internal staff and external Customers. Training covers the specific products, tools, processes and procedures to be used in support of internal operations and external Utility Customer requirements. Itron's standard implementation services include:

- *Equipment Training for installation technicians, field personnel, and contractors.* This training includes specific aspects of installing Itron-enabled meters and field network equipment. This training can be completed within a two-day time period.
- *Application Training to learn how to use the applications and tools to administer, monitor, and analyze a typical AMI network environment.* The training includes a single online session over four days with a classroom size of six students. Training courses are provided as a consultative-style training session(s), live/hands-on demonstrations with the Itron applications and "Question and Answer" interaction with an experienced instructor. UtilityIQ training includes system administrator training on user setup, app installation, configuration, and troubleshooting.

Itron advocates a "Train-the-Trainer" approach to training, wherever possible. This means that, after initial training, the training and support materials are sufficient for utility personnel to implement further training to people within your organization. This is an effective way to deal with turnover within the immediate core operations as well as new hires in other areas of your organization. Additional post-deployment training can be made available either onsite or via web-based training on a time and materials basis. More information regarding our training curriculum is included as *Attachment - Itron Technical Education Course Catalog*.

2.1.7 Network Tuning

Offeror must provide network tuning services during and after the network deployment, as necessary to achieve the required network performance, reliability and capacity specifications.

Itron Response: The proposed Itron solution consistently achieves performance at or above these levels following network optimization, a process performed to verify the system is operating within the design specifications. In fact, many customers are consistently achieving greater than 99.8% read reliability. Furthermore, Itron can demonstrate this performance in the VIWAPA network during the acceptance test phase of the project.

Network Optimization is the final step of the network deployment for any geographical area. This process operates on a geographic basis - when an area is saturated (98% of groups of 50,000 to 100,000 endpoints are deployed) the Optimization Process begins on that specific Optimization area. The process examines read performance as well as network metrics (e.g., loading of Access Points) and sometimes calls for the relocation of Access Points and Relays, or possible placement of additional equipment in areas in need of performance improvement. Optimization might also recommend installation of additional SocketAPs if contemplated in the deployment.

Network Optimization is required in order for endpoints to be measured for network SLAs such as Read Performance. For customers hosted by Itron, Network Optimization is provided as a service prior to SLAs taking effect. In some cases when the system is not hosted by Itron, the customer can be trained to perform this operation.

If desired as an option, Itron can provide an endpoint monitoring service during the deployment until meters can be Optimized. This service will analyze connectivity of newly installed meters to ensure they successfully connect to the mesh and direct field remediation work where required.

2.1.8 Managed Software as a Service

Offeror must provide the data center and the hardware and software (other than the AMI HES software which will be separately licensed by Owner) necessary for the AMI HES to host and provide access to the AMI HES and store the data.

Itron Response: This proposal includes a set-up and delivery model that provides Customer with access to UtilityIQ applications running on Itron's private cloud infrastructure. All annual maintenance, licenses, upgrades, etc. for the UtilityIQ headend system are included in the recurring SaaS fees.

With the Hosted Application Services SaaS option (included), Itron manages and controls the underlying cloud infrastructure, including back-office network, application, servers, operating systems, and storage. VIWAPA will access UtilityIQ for day-to-day AMI operation, field network and endpoint monitoring, and onsite remediation.

With the addition of Itron's Network Services option (not included), Itron offers the same as above, and also proactively monitors the field network 24x7 and reports on miscommunicating network backbone devices for the customer's onsite remediation. Plus, network uptime is safeguarded through Read Rate SLAs.

The AMI Head End System must be managed in the Offeror data center with Offeror responsible for the day-to-day monitoring, maintenance and management of the software application, servers and database.

Itron Response: This proposal includes a set-up and delivery model that provides Customer with access to UtilityIQ applications running on Itron's private cloud infrastructure. All annual maintenance, licenses, upgrades, etc. for the UtilityIQ headend system are included in the recurring SaaS fees.

With the Hosted Application Services SaaS option (included), Itron manages and controls the underlying cloud infrastructure, including back-office network, application, servers, operating systems, and storage. VIWAPA will access UtilityIQ for day-to-day AMI operation, field network and endpoint monitoring, and onsite remediation.

With the addition of Itron's Network Services option (not included), Itron offers the same as above, and also proactively monitors the field network 24x7 and reports on miscommunicating network backbone

devices for the customer's onsite remediation. Plus, network uptime is safeguarded through Read Rate SLAs.

The Offeror data center must have and maintain SOC 2 Type II certification and undergo annual penetration testing.

Itron Response: The Itron solution has security baked in at every level. All Itron products are developed under a formal Secure Software Development framework. This framework, depending on the class of the product (Firmware, Web Application, .NET, etc.) requires alignment to one or more well-known design and development standards. OWASP and OWASP API Security Top 10 Core Recommendations are applied during development. Applications are tested using automated and manual processes by internal CTO-Security staff and by external third parties to assure security by design is in place.

Itron maintains certification and attestation reports for ISO-27001/2, SSAE 16/SOC 2 Type 1, and SOC 2 Type 2 audits for Itron operations and processes and requires the same of its third-party hosting facilities. Itron internal and third-party attestation audits for operations of Customer environments are performed yearly. Policies are reviewed yearly and edits are performed as needed.

Itron will provide, upon request and at no charge, the certification and attestation records of any ISO-27001/2, SSAE 16, SOC 2 Type 1, and SOC 2 Type 2 audits. Reports can be made available for examination onsite at Itron's data center. Itron can facilitate a customer visit if requested.

The Managed Services must support the Production AMI HES application for all Owner AMI meters.

Itron Response: Itron's bid includes a stated amount of meters for the production environment which will be outlined in the contract and will be a key metric for defining the production environment infrastructure specifications. Itron will provide Managed Services for the stated amount of production endpoints. Adding additional endpoints, beyond the stated amount of production endpoints, will require a contract change order.

The SaaS services must support a Test/QA instance of the AMI HES application to support at least 1,000 AMI meters.

Itron Response: Comply. Itron has included both a Test and QA with the applicable pricing in the bid.

The SaaS services in support of the Production AMI HES application must include Disaster Recovery with an RTO (Recovery Time Objective) of no more than 24 hours and an RPO (Recovery Point Objective) of no more than 24 hours.

Itron Response: Itron has established formal policies and procedures to ensure that all key processes within the company have the requisite internal controls in place. This includes a business continuity plan and disaster recovery plan so that all critical operations will have appropriate redundancy, failover, and restoration capabilities.

Support for disaster recovery of individual client environments is an optional component of Itron's standard hosting offering. When a customer buys a disaster recovery solution, the plans are exercised periodically based on the terms of the services contract. Itron will provision sufficient infrastructure and network connectivity to support the failover of the designated customer environment.

For customers who have purchased the Disaster Recovery option, if Itron declares, pursuant to the customer Disaster Recovery Plan, that an event causing a significant loss of a production system functionality and/or inability to access or read production data is a "disaster," Itron will provide failover between the production and disaster recovery environments in a manner that meets the agreed upon

RTO and RPO. Itron will restore the production environment in accordance with the Disaster Recovery Plan.

Mechanisms supporting the disaster recovery process include but are not limited to DNS updates, BGP routing (or similar), application and database replication, and third-party tools for replication, automation, and monitoring.

Disaster Recovery RPO of 4-hours and an RTO of 12-hours.

Itron Response: The SaaS services must include an annual disaster recovery test of VIWAPA's instance of AMI HES and a review and update of the Business Continuity Plan. The Itron hosting disaster recovery (DR) offering includes an annual failover test. Additional DR failover tests within the calendar may be requested but would be subject to an additional fee.

The SaaS services must include upgrades of the AMI HES application, as well as DBMS (Database Management System) and operating system software as necessary.

Itron Response: Itron will be responsible for all upgrades of the hosted environment which include the underlying infrastructure up through the application stack. Itron provides two major upgrades of the UtilityIQ application per year. All upgrades are facilitated through change management which include a project plan, back-out plan, customer approval, and a scheduled date and time of the upgrade.

The SaaS services must include the following operational activities and must clearly describe VIWAPA roles and responsibilities (for avoidance of doubt any role not specified as VIWAPA's responsibility, will be the Managed Services provider's responsibility).

Itron Response: This proposal includes a set-up and delivery model that provides Customer with access to UtilityIQ applications running on Itron's private cloud infrastructure. All annual maintenance, licenses, upgrades, etc. for the UtilityIQ headend system are included in the recurring SaaS fees.

With the Hosted Application Services SaaS option (included), Itron manages and controls the underlying cloud infrastructure, including back-office network, application, servers, operating systems, and storage. VIWAPA will access UtilityIQ for day-to-day AMI operation, field network and endpoint monitoring, and onsite remediation.

With the addition of Itron's Network Services option (not included), Itron offers the same as above, and also proactively monitors the field network 24x7 and reports on miscommunicating network backbone devices for the customer's onsite remediation. Plus, network uptime is safeguarded through Read Rate SLAs.

Configure and maintain read schedules, exports, ping schedules and AMI HES background jobs, based on mutually agreed upon settings.

Itron Response: AMM provides easy-to-use, highly configurable meter read schedules. Additionally, AMM features highly configurable network ping schedules, data export schedules, and background jobs.

Meter Read Scheduling

It is important to note the difference between the scheduling of when interval reads or daily self-reads are actually taken at the meter/NIC, and when the headend (AMM) retrieves those recorded reads from the meter/NIC via the RF network. The meter might be recording 15-minute intervals but AMM might be retrieving those reads every 4 hours. These schedules are configurable.

The meter program determines how often it will record interval reads. In this case, AMM can support whatever the meter supports. This configuration can be changed over the RF Network at any time. Daily register self-reads can be configured to run at a specific time (such as 12:01 am).

AMM manages the scheduling for retrieving meter reads. VIWAPA can create custom read schedules to meet business needs, for example, residential meters being read every four hours, C&I customers can be read every hour, and power quality reads can be done every 30-minutes. Read schedules can be configured to run every 15 or 30 minutes, or every 1, 2, 4, 6, or 12 hours, or once daily, or once weekly. The AMM operator can set exactly when these schedules run. For example, a 2-hour read schedule can be set to run at 12:05, 2:05, 4:05 etc., or 1:30, 3:30, 5:30 etc. Also, any number of meter read schedules can be set up (though it is obviously useful to plan these appropriately in order to make the most efficient use of the network). AMM is installed with several default meter read schedules and network ping schedules that simply need to be activated. This illustrates one of AMM's core design principles – that operation should require as little manual intervention as possible.

A related point is that meters do not explicitly need to be added to meter read schedules. AMM provides dynamic device groups. The membership of these groups is maintained automatically by AMM according to the specified properties of devices. For example, one device group that gets used a lot is the “Active Meters” group. An “Active” meter is one for which AMM has all necessary information and which was found on the network and is, therefore, ready to read. The default meter read schedules are set up to read all meters in the “Active Meters” group. As new meters become active, they automatically join the group (and are therefore automatically on the meter read schedule). As meters become inactive, perhaps because of maintenance, they automatically leave the group (and therefore are automatically removed from the meter read schedule). The end result is that the AMM operator does not need to remember to add or remove devices from read schedules.

Manage the operation and configuration of the Network Devices, including the gathering and analyzing of network statistics and trends (with monthly reporting and recommendation for network optimization or improvement).

Itron Response: Comply. For clarity, the customer is responsible for field operations unless otherwise stated in the applicable contract and Managed Services Addendum.

Alert to VIWAPA upon an Incident with any Network Device within 24 hours of such Incident.

Itron Response: Comply. Per our Service Management and Incident Management protocols, VIWAPA would be notified within 15-minutes post the declaration of a Priority-1/Critical Situation incident.

Manage firmware updates to Network Devices and Endpoints, as firmware is released and validated/approved by VIWAPA.

Itron Response: Comply. Itron will be responsible for endpoint firmware download as well as any firmware upgrade of the AP. All firmware download activities are facilitated via Itron change control which includes customer approval.

Provide unlimited access to all data collected into the AMI HES or generated by the AMI HES.

Itron Response: Itron provides customers with access to the HES. Exports from the HES can also be made available. Itron stores up to 90-days of data retention in the HES with a default data retention of 45-days.

Manage the monitoring of all installed AMI meters (for avoidance of doubt, all backoffice activities for AMI meters will be performed by the Managed Services provider and VIWAPA will be responsible for any field activities to investigate or remove/replace failed or failing AMI meters).

Itron Response: Comply. With the SaaS model, Itron builds, owns, and manages the back-office applications at a secure Itron data center. VIWAPA owns/maintains the meters and network elements. Data communication between VIWAPA's service centers and Itron data center is via a secure VPN connection. VIWAPA personnel remotely access the UtilityIQ software applications via the web with secure log-in. Itron is also responsible for all system maintenance and upgrades.

Upgrades/changes to all environments are coordinated with clients using standard change management procedures. All SaaS environments are managed and monitored by Itron's 24x7 operations center and staff.

The Offeror shall commit to a Service Level Agreement to meet all performance requirements.

Itron Response: Comply. Itron will consider specific SLAs to meet customer performance requirements as part of final negotiation and contracting.

Default SLAs: 3-day read rate: 99.5% (post optimization), On-Demand: 98% (post optimization), Availability: 99.5%.

Itron Response: Itron will consider specific SLAs to meet customer performance requirements as part of final negotiation and contracting.

The Managed services must include the following Service Level Targets, as well as details for how the service level is calculated, with a credit to VIWAPA for any month where one or more targets are not met with escalation of the credits for multiple consecutive months (e.g. 1x for 1st month, 1.5x for 2nd month, 2x for 3rd month) of failure:

Itron Response: Service level credits are typically defined during the negotiation phase. Each SLA has a defined calculation to identify if Itron made the SLA or if a service level credit is awarded to the customer.

99.5% of Register Reads for Available Meters are collected, stored and exported to the MDMS no later than 6:00 AM (local time). Escalating credits for levels >99.0% and <99.5%, >98.0% and <99.0%, >97.0% and <98.0%, >95.0% and <97.0%, <95.0%. Maximum credit of 20%.

Itron Response: Service Level Credits are defined during the negotiation phase.

99.5% of the Interval Data for Available Meters is collected, stored and exported to the MDMS no later than 6:00AM the following day. Escalating credits for levels >99.0% and <99.5%, >98.0% and <99.0%, >97.0% and <98.0%, >95.0% and <97.0%, <95.0%. Maximum credit of 20%.

Itron Response: Service Level Credits are defined during the negotiation phase.

98% of all control operations executed, with confirmation of receipt of the request and delivery of confirmation of the execution, within 60 seconds. 99.9% System Availability where the AMI HES is available for use and all services and schedules are operational. Escalating credits for levels >99.5% and <99.9%, >99.0% and <98.0%, >98.0% and <96.0%. Maximum credit of 30%.

Itron Response: Service Level Credits are defined during the negotiation phase.

99.9% Network Availability. Maximum credit of X%.

Itron Response: Service Level Credits are defined during the negotiation phase.

Section 7: Standard Hardware Warranty

1 Relationship to General Terms and Conditions

This Addendum is governed by the General Terms and Conditions and applicable Order Documents. If there is any inconsistency between the General Terms and Conditions and this Addendum, this Addendum shall control, but only to the extent of such inconsistency.

2 Additional Definitions

The following defined terms are in addition to those defined in the General Terms and Conditions:

Equipment means Itron Equipment and Third-Party Equipment.

Firmware means the object code version of software embedded in Equipment.

Itron Equipment means equipment listed on an Order Document for sale to Customer under this Agreement that is manufactured and branded by or on behalf of Itron.

Third-Party Equipment means equipment listed on an Order Document for sale to Customer under this Agreement that is not manufactured and branded by or on behalf of Itron.

Warranty Period means the Itron Equipment warranty period specified on the attached Itron Equipment Warranty Table.

3 Ordering Equipment

Customer shall order Equipment by issuing a Purchase Order to Itron in accordance with and subject to [Section 1.6](#) (Purchase Order Requirement) of the General Terms and Conditions of this Agreement.

4 Invoicing

Itron will invoice Customer for Equipment, any related surcharges, and reimbursable shipping-related expenses, on or after the date of shipment.

5 Ordering, Lead Time & Ship Date

Scheduled shipping dates will be assigned by Itron as close as possible to Customer's requested date specified in an accepted Purchase Order based on Itron's then-current lead times for the Equipment. Upon Customer's request, Itron will communicate current lead times. Itron will also communicate scheduled shipping dates in the order acknowledgment or on Itron's customer portal.

6 Order Cancellation & Rescheduling

Accepted Purchase Orders for Equipment may not be canceled or rescheduled by Customer, unless agreed to in writing by Itron.

7 Forecasts

Each month Customer will provide Itron with a rolling, nonbinding, minimum 12-month forecast of Customer's anticipated Equipment demand.

8 Shipment, Title & Risk of Loss

Shipping terms are set forth in the applicable Pricing Summary to this Agreement (the "**Shipping Terms**") and shall be included by Customer on each Purchase Order for Equipment. Unless otherwise provided in the Shipping Terms, Customer is responsible for making shipping arrangements, and will bear the cost of transporting Equipment, from the place of origin to the place of destination, title and risk of loss shall transfer from Itron to Customer, and delivery shall be deemed to have occurred, upon release to the first carrier, except for cross-border shipments in which case title shall transfer from Itron to Customer upon completion of export clearance.

9 Documentation

Itron will make its standard Documentation for Itron Equipment available via download. Itron will provide Customer with download instructions.

10 Equipment Firmware

The purchase of Itron Equipment includes a nonexclusive license to use Firmware in Itron Equipment in accordance with its Documentation. Customer's license to Firmware in Third-Party Equipment purchased by Customer through Itron shall be subject to the terms of the manufacturer of the Third-Party Equipment.

11 Returns

Except as provided in [Section 12](#) below, Itron does not accept returns of Itron Equipment unless: (i) Itron shipped a product other than as specified in the Purchase Order, (ii) such product is unopened, and (ii) the product is returned in accordance with Itron's then current RMA policy and procedures within ten (10) business days of delivery. Customer's right to return Third-Party Equipment purchased by Customer through Itron shall be subject to the terms of the manufacturer of the Third-Party Equipment.

12 Itron Equipment Warranties

Itron warrants solely to Customer that, during the Warranty Period, Itron Equipment will be free from defects in materials and workmanship and will materially conform to Itron's published specifications in effect as of the date of manufacture. As Customer's sole and exclusive remedy for a breach of the foregoing warranties, Itron will, at its option and expense: (i) repair or replace faulty Itron Equipment under warranty after it has been returned to an Itron-designated repair facility during the Warranty Period in accordance with Itron's then current RMA policy and procedures, (ii) provide Customer with a Firmware or software fix to correct the nonconformity, or (iii) if Itron determines (in its reasonable judgment) that it is unable to provide a remedy specified in item (i) or (ii) of this section, Itron will provide Customer with a depreciated refund of the purchase price for the applicable Itron Equipment. Customer will pay the cost of returning Itron Equipment to the Itron designated repair facility and Itron will pay the cost of returning repaired or replacement Itron Equipment to Customer. Customer is responsible for any labor costs associated with removal or reinstallation of Itron Equipment. Repaired and replacement Itron Equipment will be warranted for the remainder of the Warranty Period, or sixty (60) days from the ship date of the repaired or replaced Itron Equipment, whichever is longer. Additional warranty terms for specific Itron Equipment may be specified in the attached Itron Equipment Warranty Table.

13 Itron Equipment Warranty Exclusions

The warranties under [Section 12](#) and additional warranty terms in the attached Itron Equipment Warranty Table do not cover Itron Equipment defects or nonconformities caused by: (i) changes or repairs made to Itron Equipment without Itron's prior written consent, (ii) use with cables, mounting kits, antennas, battery backups and other devices, Third-Party software or firmware that Itron has not provided to Customer or approved in writing for use with Itron Equipment, (iii) Customer's or a Third-Party's misuse, abuse, neglect, negligence, or failure to store, install, test, handle or operate Itron Equipment in accordance with its Documentation, (iv) a Force Majeure event, or (v) incorrect data, or data entry or output by Customer or a Third-Party not under Itron's control. Additional warranty exclusions for specific Itron Equipment may be specified in the attached Itron Equipment Warranty Table. Customer may request that Itron repair Itron Equipment damaged by any of the foregoing; if Itron agrees to make such repairs, Customer may be charged additional Fees.

14 Integration of Itron Equipment

If Customer purchases Itron Equipment for integration into third-party devices or other third-party hardware, Customer will obtain warranty service for the Itron Equipment from the third-party integrated device provider.

15 Equipment End of Sale

15.1 Notice and Last-Time Buys

Itron will make commercial reasonable efforts to provide Customer with no less than one hundred and eighty (180) days' notice before discontinuing the sale of any Itron Equipment set forth in an Order Document, provided that (a) the pricing for such Itron Equipment is valid under Section 6.1 (Fees) of the General Terms and Conditions of this Agreement beyond the discontinuance of sale date, and (b) Customer has purchased such Itron Equipment within the three hundred and sixty-five (365) day period preceding the date upon which notice is to be given. During the foregoing notice period, Customer may place non-cancellable, non-returnable "last time buy" Purchase Orders for any Itron Equipment identified in the end of sale notice, unless such discontinued sale is due to a Force Majeure event in which case the last time buy will be governed by the Force Majeure event notification. Customer must take delivery of all such ordered Itron Equipment within one hundred and eighty (180) days of the Purchase Order acceptance date or within thirty (30) days from shipment availability, whichever is longer. Itron does not guarantee the availability of Third-Party Equipment. Itron's sole obligation with respect to the discontinuance of Third-Party Equipment is to provide Customer with any end of sale notice that Itron receives from the Third-Party Equipment manufacturer.

15.2 Replacement Itron Equipment

Itron will not end the sale of any Itron Equipment while the pricing for such Itron Equipment remains valid under Section 6.1 (Fees) of the General Terms and Conditions of this Agreement, other than as a result of a Force Majeure event, without making replacement equipment available for purchase by Customer. Such replacement equipment will be functionally equivalent to the discontinued Itron Equipment it replaces, to the extent such functionality is listed in Itron's published specifications in effect as of the date of manufacturing for such discontinued Itron Equipment in use by Customer. Any such replacement equipment will be backwards compatible and interoperable with other Itron Equipment to the same extent as the Itron Equipment it was designed to replace. Itron may either (i) disable any new functionality or features provided by the replacement equipment, or (ii) if Itron is unable to disable any new functionality or features in the replacement equipment, or Customer elects to purchase such new functionality or features, charge Customer the applicable fees for such new functionality or features.

16 Third-Party Equipment Warranty

Itron is not the manufacturer of Third-Party Equipment and makes no representations or warranties whatsoever, directly or indirectly, express or implied, as to the suitability, durability, fitness for use, merchantability, condition, quality, performance or non-infringement of Third-Party Equipment. Third-Party Equipment shall be subject to any warranties provided by the Third-Party Equipment manufacturer. Itron will pass through to Customer, or make commercially reasonable efforts to enforce on Customer's behalf, any warranties and remedies received from the Third-Party Equipment manufacturer.

17 Survival

The following sections of this Addendum shall survive termination or expiration of this Agreement or any Order Document or Statement of Work: 1 (Relationship to General Terms and Conditions), 2 (Additional Definitions), 4 (Invoicing), 6 (Order Cancellation & Rescheduling), 8 (Shipment, Title & Risk of Loss), 10 (Equipment Firmware), 11 (Returns), 12 (Limited Itron Equipment Warranties), 13 (Itron Equipment Warranty Exclusions), 14 (Integration of Itron Equipment), 16 (Third-Party Equipment) and 17 (Survival).

Itron Equipment Warranty Table

Itron Equipment or Repair Service	Warranty Period and Additional Warranty Terms												
<p>100W+ series water module (including battery)</p> <p>500W series water module (including battery), excluding 500W series cellular water module</p>	<p>Each 100W+ and 500W series water module (including battery) (each, a "Water Module" and collectively, the "Water Modules") receives a 20-year warranty consisting of 10 years of warranty coverage under <u>Section 12</u> ("Itron Equipment Warranty") followed by 10 years of discounts against replacement products, as described below:</p> <p>Warranty Period: 10 years from date of shipment.</p> <p>Discount Period: If a Water Module (including battery) fails during the ten-year period following expiration of the applicable Warranty Period (the "Discount Period"), subject to applicable warranty exclusions under <u>Section 13</u> (Itron Equipment Warranty Exclusions), Itron will provide Customer with a discount off Itron's then-current list price for any available Itron water module to replace the failed Water Module (including battery) per the discounts set forth below:</p> <table border="1"> <thead> <tr> <th>10-year Discount Period following 10-year Warranty Period</th><th>Discount</th></tr> </thead> <tbody> <tr> <td>Years 1 through 5</td><td>50%</td></tr> <tr> <td>Years 6 through 10</td><td>25%</td></tr> </tbody> </table> <p>Itron replacement water modules will be compatible with an Itron-supported water module reading solution.</p> <p>Warranties on the applicable Water Modules shall be void if (a) such Water Module is used in connection with a third-party reading system that has not been approved by Itron in writing; or (b) Customer utilizes the two (2) battery version of such 500W Water Module in mobile mode for more than two (2) consecutive years.</p>	10-year Discount Period following 10-year Warranty Period	Discount	Years 1 through 5	50%	Years 6 through 10	25%						
10-year Discount Period following 10-year Warranty Period	Discount												
Years 1 through 5	50%												
Years 6 through 10	25%												
<p>500W series cellular water module (including battery)</p>	<p>Each 500W series cellular water module (including battery) (each, a "Cellular Water Module" and collectively, the "Cellular Water Modules") receives a 20-year warranty consisting of 10 years of warranty coverage under <u>Section 12</u> (Itron Equipment Warranty) followed by 10 years of discounts against replacement products, as described below:</p> <p>Warranty Period: 10 years from date of shipment.</p> <p>Discount Period: If a Cellular Water Module (including battery) fails during the ten-year period following expiration of the applicable Warranty Period (the "Discount Period"), subject to applicable warranty exclusions under <u>Section 13</u> ("Itron Equipment Warranty Exclusions"), Itron will provide Customer with a discount off Itron's then-current list price for any available Itron cellular water module to replace the failed Cellular Water Module (including battery) per the discounts set forth below:</p> <table border="1"> <thead> <tr> <th>10-year Discount Period following 10-year Warranty Period</th><th>Discount</th></tr> </thead> <tbody> <tr> <td>Year 1</td><td>70%</td></tr> <tr> <td>Year 2</td><td>65%</td></tr> <tr> <td>Year 3</td><td>60%</td></tr> <tr> <td>Year 4</td><td>55%</td></tr> <tr> <td>Year 5</td><td>50%</td></tr> </tbody> </table>	10-year Discount Period following 10-year Warranty Period	Discount	Year 1	70%	Year 2	65%	Year 3	60%	Year 4	55%	Year 5	50%
10-year Discount Period following 10-year Warranty Period	Discount												
Year 1	70%												
Year 2	65%												
Year 3	60%												
Year 4	55%												
Year 5	50%												

Itron Equipment or Repair Service	Warranty Period and Additional Warranty Terms	
	Year 6	45%
	Year 7	40%
	Year 8	35%
	Year 9	30%
	Year 10	25%
	<p>Itron replacement water modules will be compatible with an Itron-supported water module reading solution.</p> <p>Warranties on the applicable Water Modules shall be void if (a) such Water Module is used in connection with a third-party reading system that has not been approved by Itron in writing; or (b) Customer utilizes the two (2) battery version of such 500W Water Module in mobile mode for more than two (2) consecutive years.</p>	
CGR ACT Module (CAM)	Warranty Period: 5 years from date of shipment.	
Itron Leak Sensor		
CENTRON Electric Meter Intelis Gas Meter/Intelis 250 Gas Meter/Intelis 425 Gas Meter	Warranty Period: 3 years from date of shipment.	
SENTINEL Electric Meter		
QUANTOMETER (MZ) Gas Meter	Warranty Period: 2 years from date of shipment.	
ROTARY (DELTA) Meter		
TURBINE (FLUXI) Gas Meter		
Repairs or updates for out-of-warranty electricity meters	Additional Warranty Terms: Itron shall perform the repairs or updates with reasonable care and in a diligent and competent manner. Itron's sole obligation in connection with repair or update failures shall be, at its option, to correct or re perform repairs/updates or refund to Customer the amount paid for the repairs/updates. Customer must report any deficiencies in repair work to Itron in writing within 90 days of shipment to receive the remedies described herein.	
Repairs or updates for out-of-warranty Socket Based Routers, Pole Mounted Routers and Routing Nodes	Additional Warranty Terms: Itron shall perform the repairs or updates with reasonable care and in a diligent and competent manner. Itron's sole obligation in connection with repair or update failures shall be, at its option, to correct or re perform repairs/updates or refund to Customer the amount paid for the repairs/updates. Customer must report any deficiencies in repair work to Itron in writing within 90 days of shipment to receive the remedies described herein.	
All other Itron Equipment not listed above.	Warranty Period: 1 year from date of shipment.	
Itron Equipment	Warranty Period and Additional Warranty Terms	
[Insert product name]	[Insert warranty period if greater than one year, including commencement date (e.g., "Warranty Period: 3 years from date of shipment"), and any additional warranty terms beyond standard Itron equipment warranty terms]	

All other Itron Equipment not listed above.	Warranty Period: 1 year from date of shipment.

Section 8: Standard Software License and Software Maintenance Agreement

SOFTWARE ADDENDUM

18 Relationship to General Terms and Conditions

This Addendum is subject to the General Terms and Conditions and applicable Order Documents. If there is any inconsistency between the General Terms and Conditions and this Addendum, this Addendum shall control, but only to the extent of such inconsistency.

19 Additional Definitions

The following defined terms are in addition to those defined in the General Terms and Conditions:

Authorized Installations means installations of Itron Software only on one production environment and one test environment on Customer premises.

Authorized User means an employee or contractor of Customer who Customer permits to access and use the Itron Software and/or Documentation pursuant to Customer's license hereunder.

Endpoints means (i) a physical device (e.g., a meter, encoder-receiver-transmitter module, or other measuring, monitoring or sensing device) capable of being used in connection with Itron Software, or (ii) a virtual device created in the Itron Software to simulate the existence of a physical device. An example of a virtual device that is an Endpoint would include a single electricity meter that serves ten (10) apartment units. If the consumption data from that electricity meter was divided between ten (10) units (e.g., on the basis of square footage) and used in the Itron Software as if that single electricity meter was actually ten (10) electricity meters, it would count as ten (10) Endpoints. Further, each account, whether active or inactive, in the applicable that is associated with a single physical device counts as a separate Endpoint.

Itron Software means the machine readable (object code) version of computer programs listed on an Order Document to be licensed to Customer under this Agreement that are developed by or on behalf of Itron.

License Term means the duration of the Itron Software license granted by Itron to Customer under this Addendum; unless otherwise provided in an Order Document, the License Term for each Itron Software product is perpetual.

Software means Itron Software and Third-Party Software, including any updates provided to Customer pursuant to this Agreement.

Software Warranty Period means a period of ninety (90) days from the date of delivery, unless another Software Warranty Period is expressly stated in the applicable Order Document.

Third-Party Software means the machine readable (object code) version of computer programs listed on an Order Document to be licensed to Customer by a third-party and that are not developed by or on Itron's behalf.

20 Ordering Software

Customer shall order Software by issuing a Purchase Order to Itron in accordance with this Agreement.

21 Delivery and Invoicing

Itron will promptly deliver Software electronically, on tangible media, or by other means following Itron's acceptance of the applicable Purchase Order. Risk of loss of any tangible media on which the Software is delivered will pass to Customer on delivery to carrier. Itron will invoice Customer for Fees due for Software upon the date of delivery.

22 Itron Software License

Subject to and conditioned on Customer's payment of all applicable Fees and compliance with this Agreement, Itron hereby grants to Customer a non-exclusive, non-sublicensable, and non-transferable license during the License Term to use Authorized Installations of Itron Software and related Documentation for Customer's internal business purposes solely: (i) within the Territory; (ii) in connection with the number of Endpoints or other devices specified on the applicable Order Document; and (iii) in accordance with any other restrictions specified on the applicable Order Document.

23 Third-Party Software

All Third-Party Software and related documentation is separately licensed to Customer by the applicable third-party, and Customer's rights and responsibilities with respect to such software or documentation shall be governed in accordance with the third-party licensor's applicable software license. If Customer chooses to order Third-Party Software, Customer shall enter into or accept one or more separate third-party agreements as part of the ordering, fulfillment, installation and/or download processes for such Third-Party Software.

24 Documentation

Itron will make its Documentation available via download and provide Customer with download instructions.

25 Itron Software License Restrictions.

Customer shall not use the Itron Software or Documentation for any purpose beyond the scope of the licensed granted in this Addendum. Without limiting the foregoing, Customer will not at any time, directly or indirectly: (i) modify or create any derivative works from Itron Software, (ii) distribute the Itron Software, (iii) include or combine Itron Software with any software, equipment, or hardware other than as expressly authorized in writing by Itron, (iv) use Itron Software to provide services to third-parties, (v) reverse assemble, decompile, reverse engineer Itron Software or otherwise attempt to derive its source code except to the extent that such restriction is prohibited by applicable law, (vi) export Itron Software out of the Territory, (vii) use any Itron Software to create products or services that compete with any of Itron's products or services, or (viii) copy Itron Software except to make one machine readable copy for disaster recovery or archival purposes. Customer's breach of these restrictions or use of Itron Software or Documentation other than as licensed hereunder shall constitute a material breach of this Agreement and shall result in revocation and immediate termination of all rights and licenses granted under this Agreement. Revocation does not preclude Itron from pursuing any legal and equitable remedies for Customer's breach of these restrictions. Customer is responsible and liable for all uses of Itron Software and Documentation resulting from access provided by Customer, directly or indirectly, whether such access or use is permitted or in violation of this Agreement. Without limiting the generality of the foregoing, Customer is responsible for all acts and omissions of Authorized Users, and any act or omission by an Authorized User that would constitute a breach of this Agreement if taken by Customer will be deemed a breach of this Agreement by Customer. Customer shall take reasonable efforts to make all Authorized Users aware of this Agreement's provisions as applicable to such Authorized User's use of the Itron Software, and shall cause Authorized Users to comply with such provisions.

If an Itron Software license is acquired under a United States government contract, Customer acknowledges that such Itron Software (including updates thereto) and associated Documentation are "Commercial Computer Software" as defined in 48 C.F.R. 12.212 of the Federal Acquisition Regulations (FAR) and in 48 C.F.R. 227.7014(a)(i) of the Department of Defense Federal Acquisition Regulations Supplement (DFARS), and are provided with only the commercial rights and subject to the restrictions described in this Agreement.

Customer shall not use the Itron Software or Documentation for any purpose beyond the scope of the licensed granted in this Addendum. Without limiting the foregoing, Customer will not at any time, directly or indirectly: (i) modify or create any derivative works from Itron Software, (ii) distribute the Itron Software, (iii) include or combine Itron Software with any software, equipment, or hardware other than as expressly authorized in writing by Itron, (iv) use Itron Software to provide services to third-parties, (v) reverse assemble, decompile, reverse engineer Itron Software or otherwise attempt to derive its source code except to the extent that such restriction is prohibited by applicable law, (vi) export Itron Software out of the Territory, (vii) use any Itron Software to create products or services that compete with any of Itron's products or services, or (viii) copy Itron Software except to make one machine readable copy for disaster recovery or archival purposes. Customer's breach of these restrictions or use of Itron Software or Documentation other than as licensed hereunder shall constitute a material breach of this Agreement and shall result in revocation and immediate termination of all rights and licenses granted under this Agreement. Revocation does not preclude Itron from pursuing any legal and equitable remedies for Customer's breach of these restrictions. Customer is responsible and liable for all uses of Itron Software and Documentation resulting from access provided by Customer, directly or indirectly, whether such access or use is permitted or in violation of this Agreement. Without limiting the generality of the foregoing, Customer is responsible for all acts and omissions of Authorized Users, and any act or omission by an Authorized User that would constitute a breach of this Agreement if taken by Customer will be deemed a breach of this Agreement by Customer. Customer shall take reasonable efforts to make all Authorized Users aware of this Agreement's provisions as applicable to such Authorized User's use of the Itron Software, and shall cause Authorized Users to comply with such provisions.

To the extent directive 2009/24/EC on the legal protection of computer programs or similar legislation or regulations (collectively, the "directives") may provide Customer the right to decompile Itron Software in order to obtain information necessary to achieve the interoperability of an independently created computer program, prior to exercising any such possible rights under the directives, Customer agrees to: (a) first notify Itron of Customer's good faith belief that information necessary to achieve the interoperability of an independently created computer program is not otherwise available and that decompilation is indispensable within the meaning of the directives; and (b) provide Itron with a reasonable amount of time to respond to Customer regarding the foregoing assertions.

Customer shall not use the Itron Software or Documentation for any purpose beyond the scope of the licensed granted in this Addendum. Without limiting the foregoing, Customer will not at any time, directly or indirectly: (i) modify or create any derivative works from Itron Software, (ii) distribute the Itron Software, (iii) include or combine Itron Software with any software, equipment, or hardware other than as expressly authorized in writing by Itron, (iv) use Itron Software to provide services to third-parties, (v) reverse assemble, decompile, reverse engineer Itron Software or otherwise attempt to derive its source code except to the extent that such restriction is prohibited by applicable law, (vi) export Itron Software out of the Territory, (vii) use any Itron Software to create products or services that compete with any of Itron's products or services, or (viii) copy Itron Software except to make one machine readable copy for disaster recovery or archival purposes. Customer's breach of these restrictions or use of Itron Software or Documentation other than as licensed hereunder shall constitute a material breach of this Agreement and shall result in revocation and immediate termination of all rights and licenses granted under this Agreement. Revocation does not preclude Itron from pursuing any legal and equitable remedies for Customer's breach of these restrictions. Customer is responsible and liable for all uses of Itron Software and Documentation resulting from access provided by Customer, directly or indirectly, whether such access or use is permitted or in violation of this Agreement. Without limiting the generality of the foregoing, Customer is responsible for all acts and omissions of Authorized Users, and any act or omission by an Authorized User that would constitute a breach of this Agreement if taken by Customer will be deemed a breach of this Agreement by Customer. Customer shall take reasonable efforts to make all Authorized Users aware of this Agreement's provisions as applicable to such Authorized User's use of the Itron Software and shall cause Authorized Users to comply with such provisions.

26 Limited Itron Software Warranty

For the Software Warranty Period, Itron warrants solely to Customer that the Itron Software will substantially conform in all material respects to the applicable Itron published specifications. As Customer's sole and exclusive remedy for any breach of this warranty, Itron will, at its option, during the applicable Software Warranty Period, repair or replace non-conforming Itron Software to substantially conform to the foregoing warranty, provided that Itron will have no obligation to repair or replace any non-conforming Itron Software if this Agreement or applicable Order Document has terminated or expired. The foregoing warranty does not apply to non-conformities in Itron Software due to: (i) modifications not made or approved by Itron in writing; (ii) Customer's or any third party's negligence or intentional acts; (iii) misuse or abuse, including the failure to use or install Itron Software in accordance with the Documentation; (iv) incorrect data, or data entry or output, as applicable, by Customer or a third party; (v) use with third party software, hardware or firmware not provided or authorized by Itron in writing; (vi) a Force Majeure event; or (vii) viruses or security vulnerabilities introduced into the Itron Software or Customer's systems through no fault of Itron. After the applicable Software Warranty Period, any Itron Software errors and any maintenance updates will be addressed under the Maintenance and Support Services Addendum.

27 Effect of Expiration or Termination for Cause

Upon termination of an Itron Software license for cause or expiration of a License Term, whichever occurs first, Customer shall immediately discontinue use of the applicable Itron Software and related Documentation, and Customer will destroy or return to Itron any and all copies. Upon Itron's request, Customer will confirm in writing that Customer has destroyed or has returned Itron Software and related Documentation in compliance with this section. This requirement applies to copies in all forms, partial and complete, in all types of media and computer memory, and whether or not modified or merged into other files or materials. Termination of an Itron Software license for cause will not restrict Itron from pursuing any other remedies available to it, including injunctive relief, nor will it relieve Customer of its obligation to pay all fees that accrued prior to such termination.

28 Third-Party Software Warranty

Itron is not the owner of Third-Party Software and makes no representations or warranties whatsoever, directly or indirectly, express or implied, as to the suitability, durability, and fitness for use, merchantability, condition, quality, performance or non-infringement of any Third-Party Software. Third-Party Software shall be subject to any warranties provided by the Third-Party Software provider. Itron will pass through to Customer, or make commercially reasonable efforts to enforce on Customer's behalf, any warranties and remedies received from the Third Party Software provider.

29 License Use Verification & Audit

29.1 License Use Verification

Customer represents and warrants the Itron Software will be used by Customer in compliance with the licenses granted in this Addendum. Promptly upon Itron's written request, and no more than once annually, Customer must furnish Itron with a letter signed by an officer of Customer, verifying such compliance, and confirming the number, identification, type and location of Endpoints and other devices being managed by Customer using Itron Software.

29.2 Audit

Itron has the right to audit Customer records to verify the number of Endpoints and other devices being managed by Customer using Itron Software and otherwise confirm Customer's compliance with license restrictions and Fee obligations of this Agreement. Itron must provide Customer with at least thirty (30) days prior written notice of the audit. The audit must be conducted during Customer's normal business hours at a mutually agreeable location. Itron's right to conduct an audit under this Section is limited to one (1) time per year, unless Itron has reason to believe that Customer is out of compliance with the license restrictions and Fee obligations of this Agreement. Itron has the right to use an independent auditor to conduct the audit. The audit shall be at Itron's sole cost and expense, unless the audit identifies a deficiency in Fees or other amounts owed or reimbursable by Customer during the audited period that is greater than five percent (5%) of the total amounts payable by Customer – in which case Customer must reimburse Itron for all reasonable costs of the audit. All

amounts found to be owed by Customer pursuant to an audit will be payable within thirty (30) days after receipt of invoice from Itron.

30 Survival

The following sections of this Addendum shall survive termination or expiration of this Agreement or any Order Document or Statement of Work: 1 (Relationship to General Terms and Conditions), 2 (Additional Definitions), 4 (Delivery and Invoicing), 5 (Itron Software License) except to the extent applicable license rights expire or are terminated in accordance with this Agreement, 6 (Third-Party Software), 8 (Itron Software License Restrictions), 9 (Limited Itron Software Warranty), 10 (Effect of Termination for Cause), 11 (Third-Party Software Warranty), 12 (License Use Verification & Audit) and 13 (Survival).

Section 9: AMI Solution Requirements Compliance

Itron has completed the **AMI Solution Requirements Compliance matrix (Appendix B)** in its entirety and has included it with our proposal response.

Section 10: Pricing Response

Itron has recorded out Pricing information in the “**RFP Pricing Spreadsheet.xls**” in Appendix C and has completed the Solution Pricing matrix in its entirety. Please see this spreadsheet included with our proposal response.

Section 11: Managed AMI Operations Services

SOFTWARE-AS-A-SERVICE ADDENDUM

General SaaS Terms and Conditions

Relationship to General Terms and Conditions. This Software-as-a-Service Addendum (this “**Addendum**”) is governed by the General Terms and Conditions of this Agreement and applicable Order Documents.

Entire Addendum. This Addendum consists of these General SaaS Terms and Conditions, which generally apply to all Service Offerings, and any attached Special Terms and Conditions, which apply to specific Service Offerings. Unless otherwise provided, references to this Addendum shall be deemed to encompass these General SaaS Terms and Conditions and any attached Special Terms and Conditions.

Order of Precedence. In the event of any inconsistencies, ambiguities or conflicts between these General SaaS Terms and Conditions and the Special Terms and Conditions, the Special Terms and Conditions shall prevail, but only with respect to the applicable Service Offering.

Definitions. The following defined terms are in addition to those defined in the General Terms and Conditions of this Agreement:

Annual Adjustment means Itron’s annual price increase.

Endpoint means an electric meter, gas or water endpoint receiver-transmitter, battery-powered device, or any other device that Itron has agreed to monitor as part of a Service Offering which Endpoints are identified in the Order Document or Pricing Summary.

General SaaS Terms and Conditions means the terms and conditions set forth in the main body of this Addendum comprised of Sections 1 (“Relationship to General Terms and Conditions”) through 19 (“Roles and Responsibilities”).

Maintenance Services means services provided under the Maintenance and Support Services Addendum.

Minimum Subscription Term means the minimum number of SaaS Billing Cycles during which Customer is required to subscribe for each Service Offering, which shall be three (3) SaaS Billing Cycles following the applicable Service Offering Commencement Date, unless otherwise stated in the applicable Order Document or Pricing Summary.

One-Time Setup Fee means the one-time setup fee for each Service Offering identified in the applicable Order Document or Pricing Summary.

Recovery Point Objective or **RPO** means the maximum tolerable time period which data might be lost from production Software due to a service interruption event.

Recovery Time Objective or **RTO** means the duration of time allowing for the execution of all failover processes required to return access, connectivity, functionality, and operation of production Software to Customer following declaration of a disaster event.

SaaS means software-as-a-service whereby Itron or its designated provider hosts and provides Customer with access to Software on Servers via the internet.

SaaS Billing Cycle means a period of one year beginning on the Effective Date or any anniversary thereof.

SaaS Application Availability means the total number of minutes in a calendar month that the applicable Software is available via (a) a web browser client, (b) web services interface and (c) thin client. Scheduled downtime is excluded from this calculation. A determination of availability will be based on 24x7 accessibility, less any exclusions set forth in this Addendum.

Servers means the physical computer hardware owned by Itron or its designated provider on which Software will be installed, operated, and maintained.

Service Offering means SaaS, plus any services that are additional or supplemental to SaaS, as described in the applicable Special Terms and Conditions.

Service Offering Commencement Date means, with respect to each Service Offering, the earlier of (a) validation of such Service Offering implementation by Itron pursuant to the applicable Statement of Work, or (b) seven (7) days after completing application system setup and the Customer has been provided valid access credentials for such Service Offering.

Software means each machine readable (object code) versions of computer program identified on the applicable Order Document or Pricing Summary for which Customer has purchased a Service Offering.

Special Terms and Conditions means Service Offering-specific terms and conditions set forth on Attachment A to this Addendum.

Subscription Fees means annual fees identified in the applicable Order Document or Pricing Summary for each Service Offering, plus the Annual Adjustment, if any. Where Customer has purchased an object code license to Software pursuant to the terms of the Software Addendum and wishes to purchase a Service Offering for such Software (“Hybrid SaaS”), license fees and fees for applicable Maintenance Services are not included within the Subscription Fees and must be paid separately. Where Customer is not purchasing Hybrid SaaS, fees for applicable Maintenance Services are included within the Subscription Fees.

Subscription Term means the subscription term purchased by Customer for each Service Offering, which begins upon the applicable Service Offering Commencement Date.

Access Rights and Restrictions.

- 1.1. **Access Rights.** SaaS is only available for Itron Software identified in the table set forth in this Section 5.1 below for which Customer has purchased a Service Offering and paid all applicable fees. Subject to Customer’s compliance with the Agreement (including payment of all applicable fees which, in the case of Hybrid SaaS, shall include Software licensing fees and Maintenance Services support fees), Itron hereby grants to Customer, for the Subscription Term(s) purchased, a non-exclusive, non-transferable, non-assignable, limited right to access and use the Service Offerings, with respect to Endpoints owned or otherwise controlled by Customer, for its internal business purposes in the Territory (as defined in the General Terms and Conditions of the Agreement).

Itron Software Eligible to Receive SaaS	
UIQ: Advanced Metering Manager, Meter Program Configurator, Control Platform, and Outage Detection	

- 1.2. **Restrictions on Use.** Customer and its authorized users may not: (a) modify, translate or create derivative works of any Service Offering or related Documentation; (b) copy, reproduce, distribute, republish, download, display, post or transmit any portion of a Service Offering or related Documentation in any form or by any means; (c) sell, assign, transfer, lease or sublicense any Service Offering; (d) allow any third party, other than authorized users, to access any Service Offering or related Documentation without Itron’s prior written consent; (e) use any Service Offering or related Documentation to provide services to third parties, or otherwise use any Service Offering on a “service bureau” or “timesharing” or subscription basis including, in connection with devices or equipment not owned or otherwise controlled by Customer; (f) reverse engineer, disassemble, decrypt, extract or otherwise reduce any Service Offering to a human perceivable form or otherwise attempt to determine the source code or algorithms of any Service Offering (except to the extent the foregoing restriction is

expressly prohibited by applicable law); (g) infringe any of Itron's or its providers' Intellectual Property Rights; (h) publicly publish the results of any benchmark tests run on any Service Offering; (i) use any Service Offering or related Documentation to engage in any fraudulent, illegal or unauthorized act; (j) introduce into or transmit through any Service Offering any material containing software viruses, worms, trap doors, back doors, Trojan horses or other harmful or malicious computer code, files, scripts, agents or programs; (k) remove, alter or obscure any titles, product logo or brand name, trademarks, copyright notices, proprietary notices or other indications of Itron's or its providers' Intellectual Property Rights, whether such notice or indications are affixed on, contained in or otherwise connected to a Service Offering; (l) attempt to gain unauthorized access to a Service Offering or Itron's or its providers' systems or networks; (m) merge any Service Offering with any other product or service without Itron's prior written consent and the payment of any additional fees; or (n) access or use any Service Offering or related Documentation to build or support, and/or assist a third-party in building or supporting, products or services competitive to Itron or its providers.

- 1.3. **Content Restrictions.** Customer may not distribute, download, or place on any Itron or its providers' website or Server, or use with any Service Offering, any content that: (a) Customer knows or has reason to believe infringes the Intellectual Property Rights of any third party or violates any rights of publicity or privacy; (b) violates any applicable law, statute, ordinance; (c) is defamatory, trade libelous, unlawfully threatening or unlawfully harassing; or (d) is obscene, pornographic or indecent (items (a) – (d) are collectively referred to as "**Prohibited Content**"). Itron reserves the right to remove any Prohibited Content from the Server without prior notice to Customer. Customer will indemnify, defend and hold Itron and its providers harmless for any claims, liabilities, losses, causes of action, damages, settlements, and costs and expenses (including, without limitation attorneys' fees and costs) arising from any third-party claims related to or generated by any Prohibited Content distributed, downloaded, or placed on any Itron or its providers' website or Server or used with any Service Offering by Customer.
- 1.4. **Breach of Restrictions.** Customer's breach of the restrictions set forth in Section 5.2 ("Restrictions on Use") or Section 5.3 ("Content Restrictions") shall constitute a material breach of the Agreement and shall result in revocation and immediate suspension or termination, as determined by Itron in its sole discretion, of all rights and licenses granted under this Addendum with respect to the Service Offerings. Revocation does not preclude Itron from pursuing any legal and equitable remedies for Customer's breach of these restrictions.

Invoicing and Payment. Customer shall pay Subscription Fees in advance for each SaaS Billing Cycle for which it has purchased a Service Offering. Itron will invoice Customer for the One-Time Setup Fee and initial Subscription Fees for each Service Offering upon the Service Offering Commencement Date. Initial Subscription Fees shall be prorated based on the number of months remaining in the current SaaS Billing Cycle following the Service Offering Commencement Date. Itron may discontinue a Service Offering by providing Customer with written notice of discontinuance no less than 180 days prior to the commencement of a SaaS Billing Cycle. Otherwise, Itron will provide Customer with a renewal notice for the Service Offering at least 120 days prior to the commencement of each SaaS Billing Cycle. Customer may discontinue a Service Offering by providing Itron with written notice of non-renewal no less than 90 days prior to the commencement of a SaaS Billing Cycle. Otherwise, approximately 20 days prior to the commencement of each SaaS Billing Cycle, Itron will provide Customer with an invoice for Subscription Fees payable by Customer for the forthcoming SaaS Billing Cycle. If Customer discontinues a Service Offering prior to expiration of the Minimum Subscription Term for that Service Offering, Itron will invoice Customer, and Customer will pay, for any unpaid Subscription Fees for the respective Service Offering through the end of the applicable Minimum Subscription Term. Maintenance Services fees and license fees relating to Hybrid SaaS will be invoiced in accordance with the Maintenance and Support Services Addendum and Software Addendum, as applicable. Itron has the right to adjust Subscription Fees at any time if Customer's use of a Service Offering exceeds the applicable tier set forth in the respective Order Document or Pricing Summary. Subscription Fees adjusted as a result of

Customer exceeding the applicable tier are typically invoiced within thirty (30) to sixty (60) days after provisioning of each respective Endpoint occurs.

Monthly Application Availability Service Level.

- 1.5. **Service Level.** Provided Customer has paid all applicable fees (including all Subscription Fees and, in the case of Hybrid SaaS, all maintenance and license fees) The Monthly SaaS Application Availability Service Level will be measured and calculated separately for each Service Offering. Itron records and data will be the sole basis for all SaaS Application Availability Service Level measurements and calculations.
- 1.6. **Service Level Credits.** As Customer's sole and exclusive remedy for Itron's failure to meet the foregoing Monthly SaaS Application Availability Service Level, subject to the service level exclusions in Section 8.1 (Service Level Exclusions) below, Customer will be entitled to credits as follows:

SaaS Application Availability (production environments only)	

Service Level Exclusions; Disclaimers.

- 1.7. **Service Level Exclusions.** Itron shall not be liable for failing to meet any service level commitment set forth in this Addendum (including any Special Terms and Conditions) or any Order Document to the extent such failure is attributable to any one or more of the following: (a) planned maintenance, ~~unplanned maintenance~~, or scheduled upgrades; (b) an event triggering a disaster recovery and for a twenty-four (24) hour period after the resumption of service following such an event to allow the system to return to normal operating ranges; (c) suspension or restriction of service under Section 11 ("Suspension or Restriction of Service") of this Addendum; and (d) conditions beyond Itron's reasonable control, including but not limited to (i) failure of any backhaul between the Service Offering and the Endpoints; (iii) failures in external Internet or VPN configurations not managed by Itron; (iv) a Force Majeure event; (v) false reports of unavailability as a result of outages or errors of any Itron measurement system; (vi) an act or omission of Customer or third parties (other than Itron's contractors, subcontractors or suppliers), including security incidents caused by such act or omission; (vii) incident investigation or computer failures that could not reasonable have been prevented by Itron; (viii) failures of third-party equipment, hardware, software, or services not provided by Itron; and (ix) Customer's delay in performing tasks designated as its responsibility in this Agreement.

1.8. Disclaimers.

(a) **Third-Party Content Disclaimer.** Itron is not the owner of third-party Software or third-party Service Offerings that Customer purchases through Itron (collectively "**Third-Party Content**") and makes no representations or warranties whatsoever, directly or indirectly, express or implied, as to the suitability, durability, and fitness for use, merchantability, condition, quality, performance or non-infringement of any Third-Party Content. Third-Party Content shall be subject to any service levels or warranties provided by the third-party provider. Itron will pass through to Customer, or make commercially reasonable efforts to enforce on Customer's behalf, any service levels, warranties and remedies received from such third-party provider.

(b) **Use of SaaS with Third-Party Devices.** Customer may use a Service Offering to collect data from Endpoints equipped with radio communication devices not manufactured or provided by Itron ("**Third-Party Radio Device**"). Itron makes no representations or warranties whatsoever, directly or indirectly, express or implied, as to the suitability, durability, and fitness for use, merchantability, condition, quality, performance or non-infringement of, and disclaims all liability with respect to, Third-Party Radio Devices. In particular, Itron shall have no liability (a) if a Third-Party Radio Device is not responding or communicating or (b) for unread endpoints due to defective or unreachable attachment Radio Devices. Customer shall contact the supplier of such device for support.

Sizing of Software-as-a-Service. Itron will size Service Offerings, Servers, and systems for Customer's specific deployment. System sizing depends upon the Service Offering and types of devices and sensors and may be a factor in determining Subscription Fees. Sizing criteria may include number of system endpoints, number of network devices, residential meter configuration, commercial and industrial meter configuration, desired data collection intervals, storage duration for historical data, and the number of concurrent and total users of the application. Any sizing changes during a Subscription Term will require a Change Order and may result in a change in Subscription Fees.

Conditions on Use of Service. Customer will use the Service Offerings only in accordance with Itron user guides, the Agreement (including, this Addendum, the General Terms and Conditions, applicable Order Documents), and laws and government regulations. The rights of any user to access and use the Service Offerings cannot be shared or used by more than one individual (unless such license is reassigned in its entirety to another authorized user), and Customer shall make every reasonable effort to prevent unauthorized third parties from accessing the Service Offerings.

Suspension or Restriction of Service. Itron may suspend or restrict all or part of the Service Offerings at any time to protect the integrity and functionality of the Software, Servers, platforms, and systems, or for a breach of Section 5.2 ("Restrictions on Use"), Section 5.3 ("Content Restrictions") or Section 10 ("Conditions on Use of Service"), until such breach is cured.

Incident Management. Itron will provide Customer support and incident and problem management services, which include responding to alerts, tracking the issue, troubleshooting the problem and escalating to Itron subject matter experts or third-party providers, in accordance with the Maintenance and Support Services Addendum.

Customer Technical Responsibilities. Customer is responsible for selecting, acquiring, securing and maintaining all equipment and ancillary services needed to connect to, access, or otherwise use and maintain compatibility with the Service Offerings, at Customer's sole expense.

User IDs and Passwords. Itron shall provide Customer with user identifications and passwords ("**User IDs**") to access the Service Offerings. Customer shall be solely responsible for all use of Customer's subscriptions and accounts. Customer shall maintain the confidentiality of all User IDs assigned to Customer. User IDs may not be shared or used by more than one user.

Planned Maintenance. Planned maintenance, whenever reasonably practicable, will be performed during off-business hours between 6:00 p.m. to 12:00 a.m. Customer's local time, with as little disruption to Customer's use of the Service Offerings as possible. Unplanned maintenance, whenever reasonably practicable, shall also be performed during off-business hours between 6:00 p.m. and 12:00 a.m., Customer's local time.

Unplanned Maintenance. Itron will provide Customer with notice of unplanned maintenance as soon as reasonably practical. Itron will minimize Service Offering disruptions to the extent reasonably practical.

Business Continuity.

- 1.9. Itron has architected and operates a high availability and scalable infrastructure to facilitate virtualized customer environments with various fault tolerant components. Fault tolerance and failover

methodologies allow Itron to maximize system availability and confidently uphold the Monthly SaaS Application Availability Service Level and Monthly File Delivery Percentage Service Level. Itron will conduct daily backups of back office application configuration files and associated data. These backups are for operational purposes only and are not a disaster recovery solution or a solution to be used by the Customer for testing or analysis purposes. Itron will periodically test the restore capability of its business continuity solution. System and database backups are performed via a schedule to provide for a full weekly backup and daily differential backups. System backups and snapshots are also taken prior to any system change that has been approved via the Itron Global Managed Services Change Control Board. The system can be recovered from the backup in an event of a failure. Business continuity is designed to provide recovery for component failures within a datacenter, this does not provide coverage for the loss or connectivity to a data center. If a more robust mitigation solution is required by Customer, geo-diverse disaster recovery options can be discussed and priced as a more fault tolerant solution.

- 1.10. All incidents requiring system recovery will be required to adhere to Itron's incident management policy and related standard operating procedures. BUSINESS CONTINUITY: RPO = 72 hours; RTO = 5 business days.

Disaster Recovery.

- 1.11. Disaster Recovery ("DR") is an optional service that is offered by Itron to hosted customers who purchase DR for an additional fee. Upon Customer's purchase of DR services and payment of applicable fees as set forth in the Order Document or Pricing Summary, Itron will maintain DR services at a dedicated facility that is equipped to facilitate hosted operations, meter reading and interrogations, and Field Area Network ("FAN") communications in the event DR is needed. Upon mutual agreement, separate SOW and for identified cost, Itron can exercise the DR capabilities once per calendar year on Customer's production environments and provide the results of each such test to the Customer.
- 1.12. In the event of a Severity Level 1 Error (as defined in the Maintenance and Support Services Addendum), Itron will evaluate the scale of the incident, readily available mitigation plans, and the estimated time to recover. If it is apparent to Itron that an incident meeting the standards of a disaster as set forth in Itron's Disaster Recovery plan has occurred with no possibility of mitigation, Itron will declare a disaster and begin the notification process. Itron will notify the Customer of an any such event that will result in service interruption in excess of twelve (12) hours. Once a disaster has been declared, Itron's responsibilities for SLAs will be temporarily suspended until the time at which Customer's environment has been failed over and is operating in the secondary DR datacenter. The Recovery Point Objective (RPO) for DR is four (4) hours. The Recovery Time Objective (RTO) for DR is twelve (12) hours.

Roles and Responsibilities. The table below lists the respective responsibilities of Customer and Itron to ensure reliable operation of the Software-as-a-Service.

P=Primary responsibility

S=Support responsibility

Description of service or deliverable	Itron	Customer
Submit user access requests for new users and deletion notifications for users no longer involved with the SaaS.		P
Provide immediate notification in the event of a Customer employee termination for those with access to the SaaS.		P

Description of service or deliverable	Itron	Customer
Provide immediate notification in the event of an Itron employee termination for those with access to the SaaS.	P	
Maintain skill sets necessary to properly support the SaaS.	P	
Administer and monitor Servers including but not limited to utilization of CPU, memory, IOPs, and disk space.	P	
Manage and troubleshoot the secure SaaS components and processes (if applicable).	P	
Administer associated Linux, Unix, and Windows operating systems.	P	
Apply operating system and other third-party security patches and critical updates as appropriate.	P	
Maintain and troubleshoot third-party software issues required for SaaS operations pursuant to this Addendum; work with third party to troubleshoot as required.	P	
Maintain anti-virus on all windows-based Servers if applicable to the SaaS platform.	P	
Monitor communications and support communications troubleshooting activities for the SaaS.	P	
Perform software upgrade activities.	P	
Maintain and administer the SaaS Server databases.	P	
Manage upload and submission of meter data files; work with Itron when problems are identified.		P
Provide and maintain a Secure FTP or equivalent if included in the SOW.	P	
Perform regular system, database, and custom component backups in accordance with selected service level.	P	
Maintain the applicable standard operating procedures and run books to maintain, monitor and operate the hosted environment.	P	

ATTACHMENT A SPECIAL TERMS AND CONDITIONS

Special Terms and Conditions – Managed Services. The Special Terms and Conditions contained within this Section apply to Itron’s Managed Services Service Offering.

1. Managed Services – Descriptive Overview.

- 1.1. When Customer subscribes to Managed Services, as part of the overall Service Offering Itron will provide SaaS for the applicable Software, plus Itron will also assume some of Customer’s SaaS-related operational responsibilities, including management of reads from monitored and Available Endpoints or Provisioned and Optimized Endpoints (as applicable), collecting data, and delivering data files to Customer at agreed-upon intervals in agreed upon data formats. Itron will attempt to remotely diagnose and resolve Endpoint exceptions detected by Itron or reported by Customer. If the exception cannot be resolved remotely, or it is determined to impact an individual or small number of Endpoints, Itron will notify Customer that Customer must perform in-field investigation.
- 1.2. Managed Services are only available for Itron Software identified in the table set forth in this Section 1.2 below for which Customer has purchased such Managed Services and paid all applicable fees.

Itron Software Eligible to Receive Managed Services	
UIQ: Advanced Metering Manager, Meter Program Configurator, Control Platform, Outage Detection and SensorIQ	

- 1.3. **Managed Services – Definitions.** The following defined terms are applicable to these Special Terms and Conditions for Managed Services:

Anchor Read means the “register value” stored once daily in a register in the Communication Module as installed in the Endpoint (usually at midnight).

Communications Module or **NIC** means Itron’s network interface card that may be installed in Equipment.

Cumulative File Delivery Delay Hours means – for the purpose of determining Monthly File Delivery Performance % -- the sum of all Daily File Delivery Delay Hours in the Measurement Month.

Daily File Delivery Delay Hours means – for the purpose of determining Monthly File Delivery Performance % - - the number of hours that file delivery is delayed in a given day during the Measurement Month.

Endpoint has the meaning set forth in the General SaaS Terms and Conditions.

Equipment has the meaning set forth in the Equipment Addendum.

Managed Services means SaaS, plus the additional services to be provided by Itron as set forth in these Special Terms and Conditions for Managed Services.

Optimization is a UIQ term which means the procedure by which the layout of the network Equipment configuration and implementation have been validated (“**Optimized**”) by performing active and passive tests to confirm that performance and redundancy meet the design specifications and other requirements of the Agreement. Optimization is to be executed on an area-by-area basis (or specified portion thereof), after all

network Equipment is installed and a minimum of 98% of the metering Endpoints have been deployed to achieve the required level of saturation of the area.

Provisioned means an Endpoint that is located in an area of the NAN and which is in any of the following operational states within the UIQ System: "active," "inactive," or "disconnected," and which has been Optimized, but which is not: (i) in a "new," "discovered," "installed," "initializing," "unreachable" or "init failed" state; or (ii) considered to be in the process of being deployed or being repaired under warranty. Endpoint operational states are defined in the Meter Lifecycle Reference document.

Service Level Trigger means satisfaction of the particular condition(s) noted in these Special Terms and Conditions below upon which the applicable service level will start to be enforceable and reported on.

- 2. Managed Services – Daily Operational Roles & Responsibilities.** Daily operations, Endpoint data collection activities, delivery of daily data export files, and event exception notification require that activities be performed by both Itron and Customer to ensure effective delivery of Managed Services. The table below lists the respective responsibilities of Customer and Itron for such daily activities. Itron's obligation to provide Managed Services are expressly contingent upon Customer's full performance of all responsibilities assigned to Customer.

P=Primary responsibility

S=Support responsibility

Description of Service or Deliverable	Itron	Customer
Create, monitor, and manage interrogation schedules.	P	
Ensure any input files are received and processed and output files are delivered to Customer by posting to a SFTP folder, or equivalent, where it can be retrieved by Customer as needed.	P	
Manage files on the SFTP server where any export files are delivered. If the SFTP server is Itron's, files should be downloaded nightly and files that have been successfully downloaded and processed are to be removed from the SFTP location within 7 days.	P	S
Perform read rate monitoring and reporting.	P	
Perform remote investigation for specific groups of non-communicating Endpoints affected by a common network issue and coordinate field order with Customer as needed.	P	S
Perform scheduling of Endpoint interrogations including file delivery and delivery of Data Collection Platform standard reports.	P	
Notify Itron in advance when additional devices are planned to be installed. Perform Meter field maintenance; close work orders with Itron.		P
Perform Network Device and Endpoint repair, replacement, or relocation as required.		P
Perform RMA, Processing, Tracking and Performance Reporting for Endpoints and Network devices.	S	P
Administration of the Managed Services platform applications to	P	

Description of Service or Deliverable	Itron	Customer
Service Levels.		

- 3. Managed Services – Environmental Management Roles & Responsibilities.** In addition to the daily operational tasks, Customer and Itron each have responsibilities for monitoring and managing the operating environment of the Managed Services platform and applications. The table below lists the respective responsibilities of Customer and Itron for such activities. Itron's obligation to provide Managed Services are expressly contingent upon Customer's full performance of all responsibilities assigned to Customer.

P=Primary responsibility

S=Support responsibility

Description of Service or Deliverable	Itron	Customer
Submit user access requests for new users and deletion notifications for users no longer involved with the managed system.		P
Provide immediate notification in the event of a Customer employee termination for those with access to the managed system.		P
Provide immediate notification in the event of an Itron employee termination for those with access to the SaaS.	P	
Maintain skill sets necessary to properly support the require Managed Services platform technologies.	P	
Maintain skill sets necessary to properly support the required Managed Services platform Field operations.		P
Administer and monitor servers including but not limited to utilization of CPU, memory, IOPs, and disk space.	P	
Manage and troubleshoot the secure network infrastructure components and processes (if applicable).	P	
Administer associated Linux, Unix, and Windows operating systems.	P	
Apply Operating System and other 3rd party security patches and critical updates as appropriate.	P	
Update security appliances (if applicable) with new Endpoint related security files.	P	
Maintain and troubleshoot third party software issues required for Managed Services platform operations, work with third party to troubleshoot as required.	P	
Maintain anti-virus on all windows-based servers.	P	
Perform the initial Network Devices configuration.	P	
Monitor Network and Endpoint communications and support	P	

Description of Service or Deliverable	Itron	Customer
metering and communications troubleshooting activities for the Managed Services platform.		
Support solution upgrade activities.	P	
Maintain and administer the Managed Services platform server databases.	P	
Establish and manage the wireless backhaul contracts and accounts if applicable.	P	
Support Customer's technical operations department to handle Endpoint and Network field exceptions.	P	
Manage upload and submission of meter data files; work with Itron when problems are identified.		P
Provide and maintain a Secure FTP.	P	
Perform regular system, database, and custom component backups in accordance with selected service level.	P	
Develop and maintain related standard operating procedures.	P	
Manage Endpoint firmware revisions, including coordination and scheduling of firmware downloads as necessary (for Itron manufactured devices only with Itron provided firmware).	P	
Monitor Endpoint communications, reporting, and troubleshoot Managed Services platform issues as necessary.	P	
Manage Endpoint manufacturing and security files for all necessary solution components, troubleshoot and coordinate with manufacturing as needed.	P	
Develop, maintain and utilize system operations clock, standard operations procedures, and daily checklists for Itron operators and administrators.	P	

4. Service Levels - Managed Services. This Section 4 of the Special Terms and Conditions for Managed Services sets forth the service levels for Managed Services. Such service levels are only available for Itron Software identified in the tables set forth below for which Customer has purchased Managed Services and paid all applicable fees.

4.1. Read and Demand Service Level.

4.1.1. Service Level Applicability. The Data Read Service Levels and On-Demand Read Service Level (collectively, the "**Data and On-Demand Read Service Level**") set forth in this Section 4.3 apply to the Itron Software identified in the following table for which Customer has purchased Managed Services and paid all applicable fees:

Itron Software Eligible to Receive Data and On-Demand Read Service Level

which was not read in previous 24 hours will be excluded; and on-demand read jobs initiated by system-level accounts ("root" and "UIQ") will be excluded. Service level credits will apply only if there is a minimum of 2,000 on-demand requests in the applicable month.

- (c) **Service Level Credits.** Subject to the service level exclusions set forth in Section 8.1 (Service Level Exclusions) of the General SaaS Terms and Conditions, and provided that the minimum number of on-demand Anchor Reads and interval meter read requests has been met pursuant to the table below, Customer will be entitled to the following credits as its sole and exclusive remedy for Itron's failure to meet the foregoing On-Demand Read Service Level:

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Special Terms and Conditions – Temetra. The following Special Terms and Conditions contained within this attachment apply to Itron's SaaS Service Offering for Temetra:

1. Mobile Device Software.

(a) **License Grant.** Subject to the terms of this Agreement, Itron grants Customer a limited, non-exclusive, and non-transferrable license to download, install, and use Itron's Temetra Mobile application and any associated drivers provided by Itron (collectively, the "**Mobile Device Software**")_on Itron-approved mobile devices owned or otherwise controlled by Customer (each a "**Mobile Device**") strictly in accordance with the Documentation.

(b) **License Restrictions.** Customer shall not: (a) copy the Mobile Device Software; (b) modify, translate, adapt, or otherwise create derivative works or improvements, whether or not patentable, of the Mobile Device Software; (c) reverse engineer, disassemble, decompile, decode, or otherwise attempt to derive or gain access to the source code of the Mobile Device Software or any part thereof; (d) remove, delete, alter, or obscure any trademarks or any copyright, trademark, patent, or other intellectual property or proprietary rights notices from the Mobile Device Software, including any copy thereof; or (e) rent, lease, lend, sell, sublicense, assign, distribute, publish, transfer, or otherwise make available the Mobile Device Software, or any features or functionality of the Mobile Device Software, to any third party for any reason.

(c) **Directives.** To the extent directive 2009/24/EC on the legal protection of computer programs or similar legislation or regulation (collectively, the "**Directives**") is applicable, such Directives may provide Customer the right to decompile Software in order to obtain information necessary to achieve the interoperability of an independently created computer program, prior to exercising any such possible rights under the Directives, Customer agrees to (a) first notify Itron of Customer's good faith belief that information necessary to achieve the interoperability of an independently created computer program is not otherwise available and that decompilation is indispensable within the meaning of the Directives; and (b) provide Itron with a reasonable amount of time to respond to Customer regarding the foregoing assertions.

(d) **Limited Mobile Device Software Warranty.** For a period of ninety (90) days from the date of delivery of the Mobile Device Software to Customer (the "**Warranty Period**"), Itron warrants solely to Customer that the Mobile Device Software will substantially conform in all material respects to the applicable Itron published specifications. As Customer's sole and exclusive remedy for any breach of this warranty, Itron will, at its option, during the warranty period set forth in this [Section 1\(c\)](#), repair or replace non-conforming Mobile Device Software to substantially conform to the foregoing warranty, provided that Itron will have no obligation to repair or replace any non-conforming Mobile Device Software if the Agreement or applicable Order Document has terminated or expired. The foregoing warranty does not apply to non-conformities in the Mobile Device Software due to: (i) modifications not made or approved by Itron in writing; (ii) Customer's or any third party's negligence or intentional acts; (iii) misuse or abuse, including the failure to use or install the Mobile Device Software in accordance with the Documentation; (iv) incorrect data, or data entry or output, as applicable, by Customer or a third party; (v) use with third party software, hardware or firmware not provided or authorized by Itron in writing; (vi) a Force Majeure event; or (vii) viruses or security vulnerabilities introduced into the Mobile Device Software or Customer's systems through no fault of Itron. After the Warranty Period, any Mobile Device Software errors will be addressed under maintenance and support terms.

(e) **Updates.** Itron may from time to time in its sole discretion develop and provide Mobile Device Software updates, which may include upgrades, bug fixes, patches, other error corrections, and/or new

features (collectively, including related documentation, “**Updates**”). Based on Customer’s Mobile Device settings, when Customer’s Mobile Device is connected to the internet either: (a) the Mobile Device Software will automatically download and install all available Updates; or (b) Customer may receive notice of or be prompted to download and install available Updates. Customer shall promptly download and install all Updates and acknowledge and agree that the Mobile Device Software, the Service Offering, or portions thereof may not properly operate should Customer fail to do so. Customer further agrees that all Updates will be deemed part of the Mobile Device Software and be subject to all terms and conditions of this Agreement.

2. **Compatible Mobile Devices.** Mobile Device Software is designed to work in connection with Mobile Devices that meet Itron minimum requirements. Itron will provide the minimum specifications to Customer. Itron is not required to make Mobile Device Software work with any other mobile devices.
3. **Disclaimer of Liability.** Mobile Device Software requires Internet connectivity, which Customer is solely responsible for procuring. Itron accepts no responsibility for any internet services failure, Mobile Device failure, or for any loss or damage of any kind caused by such failure.
4. **Business Continuity and Disaster Recovery.** The following shall replace Section 17 (“Business Continuity”) and Section 18 (“Disaster Recovery”) of the General SaaS Terms and Conditions in its entirety:

Itron uses streaming replication to keep a hot failover database always available, with automatic switch over in the event of failure. Application data is automatically backed up every night.

5. **Recovery of Customer Data at the End of the Agreement or SaaS Service.** At the end of the Term of the Agreement or SaaS service (unless the Agreement or SaaS service is renewed pursuant to duly executed amendment or a new agreement), or in the event of its early termination in accordance with the terms of the Agreement, Customer will confirm to Itron in writing, no later than on the effective date of expiration or termination, its decision to close the SaaS service (“**Closure Confirmation**”). Provided that Itron has received the Closure Confirmation from Customer within the aforementioned period, Itron will maintain Customer's access to the system for a maximum period of three (3) months from receipt of the Closure Confirmation, for the sole purpose of enabling Customer to retrieve the following Customer data: access account information, meter details, history of index reading data and photographs. Customer may, at no additional cost, export said system data in the standard file format used by the SaaS service, or the format already supported by the SaaS service. At the end of this three (3) month period, the Customer data will be permanently deleted and will no longer be recoverable.

END

Special Terms and Conditions – Itron Mobile. The following Special Terms and Conditions contained within this attachment apply to Itron’s SaaS Service Offering for Itron Mobile:

- 1. Relationship to Licensed FCS Software and Maintenance & Support.** Customer may be required to update or upgrade its licensed FCS Software from time to time in order to ensure full functionality of Itron Mobile. Customer’s subscription and right to use Itron Mobile will terminate if Customer’s FCS Software license is terminated.
- 2. Compatible Mobile Devices.** Itron Mobile is designed to work in connection with mobile devices that meet Itron minimum requirements. Itron will provide the minimum specifications to Customer. Itron is not required to make Itron Mobile work with any other mobile devices.
- 3. Customer’s Obligation to Protect Customer Information on Mobile Devices.** Customer must take steps to protect Customer information stored on mobile devices. User identification codes, passwords, and any information provided to Customer as part of Itron’s security procedures must be treated by Customer as confidential and must not be disclosed in violation of the Agreement. Customer is at all times responsible for its employees and subcontractors’ use of Itron Mobile. Itron has the right to disable any user identification codes or passwords if Customer or its employees and contractors have failed to comply with any of the provisions of this Agreement.
- 4. Internet Connectivity.** Itron Mobile requires internet connectivity. Customer is solely responsible for obtaining, maintaining and paying for such internet connectivity.
- 5. Disclaimer of Liability.** Itron accepts no responsibility for any internet services failure, mobile device failure, or for any loss or damage of any kind caused by such failure.

END

Special Terms and Conditions – Field Tools Advanced. The following Special Terms and Conditions contained within this attachment apply to Itron’s SaaS Service Offering for Field Tools Advanced:

- 1. Compatible Mobile Devices.** Field Tools Advanced is designed to work in connection with mobile devices that meet Itron minimum requirements. Itron will provide the minimum specifications to Customer. Itron is not required to make Field Tools Advanced work with any other mobile devices.
- 2. Customer’s Obligation to Protect Customer Information on Mobile Devices.** Customer must take steps to protect Customer information stored on mobile devices. User identification codes, passwords, and any information provided to Customer as part of Itron’s security procedures must be treated by Customer as confidential and must not be disclosed in violation of the Agreement. Customer is at all times responsible for its employees and subcontractors’ use of Field Tools Advanced. Itron has the right to disable any user identification codes or passwords if Customer or its employees and contractors have failed to comply with any of the provisions of this Agreement.
- 3. Internet Connectivity.** Field Tools Advanced requires internet connectivity. Customer is solely responsible for obtaining, maintaining and paying for such internet connectivity.
- 4. Disclaimer of Liability.** Itron accepts no responsibility for any internet services failure, mobile device failure, or for any loss or damage of any kind caused by such failure.

END

Special Terms and Conditions – Operations Optimizer. The following Special Terms and Conditions contained within this attachment apply to Itron’s SaaS Service Offering for Operations Optimizer:

- 1. User IDs and Passwords.** The following shall replace Section 14 (“User IDs and Passwords”) of the General SaaS Terms and Conditions in its entirety:

Itron shall provide Customer with an integration with Azure Active Directory for managing their user identifications and passwords (“User IDs”) to access Itron’s Operations Optimizer. Customer shall be solely responsible for all use of Customer’s subscriptions and accounts. Customer shall maintain the confidentiality of all User IDs assigned to Customer. User IDs may not be shared or used by more than one user.

- 2. Roles and Responsibilities.** The table in Section 19 (“Roles and Responsibilities”) of the General SaaS Terms and Conditions shall be replaced in its entirety with the following:

Description of service or deliverable	Itron	Customer
Manage user access according using Azure Active Directory to add new users and promptly remove users no longer involved with the Software as a Service.		P
Maintain skill sets necessary to properly support the SaaS.	P	
Administer and monitor Servers including but not limited to utilization of CPU, memory, IOPs, and disk space.	P	
Manage and troubleshoot the secure SaaS components and processes (if applicable).	P	

Administer associated Linux, Unix, and Windows operating systems.	P	
Apply operating system and other third-party security patches and critical updates as appropriate.	P	
Maintain and troubleshoot third-party software issues required for SaaS operations pursuant to this Addendum; work with third party to troubleshoot as required.	P	
Maintain anti-virus on all windows-based Servers if applicable to the SaaS platform.	P	
Monitor communications and support communications troubleshooting activities for the SaaS.	P	
Perform software upgrade activities if required.	P	
Maintain and administer the SaaS Server databases.	P	
Manage upload and submission of meter data files; work with Itron when problems are identified.		P
Provide and maintain a Secure FTP or equivalent if included in the SOW.	P	
Perform regular system, database, and custom component backups in accordance with selected service level.	P	
Maintain the applicable standard operating procedures and run books to maintain, monitor and operate the hosted environment.	P	

END

Section 12: Deployment Services

Comply. Itron and our subcontractor, TMD has outlined our network and meter deployment plan above in **Section 4: Project Deployment/Installation**. Additionally, Itron has reviewed the attached SOW and Contract and has provided comments and exceptions. These can be found in Appendix H - *Itron - Appendix H - VIWAPA AMI Implementation SOW - Itron Mark Up*.

Section 13: Exceptions

Exceptions to SOW

Itron has provided our list of exceptions and comments with our attached SOW review and makrup with this proposal response in *Itron - Appendix H - VIWAPA AMI Implementation SOW - Itron Mark Up_22Nov24*.

Itron Exceptions and Comments on AMI Project General Contract Terms and Federal Requirements

General Exceptions and Comments

Itron has provided a copy of its standard Master Sales Agreement and applicable Addenda with its RFP response. Please consider Itron's standard Master Sales Agreement and applicable Addenda as general exceptions to the AMI Project General Contract Terms/Federal Requirements. Specific provisions of Itron's standard Master Sales Agreement and applicable Addenda are referenced below or quoted.

Itron reserves the right to provide exceptions and comments on any additional federal requirements documents provided by VIWAPA following submission of Itron's RFP response.

Specific Exceptions and Comments

SECTION	EXCEPTION/COMMENT
AMI Project General Contract Terms/Federal Requirements	Referred to here as the "Agreement."
Exhibits, Annexes and Statements of Work	Itron Addenda and Supplemental Terms (i.e., product specific terms) as well as the statement of work and any order document shall be made a part of the Agreement.
1. Definitions: Work and Services Work	Agreement must be expanded to cover products as well as equipment and professional services – i.e., software, maintenance and support, software-as-a-service, managed services.
8. Progress Reports and Working Schedule	Itron will provide its standard reports. Itron is willing to consider to additional reporting for which there may be additional fees.
10. Suspension or Interruption of Work	For discussion. Itron is in general agreement with this section, but clarification is needed regarding certain clauses such as "excluding profit" and relationship to force majeure provisions.
11.A Termination for Default	For discussion. Itron is in general agreement with this section, but would like to discuss notice and cure periods.
11.B Termination for Convenience	For discussion. If termination by Customer is permitted, Itron must be compensate for all wind down and termination charges from subcontractors as well as for all equipment manufactured by Itron for the project or in process of being manufactured.

SECTION	EXCEPTION/COMMENT
	<p>In the case of suspension of by Customer, Itron must be compensated for both wind-down and ramp-up costs and fees (including those from subcontractors) as well as for all equipment manufactured by Itron for the project or in process of being manufactured.</p>
15.b Services Work Payments	<p>For discussion.</p> <p>General Comment: Agreed upon statements of work will address invoicing and payment terms at agreed upon milestones which may deviate from Section 15.b.</p> <p>Itron can agree to retention on professional installation services.</p> <p>For back office professional services, Itron uses payment milestones tied to deliverables.</p>
16. Equipment, Construction, and Professional Services Warranties	<p>As commented above: the Agreement must explicitly cover products as well as professional services and equipment – i.e., software, maintenance and support, software-as-a-service, managed services.</p> <p>Itron's Professional Services Addendum provided to VIWAPA contains Itron's standard warranty terms – and the duration of the warranty, which is 90 days from completion of the Professional Services.</p> <p>>> EXPRESS WARRANTIES FOR PROFESSIONAL SERVICES.</p> <p>Itron warrants to Customer that Professional Services will be provided by personnel with the requisite experience, skills, knowledge, training and education and in a timely, professional, and workmanlike manner in accordance with the applicable Statement of Work.</p> <p>Remedies.</p> <p>As Customer's exclusive remedy for any material noncompliance by Itron with the express warranties provided above for Professional Services, Itron shall correct the noncompliance within a reasonable period of time under the circumstances, if Customer gives Itron written notice (which notice must describe the noncompliance in sufficient detail to enable Itron to provide the required corrective action) within ninety (90) days of performance of the applicable noncompliant Professional Services. If Itron, in its sole discretion, is unable to correct the noncompliance, its sole obligation will be to refund to Customer a pro-rata amount paid for the nonconforming Professional Services.</p> <p>Itron's Equipment Addendum provided to VIWAPA contains Itron standard warranty terms on equipment manufactured by Itron, as well as duration of warranty which varies by type of equipment. For this particular bid, Itron is quoting a 5-year warranty on Itron Equipment which begins on date of shipment.</p>

SECTION	EXCEPTION/COMMENT
	<p>>> Itron Equipment Warranty.</p> <p>Itron warrants solely to Customer that, during the Warranty Period, Itron Equipment will be free from defects in materials and workmanship and will conform in all material respects to the applicable Itron published specifications. As Customer's sole and exclusive remedy for a breach of the foregoing warranty, Itron will, at its option and expense: (i) repair or replace faulty Itron Equipment under warranty after it has been returned to an Itron-designated repair facility during the Warranty Period in accordance with Itron's then current RMA policy and procedures, (ii) provide Customer with a Firmware or software fix to correct the nonconformity, or (iii) if Itron determines (in its reasonable judgment) that it is unable to provide a remedy specified in item (i) or (ii) of this section, Itron will provide Customer with a depreciated refund of the purchase price for the applicable Itron Equipment. Customer will pay the cost of returning Itron Equipment to the Itron designated repair facility and Itron will pay the cost of returned repaired or replacement Itron Equipment to Customer. Customer is responsible for any labor costs associated with removal or reinstallation of Itron Equipment. Repaired and replacement Itron Equipment will be warranted for the remainder of the Warranty Period, or sixty (60) days from the ship date of the repaired or replaced Itron Equipment, whichever is longer. Additional warranty terms for specific Itron Equipment may be specified in the attached Itron Equipment Warranty Table.</p> <p>Itron Equipment Warranty Exclusions.</p> <p>The above warranty and additional warranty terms in the attached Itron Equipment Warranty Table do not cover Itron Equipment in poor operating condition due to: (a) changes made to Itron Equipment without Itron's prior written consent; (b) use with cables, mounting kits, antennas, battery backups and other devices, third party software or firmware that Itron has not provided to Customer or approved in writing for use with Itron Equipment; (c) Customer's or a third party's misuse, abuse, negligence, or failure to install, test, handle or operate Itron Equipment in accordance with its Documentation; (d) a Force Majeure event; or (e) incorrect data, or data entry or output by Customer or a third party not under Itron's control. Additional warranty exclusions for specific Itron Equipment may be specified in the attached Itron Equipment Warranty Table. Customer may request that Itron repair Itron Equipment damaged by any of the foregoing; if Itron agrees to make such repairs, Customer may be charged additional Fees.</p> <p>Itron Equipment warranty also states that it will pass through to Customer warranties on equipment manufactured by a third-party purchased by Customer through Itron.</p> <p>>> Third-Party Equipment Warranty.</p> <p>Itron is not the manufacturer of the Third Party Equipment and makes no</p>

SECTION	EXCEPTION/COMMENT
	<p>representations or warranties whatsoever, directly or indirectly, express or implied, as to the suitability, durability, fitness for use, merchantability, condition, quality, performance or non-infringement of Third-Party Equipment. Third Party Equipment shall be subject to any warranties provided by the Third Party Equipment manufacturer. Itron will pass through to Customer, or make commercially reasonable efforts to enforce on Customer's behalf, any warranties and remedies received from the Third Party Equipment manufacturer.</p> <p>Itron's Software Addendum provided to VIWAPA contains Itron standard warranty terms on Itron software as well as duration of warranty which is 90 days from date of delivery.</p> <p>>> Limited Itron Software Warranty.</p> <p>For a period of ninety (90) days from the date of delivery, Itron warrants solely to Customer that the Software will substantially conform in all material respects to the applicable Itron published specifications. As Customer's sole and exclusive remedy for any breach of this warranty, Itron will, at its option, during the warranty period set forth in this section, repair or replace non-conforming Itron Software to substantially conform to the foregoing warranty, provided that Itron will have no obligation to repair or replace any non-conforming Itron Software if this Agreement or applicable Order Document has terminated or expired. The foregoing warranty does not apply to non-conformities in Itron Software due to: (i) modifications not made or approved by Itron in writing; (ii) Customer's or any third party's negligence or intentional acts; (iii) misuse or abuse, including the failure to use or install Itron Software in accordance with the Documentation; (iv) incorrect data, or data entry or output, as applicable, by Customer or a third party; (v) third party software, hardware or firmware not provided or authorized by Itron in writing; (vi) a Force Majeure event; or (vii) viruses or security vulnerabilities introduced into the Itron Software or Customer's systems through no fault of Itron. After the ninety (90) day period described above, any Itron Software errors will be addressed under maintenance and support terms.</p> <p>Itron does not provide a warranty on Software-as-a-Service or Managed Services. Rather Itron's Software-as-a-Service Addendum and Managed Services Special Conditions provided to VIWAPA contains are provided with service levels.</p> <p>Itron's Maintenance & Support Services Addendum provided to VIWAPA contains response objectives for tech support. In addition, it provides terms address the treatment of warranty on Itron Equipment returned under RMA.</p> <p>In addition, Itron's standard Master Sales Agreement contains the following:</p> <p>>> Warranties and Disclaimer.</p> <p>All warranties relating to products and services provided by Itron under this</p>

SECTION	EXCEPTION/COMMENT
	<p>Agreement are set forth in the applicable Addendum or Order Document.</p> <p>EXCEPT FOR THE EXPRESS WARRANTIES PROVIDED BY ITRON UNDER THE APPLICABLE ADDENDUM OR ORDER DOCUMENT, ITRON MAKES NO WARRANTY OF ANY KIND RELATING TO PRODUCTS AND SERVICES AND DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING: (I) IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, (II) WARRANTIES OF TITLE AND NON-INFRINGEMENT, AND (III) WARRANTIES ARISING FROM STATUTE, OPERATION OF LAW, COURSE OF DEALING, PERFORMANCE, USAGE OR TRADE PRACTICE. TO THE EXTENT ANY IMPLIED WARRANTY CANNOT BE EXCLUDED, SUCH WARRANTY IS LIMITED IN DURATION TO THE EXPRESS WARRANTY PERIOD. ITRON AND ITS SUPPLIERS DO NOT WARRANT OR REPRESENT THAT PRODUCTS OR SERVICES WILL BE FREE FROM BUGS OR ERRORS OR THAT THEIR USE WILL BE UNINTERRUPTED. ITRON ASSUMES NO LIABILITY OR RESPONSIBILITY FOR ANY INTERRUPTION OR CESSATION OF TRANSMISSION VIA CUSTOMER OR THIRD-PARTY WIDE-AREA NETWORK (WAN), CELLULAR OR OTHER PUBLIC COMMUNICATIONS OR BROADBAND SYSTEMS (INCLUDING OUTAGES, DISCONTINUANCE, DEVICE NON-REACHABILITY, LOSS OR INACCURATE READING) OR FOR ANY CONSEQUENCES, LOSSES, OR DAMAGES ARISING FROM CHANGES MADE BY CUSTOMER TO THE CONTENT OR PROGRAMMING OF EQUIPMENT (UNLESS CAUSED BY A DEFECTIVE PRODUCT). THESE DISCLAIMERS WILL APPLY NOTWITHSTANDING ANY FAILURE OF THE ESSENTIAL PURPOSE OF ANY LIMITED REMEDY PROVIDED UNDER THIS AGREEMENT.</p>
5. Ownership of Intellectual Property – First paragraph re PREPA IP	<p>Itron interprets the term “related data” to mean data and meta data generated by or originating from VIWAPA products and services.</p> <p>For avoidance of doubt, Itron reserves ownership in all data and metadata generated by or originating from Itron products, services, and platforms.</p>
22. Patent Infringement 26. Indemnification for Injury and Damage Claims	<div style="background-color: black; height: 15px; width: 100%;"></div> <div style="background-color: black; height: 15px; width: 60%;"></div> <div style="background-color: black; height: 15px; width: 20%;"></div> <div style="background-color: black; height: 15px; width: 30%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 80%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 90%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 95%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 95%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 95%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 80%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 85%; margin-left: 40px;"></div> <div style="background-color: black; height: 15px; width: 95%; margin-left: 40px;"></div>

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SECTION	EXCEPTION/COMMENT
	<p>Section. Itron's use of Deidentified Data shall not conflict with Itron's obligations under this Agreement.</p> <p>Customer warrants that: (a) it has the legal right and authority to grant Itron the license rights described above, and (b) Itron's exercise of such rights in accordance with this Agreement will not violate any applicable laws or regulations or cause a breach of any agreement or obligation between Customer and any third-party.</p> <p>Deidentified Data means information that cannot reasonably be used to infer information about a Customer end user.</p>
Confidential Information	<p><u>Definition from Itron MSA.</u> Confidential Information means all information disclosed by a Party ("Disclosing Party") to the other Party ("Receiving Party"), whether orally or in writing, that is designated as confidential or that reasonably should be understood to be confidential given the nature of the information and the circumstances of disclosure. The Confidential Information of each Party includes the terms and conditions of this Agreement, as well as business and marketing plans, pricing, technology and technical information, trade secrets, product plans and designs, and business processes disclosed by such Party. However, Confidential Information does not include any information that: (i) is or becomes generally known to the public without breach of any obligation owed to the Disclosing Party, (ii) was known to the Receiving Party prior to its disclosure by the Disclosing Party without breach of any obligation owed to the Disclosing Party, (iii) is received from a third party without breach of any obligation owed to the Disclosing Party, or (iv) was independently developed by the Receiving Party without reference to the Disclosing Party's Confidential Information.</p> <p>Note: Itron will retain a copy of VIWAPA confidential information to meet regulatory and legal obligations.</p> <p>10 Confidentiality (Itron MSA)</p> <p>Each Receiving Party acknowledges that the Disclosing Party's Confidential Information is the property of and confidential to, or a trade secret of, the Disclosing Party. The Receiving Party: (i) must keep the Disclosing Party's Confidential Information confidential and may not directly or indirectly disclose, divulge or communicate that Confidential Information to, or otherwise place that Confidential Information at the disposal of, any other person without the Disclosing Party's prior written approval, (ii) must take reasonable steps to secure and keep secure all Disclosing Party's Confidential Information coming into its possession or control, (iii) may not disclose any Confidential Information to anyone other than the Receiving Party's employees, agents, contractors or subcontractors and professional advisors, or those of its Affiliates, who have a legitimate need to know such Confidential Information, (iv) must use the Confidential Information solely for purposes related to the subject matter of this Agreement or for potential future commercial transactions between the Parties not otherwise covered by a separate agreement, and (v) must ensure that any person to whom it discloses Confidential Information in accordance with this</p>

SECTION	EXCEPTION/COMMENT
	<p>Section is subject to binding confidentiality obligations that are at least as restrictive as those set forth in this Section. Notwithstanding any language to the contrary, the Receiving Party may disclose the Disclosing Party's Confidential Information to the extent it is compelled by law to do so, if the Receiving Party gives the Disclosing Party prior written notice of such compelled disclosure (to the extent legally permitted) and provides reasonable assistance, at the Disclosing Party's cost, if the Disclosing Party wishes to contest such disclosure.</p>
Intellectual Property	<p>5 Intellectual Property (Itron MSA)</p> <p>5.1 Reservation of Intellectual Property</p> <p>Subject to the limited rights expressly granted by Itron to Customer under this Agreement, Itron reserves all of its Intellectual Property and, as between the Parties, Itron owns all rights, title and interest in and to its Confidential Information and the products, services and related deliverables provided by Itron under this Agreement. Subject to the limited rights expressly granted by Customer to Itron under this Agreement, Customer reserves all of its Intellectual Property and, as between the Parties, Customer owns all right, title and interest in and to its Confidential Information, including Customer Data. All rights, titles, and interests not specifically and expressly granted by either Party hereunder are hereby reserved. Nothing in this Agreement will be understood to preclude or limit Itron from developing or providing products, services, or related deliverables for itself or other customers, irrespective of the possible similarity of such products, services, or related deliverables to those delivered to Customer.</p> <p>____/</p> <p>Itron will not be providing work for hire.</p> <p>Itron agrees that all documents created specifically for VIWAPA – such as deployment planning and design documents – shall be owned by VIWAPA, as well as required reports to the extent that such reports do not contain Itron proprietary information, such as -- by way of example -- performance characteristics of Itron products and services (or performance of any third-party products purchased by Customer through Itron, without prior written consent of the manufacturer or developer of such third party products).</p>
Dispute Resolution (General)	<p>14 Disputes (Itron MSA)</p> <p>The Parties shall attempt in good faith to resolve any dispute, controversy, or claim arising out of or relating to this Agreement, or the breach, termination, or invalidity hereof (each, a "Dispute") in accordance with this Section 14. A Party shall send written notice to the other Party of any Dispute ("Dispute Notice"). The Parties shall first attempt in good faith to resolve any Dispute set forth in the Dispute Notice by negotiation and consultation between themselves. In the event that such Dispute is not resolved on an informal basis within thirty (30) business days after one Party delivers the Dispute Notice to the other Party,</p>

SECTION	EXCEPTION/COMMENT
	<p>either Party may, by written notice to the other Party ("Executive Dispute Notice"), refer such Dispute to the executives of each Party designated by such Party in a written notice to the other Party ("Executive"). If the Executives cannot resolve any Dispute during the time period ending thirty (30) business days after the date of the Executive Dispute Notice (the last day of such time period hereinafter referred to as the "Escalation Date"), the Parties may submit the Dispute to any mutually-agreed-to mediation service for mediation by providing to the mediation service a joint written request for mediation and—jointly or individually—a written summary the Dispute and the relief requested in the Dispute. If the Parties decide to mediate the Dispute, they shall cooperate with one another in selecting a mediation service and shall cooperate with the mediation service and with one another in selecting a neutral mediator and in scheduling the mediation proceedings. The Parties agree that, if they mediate the Dispute, the mediator's fees and expenses and the costs incidental to the mediation will be shared equally between the Parties. Either Party may proceed in accordance with the provisions of Section 15 ("Governing Law and Venue") if (i) the Parties mediate the Dispute and cannot resolve the Dispute for any reason within sixty (60) business days after the Escalation Date, or (ii) no mediation occurs, and the Parties cannot resolve the Dispute for any reason within ten (10) business days after the Escalation Date. Notwithstanding the foregoing, nothing in this Section 14 shall be construed as preventing a Party from seeking available equitable relief, including specific performance, and injunctive relief in a court of competent jurisdiction.</p>
Invoice Disputes	<p>6.4 Invoice Disputes (Itron MSA)</p> <p>Customer shall notify Itron in writing of any dispute with any invoice (along with substantiating documentation and a reasonably detailed description of the dispute) within ten (10) days from the original invoice date. Invoices for which no such timely notification is received shall be deemed accepted by Customer as true and correct, and Customer shall pay all amounts due under such invoices within the period set forth in Section 6.3 above. The Parties shall seek to resolve all such disputes expeditiously and in good faith in accordance with the dispute resolution provisions set forth in Section 14 ("Disputes") of these General Terms and Conditions. Notwithstanding anything to the contrary, each Party shall continue performing its obligations under this Agreement during any such dispute, including timely payment by Customer of all undisputed amounts due and payable under this Agreement.</p>
[REDACTED]	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>

SECTION	EXCEPTION/COMMENT
	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]

Itron Commercial Comments

Above and beyond the exceptions noted in the previous section and the Itron-provided MSA and Addenda, Itron would like to provide clarity on certain terms attached to our pricing.

Pricing and Taxes

- » Our pricing excludes all Tax, tariffs and duties, except as noted below; any changes to these assumptions will require an adjustment to our price.
- » Taxes assumptions:

Tax	Itron's assumption
Sales Tax	Sales Tax is NOT included in our prices. Itron has assumed VIWAPA is exempt.
Use Tax	Use Tax is NOT included in our prices. Itron has assumed that VIWAPA will be the importer of record and will not be subject to use tax.
Property Tax	Property Tax is NOT included in our prices. Itron has assumed that VIWAPA will hold ownership of the products starting from when the goods leave Itron's manufacturing facility.
Gross Receipts Tax	With respect to any payments the customer deems subject to the gross receipts tax, we expect to increase our pricing to cover the imposition of such taxes.
Withholding taxes	Itron has not assumed any withholding taxes would occur and did not include it in our prices. Itron reserves the right to add a contractual provision for VIWAPA to gross up for withholding taxes in the event VIWAPA does withhold.

Price Adjustments

- » Itron Equipment and Software. Prices for Itron Equipment and Software set forth on the pricing summary are fixed for four years, subject to the following: Once every twelve (12) month period, beginning, Itron reserves the right to adjust the then-current prices for Itron Equipment by up to a percentage equal to the increase in the Index over the prior twelve (12) month period. Adjusted pricing will impact any new or unfulfilled purchase orders. "Index" means the PPI Commodity data for Final demand goods, seasonally adjusted (WPSFD41), as published by the US Department of Labor. The Index is accessible at www.bls.gov/data/.
- » Recurring Services. Itron reserves the right to adjust the then-current prices by up to a percentage equal to the increase in the Index over the prior twelve (12) month period. "Index" means the PPI Commodity data for Final demand goods, seasonally adjusted (WPSFD41), as published by the US Department of Labor. The Index is accessible at www.bls.gov/data/.
- » Professional services. Itron provides a fixed fee per project based on the scope defined in the Core Services and Start-up Services program. Work exceeding these thresholds due to customer delay will be charged at T&M using prevailing Itron labor rates at the time the work is incurred. Work outside of the SOW will require a change order.

Payment

- » Itron's payment terms are 30 days net.
- » Itron reserves the right to suspend work (and charge related Itron's cost), terminate the contract and / or charges late payment penalties of 1% / month in case of nonpayment.

Invoicing

- » All Equipment will be invoiced upon shipment.
- » Software Licence will be invoiced once it is made available to VIWAPA in accordance with the SOW.
- » Software Maintenance will be invoiced annually in advance starting on the date at which Software has been made available.
- » Hybrid SaaS will be invoiced annually or monthly in advance starting on the date at which each environment has been made available.
- » Professional Services will be invoiced in accordance with the SOW.

Freight, Title and Risk of Loss

- » As applicable, VIWAPA will be the importer of record.
- » All Equipment prices do NOT include freight, taxes or duties; an estimate for these charges has been included in the Pricing Worksheet but they will be charged to VIWAPA based on actuals.
- » Title and Risk of Loss will transfer to VIWAPA upon delivery to the carrier at Itron's facility. VIWAPA will keep ownership of the Equipment during the project, even if these are handled in Itron's subcontractors' warehouses during the installation project.

Section 14: Questionnaire

Appendix K – Standard Questionnaire

The undersigned guarantees the truth and accuracy of all statements and answers contained herein.

How long have you been in business as a General Contractor, Sub Contractor?

Since our founding in 1977, Itron has managed thousands of projects, acting mostly as a general prime contractor, but also as a key subcontractor. Itron has gained the experience and the expertise needed to manage even the most complex large-scale solutions. For example, Itron's solution delivery team has extensive experience with setting up complex IT systems, integrating with back-office business systems and third-party components, guiding customers with updating and automating associated business processes, and managing subcontractors responsible for field deployment activities. Itron has the organization, project management, technical expertise, training resources, and tools needed to deliver a successful project.

How many years of experience do you have in producing and installing an AMI Solution?

The proposed AMI network was first deployed in 2007 and is currently in its fifth generation (thus the name Gen5). Itron maintains full forwards and backwards compatibility for all generations of the GenX technology. The proposed Itron platform currently supports more than 40 million endpoints across more than 50 investor-owned, municipal, and cooperative utility customers, some of which have been in operation for more than twelve years.

Within the past five years, how many AMI design and build projects have you preformed similar to the project requested in this RFP?

Itron is engaged in some of the largest, most innovative, and ambitious AMI smart grid, smart lighting, and smart city programs worldwide. Itron has proven our GenX AMI communications platform with over 140 active and pending deployments. These deployments manage tens of millions of electricity, gas, and water smart meters, smart streetlight controllers, distribution automation devices, and smart city sensors.

Have you ever failed to complete work per contract specification or within the time limits of a contract awarded to you? If so, where and why?

No. Any issues regarding time and delivery of a project is discussed with the customer with a mutually beneficial agreement with Itron.

Provide the following reference information regarding your most recent work(s) as required for Section TBD. Please indicate that these references are included along with the contact information. Failure to provide the contact information will be deemed non-compliant with this RFP.

See Itron's references above in *Section 3: Customer References and Experience* for recent projects which include contact information.

Describe any anticipated problems with the site and your proposed solutions.

With any cellular based solution, coverage can often be the most significant challenge. To mitigate these issues, Itron collects cellular strength data during the network survey process and adjust AP placement as required.

Will you sublet any part of this work? If so, give details.

Yes. Itron has partnered with our Installation Contractor in Texas Meter & Device (TMD) and also our Systems Integration Subcontractor in TRC.

Is the business a: Sole-Proprietorship, Partnership, Corporation? (circle one)

Please mark (with an X) the included documentation or accepted terms in your proposal.

	YES	NO
Bid Bond included	<u>X</u>	<u> </u>
Performance Bond included	<u> </u>	<u>X</u>
Payment Bond included	<u> </u>	<u>X</u>
Liquidated damages accepted	<u>X</u>	<u> </u>
Insurance included	<u>X</u>	<u> </u>
General Contract Terms accepted	<u>X</u>	<u> </u>
Payment schedule provided	<u>X</u>	<u> </u>
Valid VI Business License	<u> </u>	<u>X</u>
Submittals (Project schedule, etc.)	<u>X</u>	<u> </u>

Note: If any marked “NO”, please explain:

Itron will provide the performance and payment bond will be supplied upon contract award. While Itron has marked “Yes” regarding general contract terms see our exceptions to the SOW in Section 13: Exceptions above in addition to our attached *Implementation SOW* included with this response.

The names of all persons interested in the foregoing proposal as principal are:

(NOTE: If Offeror or other interested person is a corporation, give legal name of corporation, state where incorporated and names of president and secretary; if partnership, give name of firm and names of all individual co-partners composing the firm; if Offeror or other interested person is an individual, give first and last names in full.)

Legal Name of Corporation: Itron, Inc.

State of Incorporation: Washington

Are any current employees of the Authority involved in any way, shape or form with the preparation of the proposal or completion of the described work scope? If so, please describe.

No.

Licensed in accordance with 27 Virgin Islands Code Section 303 and with license number:

N/A

SIGN HERE: _


Signature of Offeror

(NOTE: If Offeror is a corporation, set forth the legal name of the corporation together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation. If the Offeror is a partnership, set forth the name of the firm together with the signature(s) of the partner or partners authorized to sign contracts on behalf to the partnership.)

Business Address: 2111 North Molter Road Liberty Lake, WA 99019 USA

Telephone Number: 800.635.5461

Facsimile Number: 509.891.3355

Date of Proposal: November 22, 2024

Section 15: Sample Meters Shipment

Itron sample meters were shipped on November 14, 2024, and successfully delivered November 19, 2024. Please see the following confirmation below through FedEx for proof of meter shipment and receipt through tracking number 779968403015.



November 21, 2024

Dear Customer,

The following is the proof-of-delivery for tracking number: 779968403015

Delivery Information:

Status:	Delivered	Delivered To:	Receptionist/Front Desk
Signed for by:	A.SAMSAUL	Delivery Location:	
Service type:	FedEx International Economy		
Special Handling:	Deliver Weekday		ST THOMAS,
		Delivery date:	Nov 19, 2024 14:42

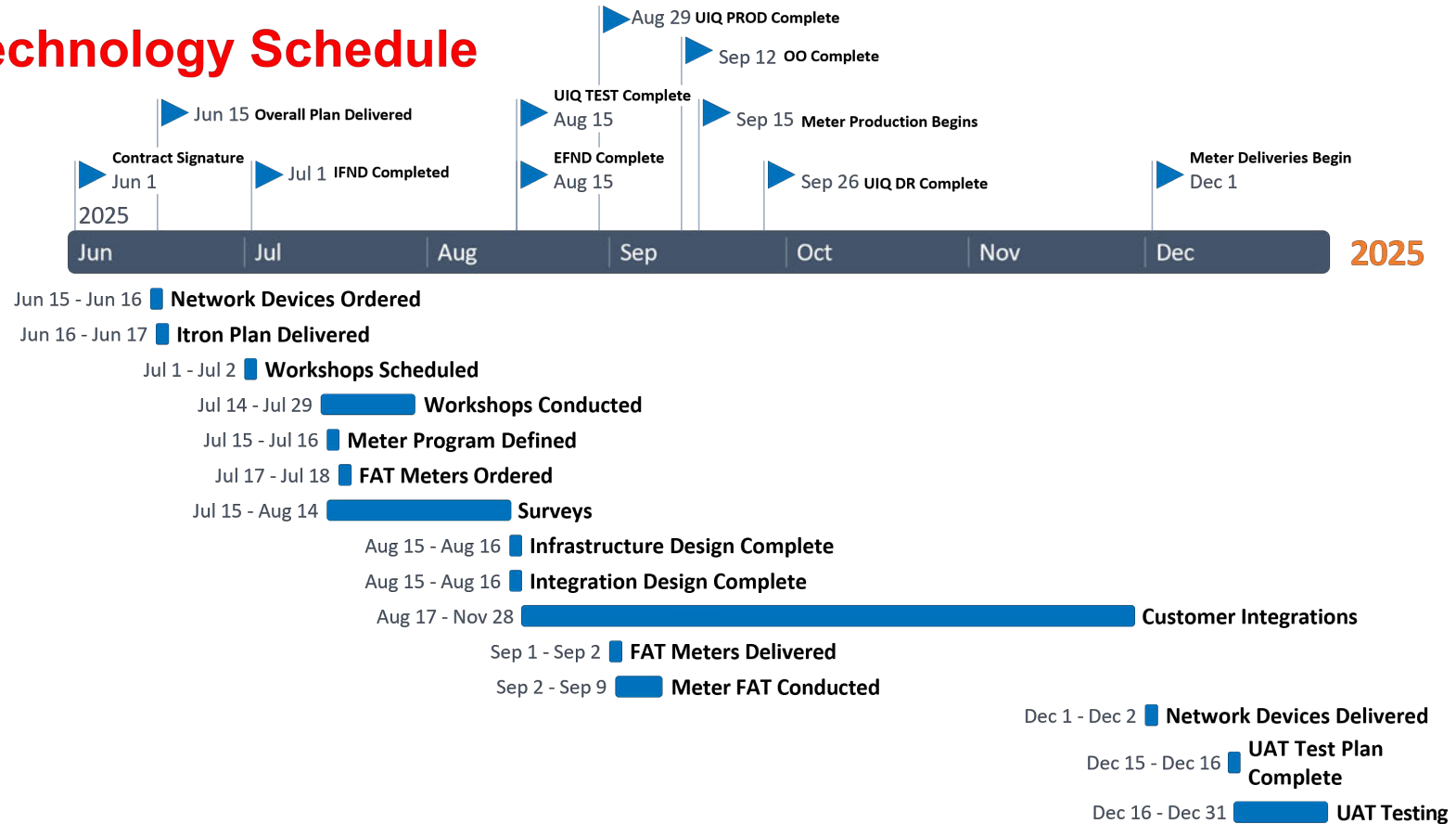
Shipping Information:

Tracking number:	779968403015	Ship Date:	Nov 14, 2024
		Weight:	8.1 LB/3.68 KG
Recipient:	ST THOMAS, VI,	Shipper:	LIBERTY LAKE, WA, US,

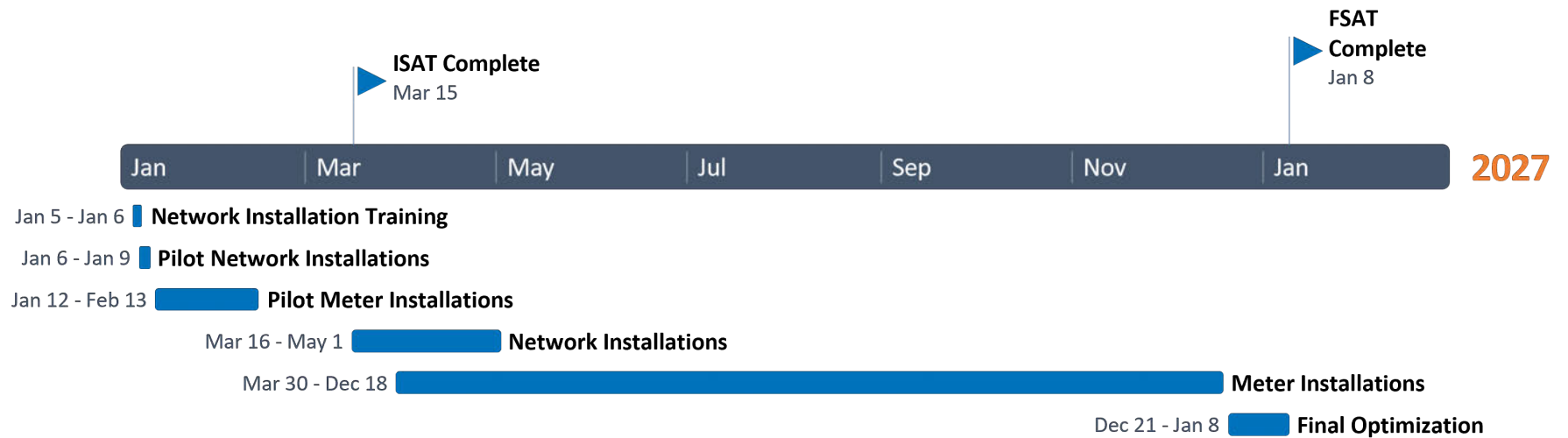
FedEx Express proof-of-delivery details appear below; however, no signature is currently available for this shipment. Please check again later for a signature.

Appendix 1 – Schedules

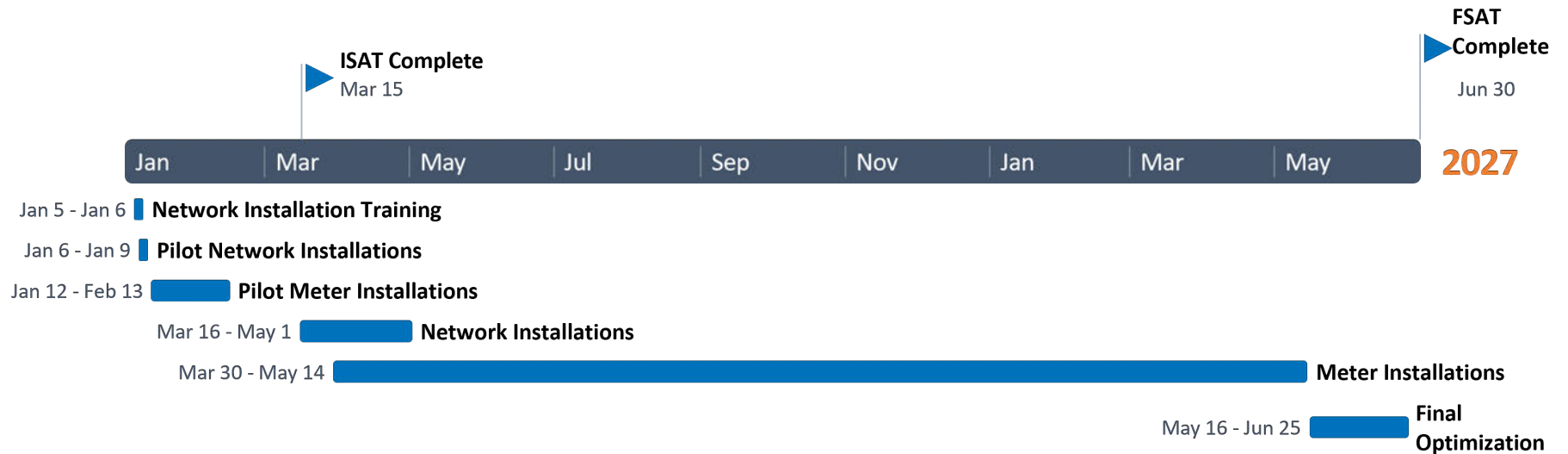
Technology Schedule



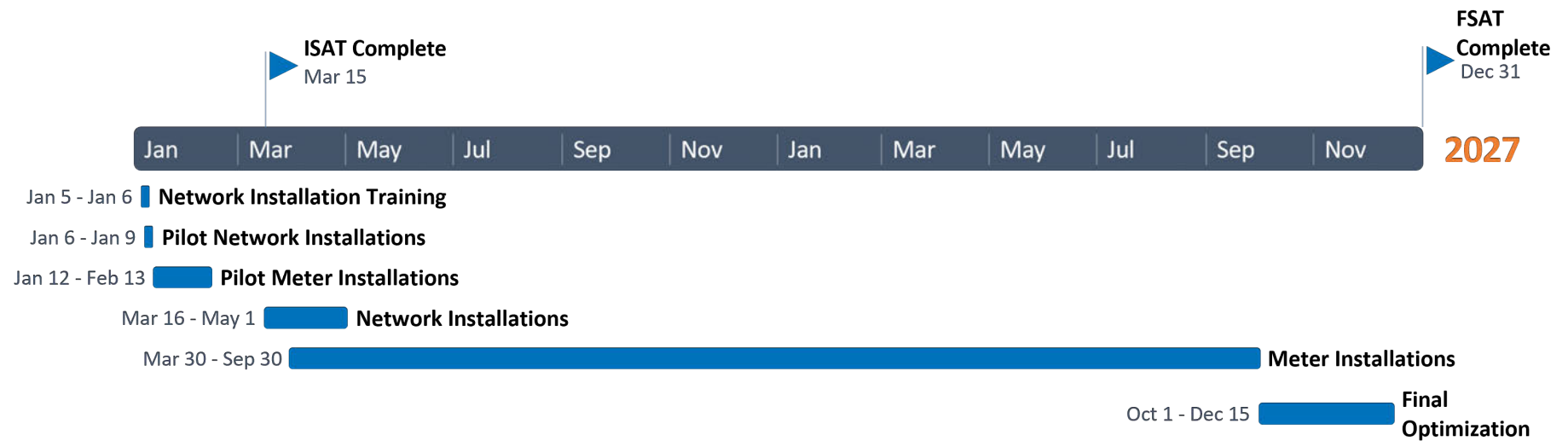
12-Month Installation Schedule



18-Month Installation Schedule



24-Month Installation Schedule



Appendix 2: Distributed Intelligence

Itron Riva DI delivers Itron's ground-breaking and fully realized smart meter-based distributed computing capability to enable *real-time grid edge infrastructure-based solutions and services*. Enabled by distributed intelligence technology, Itron's Grid Edge Intelligence portfolio empowers utilities with greater visibility and control at the edge by connecting, detecting, operating, and controlling devices to deliver an efficient, optimized, and smarter grid for communities. This portfolio uses distributed computing, machine-to-machine communication, and an open ecosystem of application developers to redefine what is possible in utility consumer engagement and grid operations. The Itron Riva DI combines:

- » Gen5 Itron Riva meters with standard features like a Wi-Fi radio for in-home consumer engagement, PLC (Power Line Carrier) for unparalleled, high-precision grid sensing and location, and a Linux software platform for running several applications at once, all with access to frequent meter measurements and each with the ability to communicate with other devices on the same network.
- » Itron's market-leading Gen5 field area industrial IoT network to deliver peerless connectivity, performance, and reliability.
- » Our 3rd party-distributed application ecosystem and supporting enablement tools.
- » App Management and App Store platform.

Taken together, Itron provides unparalleled flexibility to develop and evolve consumer engagement, grid safety, and operational efficiency capabilities for years.

Improving Grid Resilience

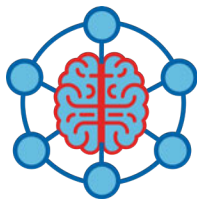
The proposed DI edge computing platform combines high-resolution data capture, edge computing, and peer-to-peer capabilities to enable real-time monitoring and control at the edge of the grid. The platform enables the following capabilities and use cases to improve grid resilience:

1. With the DI platform's **High Impedance Detection** and **Active Temperature Monitoring** applications, you get insights into issues such as poor electrical connections in the secondary network and meter socket problems before they create a safety hazard or interrupt service. This reduces customer outage minutes, which enhances customer satisfaction, minimizes unplanned outage restoration work, and helps you effectively plan repairs. Multiple North American utilities have deployed these applications and they have been able to identify and remedy hundreds of issues before they lead to an outage.
2. The solution's Gen5 Riva (DI-capable) electricity meters can record waveform level data that for the first time enables point-on-wave recordings at the LV network level. You can use this waveform data to **detect anomalies occurring on the grid from numerous possible causes**, such as vegetation contact, wildlife contact, protection device failures, grid equipment issues, and power quality issues. By installing these agents on a large meter population, the solution can notify you not only about the issues, but also about the time-criticality and location of the problems to avoid high risk scenarios, such as wildfires. You can also integrate this information into your DA system, enabling it to react automatically to certain extremely high-risk issues (such as through FLISR systems).
3. The solution's DI platform provides enhanced real-time visibility into distribution grids through applications such as **Active Transformer Load** and **Voltage Monitoring**, where for the first-time utilities can obtain minute-level information on distribution transformer loading and voltage conditions. The **EV Awareness** and **Solar Awareness** applications provide near real-time disaggregation information for when EVs begin or stop charging and the amount of solar generation on a time scale of minutes. We can integrate this real-time visibility into grid assets and DERs monitored by your

operational systems, such as an ADMS, to provide grid operators with real-time visibility up to the edge of the grid. This visibility can also be combined with control capabilities, where the meter can automatically take control actions to manage flexible loads and DERs behind-the-meter in near real time. This paradigm shift from a traditional centralized control architecture to hierarchical control is critical for dealing with the demands of a dynamic grid that must manage large numbers of distributed resources.

The solution also offers **DI network interface cards (DI NICs) that can extend DI edge computing capabilities to MV grid assets**, such as capacitor bank controllers. With the DI NIC's onboard edge computing and peer-to-peer communications functionality, these grid assets can benefit from additional information from downstream DI-cable smart meters to adaptively manage power flow and voltages in the grid in real-time.

What is Distributed Intelligence?



Itron's **Distributed Intelligence (DI)** platform allows multiple single-purpose applications (*apps*) to be distributed to and run directly on targeted AMI network endpoints, such as smart meters, network interface cards, and gateways. DI apps provide high-resolution data, real-time analysis, decision making, and action on and across endpoints at the very edge of the distribution grid—right where and when the action happens.

Itron launched its DI program in North America in 2017, with initial meter and app deployments in 2018. Itron refers to this innovation as *Distributed Intelligence (DI)*. *Edge computing* and *edge processing* are other industry terms commonly used to describe this concept.

Adding apps to endpoints is simple, rapid, and inexpensive. Each app can be managed separately and acts independently of other apps, just like the apps on your smart phone. You can have multiple apps per meter, deploy the apps on targeted groups of meters (or your entire meter population), and load only those apps that best apply to that meter group's specific needs and use cases.

For centralized reporting and decision-making, Itron's DI apps return near-real-time alerts and other data to back-office applications that further process and summarize results to execute centrally driven operational/business processes.

Itron takes a **comprehensive system** approach to edge computing—to the meter, to the network, to the analytics, to the supporting operational infrastructure. Further, DI apps can support many varied use cases, including safety, grid management, DER management, and consumer engagement. Itron's DI solution is much more than an app on a meter—it includes the infrastructure to download and manage the apps and the back-office analytics needed to ensure that Itron delivers the outcomes and value you need.

How It Works

Itron implements DI apps within **Linux containers**, using LXC technology, to both isolate and manage app resources on the device. Each DI app operates independently of the host device's operating system, metrology, and billing register code.

Apps installed on the Itron Riva meter (Itron's DI-capable meter) have real-time access to the meter's metrology data (including 1-second data, 2 cycle data, and waveform data), and implement data analysis algorithms directly on the device. Results of local analysis can trigger decision making and action directly on the device or on a collection of local devices, or they can trigger deliver alerts and analysis results to the back office for further analysis, decision making, and action.

The DI platform's Linux container model enables utilities to deploy new apps at any time without the extensive regression testing of all functions on the meter that was traditionally required when implementing new functions directly on core device firmware. As a proof point, one of our utility customers with extensive experience with Itron DI technology now only requires 3 weeks of system testing before deploying a new app because they have learned while a given app may have defects, as with any software, it cannot affect other device functions.

Real-Time Analysis

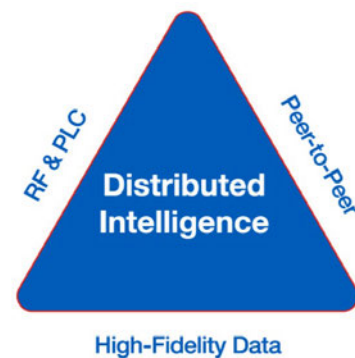
DI apps have access to three real-time data feeds on the meter:

- » 1-second integrations (voltages, currents, real/reactive/apparent power, etc.)
- » 2-cycle integrations
- » Raw waveforms (4 kHz single phase, 32 kHz polyphase)

The apps can subscribe to any or all these data feeds, as appropriate for the required analysis or use case.

DI-enabled devices also support **peer-to-peer communications** via RF, PLC, and W-Fi network communications—which come standard on every device.

With these capabilities, the DI apps make use of the meter's onboard Linux processor, high-resolution meter data feeds, and peer-to-peer communications with neighboring DI devices, operating in real time to identify specific grid edge failures or events. The apps then send resulting data, analysis, or alarms to back-office systems for **processing, presentation, and action**.



The apps' real-time, high-resolution access to data yields higher accuracy and lower latency results and information than traditional back-office analytic models. For example, apps currently in full production continually analyze and identify poor connections in the Low Voltage (LV) grid with >90% accuracy. They can also provide real-time notification of voltage and ANSI voltage excursions. And they can identify meter electrical grid connectivity topology with >99% accuracy as new meters get installed or as grid topology changes.

What Sets DI Apart from Standard Analytics?

Itron's DI platform has several differentiators:

- » Itron's DI platform offers a dedicated **infrastructure** and **ecosystem** for developers to create, test, and certify edge computing applications.
- » You can deploy DI apps directly onto **targeted meters and devices**, thus distributing their real-time analysis and decision-making capabilities across devices and where they are most needed.
- » The platform's supporting back-office analytics offer the visibility and insights you need for nuanced **understanding, decision making, and action**.
- » DI apps **minimize data** transport, processing, storage cost, and complexity. They process the high-resolution data locally, and then deliver only the useful data and information needed for centralized analysis and management.

Itron's new **DataHub** offers a clearinghouse for **authorized data sharing** between data producers and data subscribers.

Supported Devices

Supported Itron Electricity Meters and Devices

Itron's DI platform currently comes standard on the following devices:

- » Itron Gen5 Riva Singlephase and Polyphase Electricity Meters.
- » Itron OpenWay Riva Singlephase and Polyphase Electricity Meters.
- » Itron Edge Gateway, which enables DI applications to support distribution automation.
- » Itron DI NIC supports Itron non-metering devices and third-party meters and devices. For example, Itron is currently working with Aclara and some other devices, like communicating Fault Circuit Indicators (FCI) vendors.

To date, Itron has shipped more than **11.2 million** DI-enabled smart endpoints.

DI User Environment

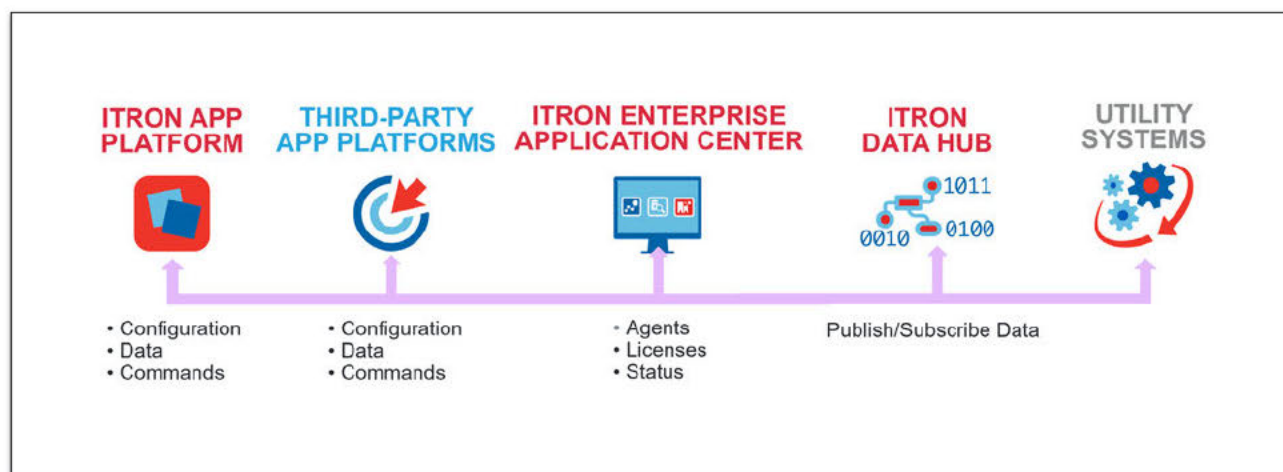


Table 1. DI Solution Components

Component	Description
Itron App Platform	Itron DI apps send their data, analysis, and alarms to back-office systems for further processing, presentation, and action. The back-office system, built on Itron's Optimizer Analytics Suite, displays DI app-specific analytics in a web-based user interface that uses simple maps, tables, charts, and graphs to present its findings. The contents of the interface vary with each app, based on its area of focus.
Third-Party App Platforms	Third-party DI apps send their data to their supporting third-party systems for ingestion and processing and for viewing in their respective user application.

Component	Description
Itron Enterprise Application Center (EAC)	<p>The Enterprise Application Center serves several purposes:</p> <ul style="list-style-type: none">• Itron uses the EAC to manage the DI environment; to review, approve, and certify third-party DI apps, and to present the DI app ecosystem to our utility customers.• DI App Developers use the EAC to submit, test, certify, and update their DI apps. They can also monitor app usage, resource utilization, and other metrics.• Utility companies use the EAC to explore, select, test, license, and distribute DI apps among their meter population.
Itron DataHub	<p>Itron's DataHub, powered by Microsoft Azure, is a secure, scalable, cloud-based platform for utilities and their customers to authorize data sharing through a simple "1-click" authorization process. DataHub can offer data at any resolution, including metering data (including Green Button data), DI application data, DER data, low voltage network data, and others.</p> <p>DataHub is also a marketplace where utilities and third parties can offer data products for free or for purchase. Potential data customers can use DataHub to explore and subscribe to data products, or to post their own data-based products and services.</p> <p>Customers can then use DataHub as a common API layer to subscribe to processed DI data for storage in their own data analytics platform or other business systems, according to the terms of their application license. For Itron DI apps, end users interact with the DI App Platform's user interface. Third-party DI apps send their respective agent data to their supporting third-party system for ingestion and to populate their respective user-facing application.</p>
Utility Systems (via DI APIs)	<p>DI application programming interfaces (APIs) provide utility back-office systems with access to DI data resources, meter data subscriptions, upstream systems, etc. Systems can receive events, alarms, and data from the DI app, and can send configuration changes to the DI app.</p>

Enterprise Application Center (DI App Management)

Itron's **Enterprise Application Center (EAC)** offers a secure marketplace and application management infrastructure for DI apps and associated back-office applications. You can use this platform to explore, select, test, license, and distribute DI apps among your meter population. The EAC puts you in full control over which apps you license and where they are deployed.

DI App Developers also use the EAC to submit, test, and certify their DI apps, update apps, monitor resource utilization, and control DI apps.

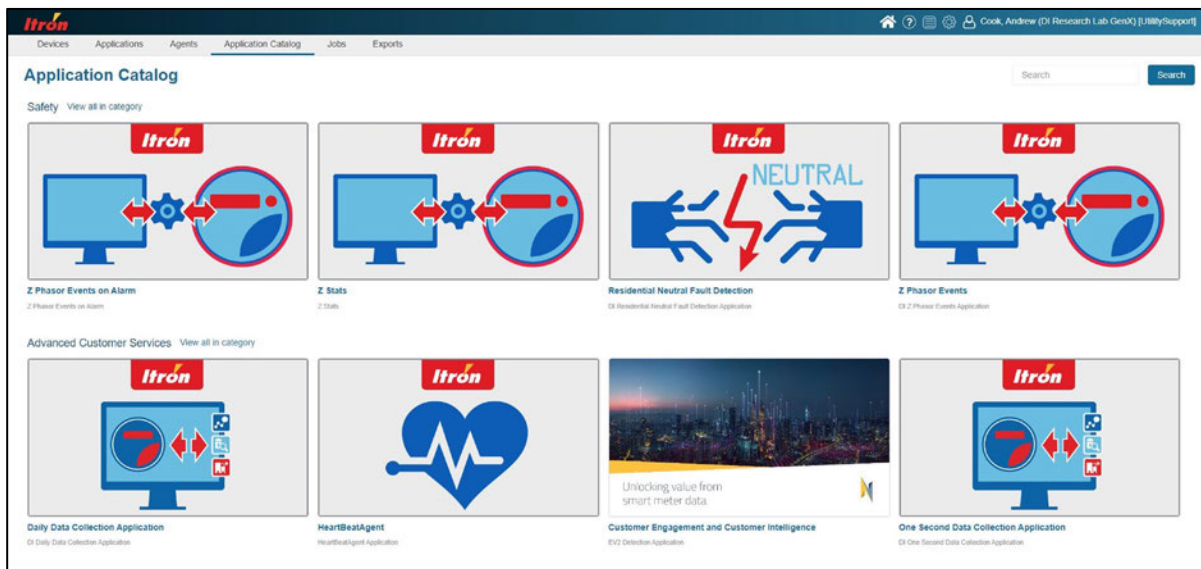


Figure 1. Itron's Enterprise Application Center (EAC) is the web environment that Itron, utilities, and third-party app developers use to manage their DI apps. It is both an app development resource and an "app store" to select, license, and distribute DI apps.

Utility Use Cases

The EAC's application management infrastructure provides:

- » A marketplace for Itron and authorized third-party apps
- » Secure app delivery
- » App licensing
- » App resource and policy management
- » Secure code delivery and version maintenance
- » App health and resource monitoring, and

A utility app test and certification workflow

Note: No sensitive or personally identifiable customer information is exchanged via these transactions. The system only maintains address information with respect to service point IDs.

Technology Partner Use Cases

The EAC also provides a central location for our technology partners to:

- » Submit new DI apps for testing, approval, and certification
- » Expose apps to utilities
- » Manage DI app license allocations to utilities
- » Distribute DI apps to targeted groups of meters or devices
- » Receive alarms and notifications for app fail/restarts and apps exceeding resource thresholds.
- » Submit new versions of DI apps for testing, approval, and certification

Installing DI Apps

Before a utility can install an app, it must meet the following conditions:

- » The app must be available and licensed by the utility.
- » A utility tester must have approved the app and version for use by that utility.

To install a DI app, a utility operator uses the Enterprise Application Center (EAC) to do the following:

1. Select an application and version.
2. Select a target device or target group of devices.
3. Executes the download.
4. Use the EAC's standard tools to monitor the download process and remedy any discrepancies.

Note: An API also exposes EAC app deployment functions to facilitate automated integration with utility back-office business systems.

DI App Activation Time

DI app activation times depend on several factors and specific utility goals. The network is optimized to support pushing DI apps to the targeted endpoints without impacting high-priority network traffic and associated capacity. Therefore, the network's QoS model places a low priority when pushing DI agents relative to high-priority AMI data, alarms, and events, and DA traffic. When deploying DI apps to only a handful of devices, the apps can be operational within a few hours. If deploying a full-scale delivery (that is, multiple apps over your entire meter population), the system-wide deployment can be fully operational in as little as 4 weeks.

DI App Management

In addition to managing DI apps via its user interface, the Enterprise Application Center (EAC) provides an API for managing DI applications across all targeted devices. This API allows other business systems to manage and monitor DI apps. For example, a customer service web portal could initiate an app download, such as Load Disaggregation, based on a customer request via the utility web portal.

The API functions for DI app management include:

- » Create target group of devices
- » Initiate app download to target group
- » Monitor app download to target group (status)
- » License app on target group
- » Unlicensed app from target group

» Utility web experience

For all functions above, the “target group” can be an individual meter.

DI User Interface: DI App Monitoring and Reporting

The solution displays Itron DI app-specific analytics within a standard user interface that uses simple maps, tables, charts, and graphs to present its findings. The contents of the interface vary with each app, based on its area of focus. The interface features zoom-in/out, hovering (for pop-up details), and clicking to “drill down” to detailed data about a specific item.

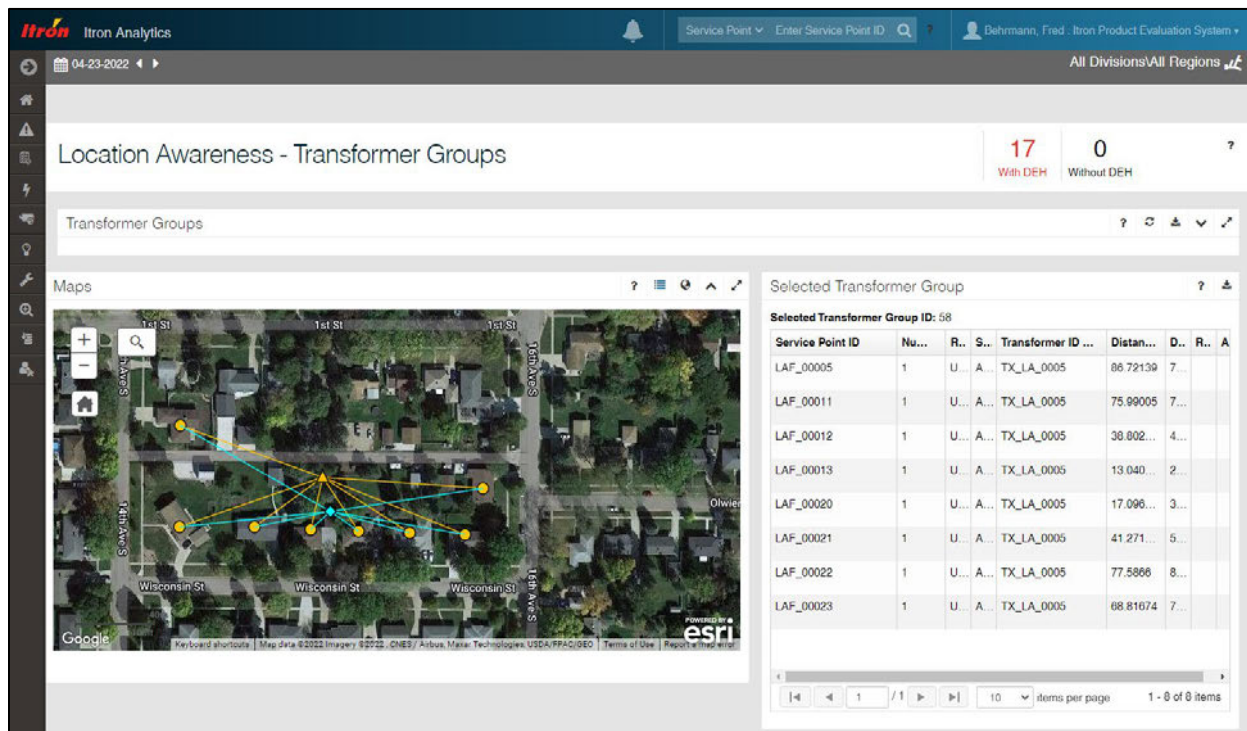




Figure 2. Back-office tools report DI findings in simple, intuitive maps, tables, charts, and graphs.




Available Itron DI Apps


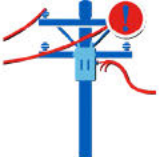

Available DI Apps




The following table summarizes the distributed intelligence apps that are currently available. These apps deliver significant value by minimizing response time, eliminating network data congestion, by acting precisely when and where needed to solve problems, and by helping you effectively manage rapidly changing conditions.

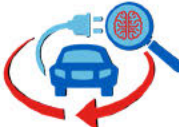



Note: DI apps are subject to periodic upgrades to include improvements and new features. Itron is also actively developing new DI apps to expand the DI portfolio to support additional grid optimization and DER management use cases.

App	Application / Description	Why You Need It
Grid Optimization		
	<p>Active Temperature Monitoring</p> <p>This app detects developing hot meter connections (such as meter jaw issues) before they create a safety hazard or an unplanned outage. The app uses meter temperature readings in conjunction with correlating load, weather, meter orientation, location, and radio broadcasting variables (all of which generate heat) to offer significantly greater accuracy than the meter's temperature threshold alarms.</p> <p>Our customers regularly get better than 90% accuracy of hot socket detection with this application.</p>	<p>It uses high-resolution temperature readings to detect meter socket problems before they create a safety hazard or interrupt service.</p> <p>Benefits:</p> <ul style="list-style-type: none"> • Prevent unplanned customer interruptions • Avoid unnecessary truck rolls. • Lower O&M costs with proactive maintenance vs. reactive maintenance • Increased safety for customers and utility personnel
	<p>Active Transformer Load Monitoring</p> <p>This app supports near real-time monitoring of system loading down to the distribution transformer level, offering the ability to share bi-directional aggregated load data to utility control systems (SCADA/ADMS) in resolutions between 1 to 5 minutes.</p> <p>This app provides a path to measure actual vs. forecasted edge control of the grid. You can also use this information for real-time state modeling and for load flow management on the distribution network. This app also provides transformer load statistics, such as daily load duration, peak load, etc., to the back office for non-real-time analysis.</p>	<p>Benefits:</p> <ul style="list-style-type: none"> • Near real-time load monitoring (1-min) on all distribution transformers. • Improves power flow and state analysis. • Supports alarms or reporting by exception based on configurable loading or power factor constraints. • Improves SCADA feedback loops for an array of ADMS/SCADA control system use cases. • Enhances decision making from distribution planners and system dispatchers.

App	Application / Description	Why You Need It
	<p>Active Transformer Voltage Monitoring</p> <p>This app provides near real-time voltage conditions in the secondary Low Voltage (LV) system served by a distribution transformer to back-office operational applications such as SCADA/ADMS.</p> <p>You can use this information for real-time state modeling and voltage management on the distribution network. The application also provides transformer LV statistics, such as average, high, low, etc., to the back office for non-real-time analysis.</p>	<p>Benefits:</p> <ul style="list-style-type: none"> Near Real-time voltage visibility (1-min) on all distribution transformers. Improve power flow and state analysis. Support alarms or reporting by exception, with configurable voltage sag or swell constraints. Improve SCADA feedback loops for an array of ADMS/SCADA use cases.
	<p>Active Transformer Load Management (Near-Term Roadmap)</p> <p>This app consumes data from Active Transformer Load and Voltage Monitoring apps to run local control sequencing at the spokedmeter level. This supports various use cases for transformer protection, demand response, DER management, Volt Var Optimization, etc.</p> <p>This app lets utilities add more advanced control capabilities to simplify SCADA, EMS, and ADMS integration, which helps manage energy challenges occurring at the edge of the grid in real-time.</p>	<p>Benefits:</p> <ul style="list-style-type: none"> Allows transformer energy management control sequencing and closed-loop operations. Improves response time to correct adverse conditions on the low voltage (secondary) side of the distribution circuit. Allows rules engines that support dynamic and static configurable thresholds. Supports controlling local assets to optimize power/load flows in real-time at the edge of the distribution circuit.
	<p>Anomaly Detection (In Beta Testing)</p> <p>This foundational app captures the voltage waveform anomalies (transients, harmonics, and distortion) resulting from various grid events.</p> <p>Such events include capacitor bank switching, feeder contact from objects (trees, animals), weather (ice, lightning), vehicle collisions, and equipment failures.</p> <p>It also includes customer-facing events due to equipment malfunctions, arcing, and energy efficient technologies, such as variable-frequency drives (VFD).</p> <p>You can then process this data offline to diagnose power quality and other issues causing the transients.</p> <p>PG&E is currently field beta testing this app with ~400 meters. The app is yielding interesting data on a variety of anomalies.</p>	<p>This app helps identify and diagnose power quality issues for customers who need "high quality power" that don't have their own substation.</p> <p>The app supports such use cases such as Power Quality, Energized Downed Conductor, Vegetation/Animal Contact Detection, Equipment Mis-Operation, and Underground/Overhead Conductor Failure.</p> <p>Use cases can be time-critical (such as Energized Downed Conductor) or less so (such as Power Quality). The app also has configurable thresholds for sending alarms based on time criticality.</p> <p>Benefits:</p> <ul style="list-style-type: none"> Supports identification transient and sustain fault operations Improves speed to respond and correct adverse conditions through enhancing location algorithms Supports enhanced distribution risk

App	Application / Description	Why You Need It
		modeling, and targeted preventative maintenance.
	<p>Enhanced Outage and Restoration (Near-Term Roadmap)</p> <p>This app enhances outage auditing capabilities by using the PLC auditing process in DI-capable meters to act as a spokesmeter. The spokesmeter can audit its peers in near real-time to confirm that all devices on the same secondary bus are powered or if any are experiencing an outage.</p> <p>Upon restoration, the spokesmeter can also audit its peers to identify and highlight nested outage conditions.</p> <p>Utilities and OMS systems have always struggled with scaling and scoping outages and restoration from AMI data.</p> <p>This app's pre-process field auditing and mapping to distribution level device outages provides enhanced visibility to outages and restorations.</p>	<p>This app also enhances ADMS/OMS performance by accurately reporting outage scale and scope, which significantly reduces the need to estimate outage scope and scale.</p> <p>Benefits:</p> <ul style="list-style-type: none"> • Optimizes event and alarm management for blue and grey sky days. • Supports better outage scaling and scoping capabilities while improving the reliability of outage messages. • Identifies nested outages. • Supports improved estimated restoration time calculations by supporting restoration auditing of meter peers.
	<p>High-Impedance Detection</p> <p>This app accurately detects and locates high-impedance "hot spots" (poor electrical connections) in low-voltage (LV) secondary distribution between the meter and the distribution transformer. Typical examples include poor insulators, faulty meter installations, and poor wiring conditions.</p> <p>This app proactively detects potentially poor electrical connections that can cause customer voltage flicker, interruption, and fire risk. Early detection allows you to proactively resolve the issue before it impacts the customer.</p>	<p>Benefits:</p> <ul style="list-style-type: none"> • Improves customer safety by Identifies customer hot socket conditions. • Identifies poor or failing connections from the line side of the meter to the distribution transformer. • Identifies over-loaded conductor or distribution transformers. • Supports the identification and validation of conductors and distribution transformers. • Supports identifying host capacities for EV and PV.
	<p>Intelligent Voltage Monitoring (IVM)</p> <p>IVM provides highly configurable, threshold-based voltage monitoring, events, and alarms based on actual measured voltage and locally computed primary (MV) voltage. IVM can act as a bellwether to self-determine voltage applicability based on historical</p>	<p>IVM provides real-time voltage alerts based on configurable parameters to issue operational alarms for over- and under-volt situations that can create outages. With such information about circuits that have chronic voltage issues due to load, infrastructure, or transformer overloading, you can plan infrastructure updates to accommodate new loads, such as</p>

App	Application / Description	Why You Need It
	<p>voltage trends and communication network connectivity. It can also act as an endpoint voltage sensor, a voltage monitor for conservation voltage reduction (CVR) events, and supports other use cases.</p>	<p>EV charging or PV systems.</p> <p>Benefits:</p> <ul style="list-style-type: none"> • Supports near real-time state analysis. • Supports improved VVO in brownfield environments.
	<p>Location Awareness</p> <p>This app provides the electrical location of every meter on the distribution grid, including transformer, phase, and feeder/substation bank.</p> <p>Includes the phase ID to better balance load across phases and to determine which downstream asset is connecting to which phase for better outage communication and restoration.</p> <p>It also compares connections to the utility system of record, usually a Geographic Information System (GIS), and reports discrepancies to update those systems.</p> <p>This app is a prerequisite for use cases centered on distribution operations involving control of devices, loads, and assets.</p>	<p>Multiple DI apps use this information. The app delivers its data to the back office for updating and validating GIS connectivity, improving outage responses, feeder phase balancing, and multiple other grid applications.</p> <p>Benefits:</p> <ul style="list-style-type: none"> • Identifies meter-to-transformer, meter-to-phase, and meter-to-feeder relationships. • Continuously maintains an accurate system model. • Improves the scoping and scaling of outages and restoration. • Enhances estimated time to restoration (ETR) algorithms. • Drives better grid analytics to support system engineering and planning.
	<p>Meter Bypass Detection</p> <p>This app detects diversion theft where illegal connections are made ahead of the meter or directly on the low voltage (LV) secondary to steal electricity.</p>	<p>You can increase revenue by accurately identifying locations of tampered and bypassed meters. This app can identify meter diversions with 98% accuracy.</p> <p>Benefits:</p> <ul style="list-style-type: none"> • Enhances existing theft analytics by providing an additional measurement that highlights when changes in voltage are not within the bounds of the change in current. • Identifies when to visit sites with the most likely time to verify tampering events. • Improves loss prevention and recovery.
	<p>Voltage Bellwether Monitoring</p> <p>For those meters the utility identifies as a bellwether meter, this app continually sends unsolicited voltage measurements and alarms at defined intervals. The three event types are high voltage, low voltage, and voltage phase imbalance.</p>	<p>You can regularly monitor your designated bellwether meters.</p> <p>Benefits:</p> <ul style="list-style-type: none"> • Supports near real-time state analysis. • Supports improved VVO in brownfield environments.

App	Application / Description	Why You Need It
DER Integration (Remote Asset Management)		
	<p>Electric Vehicle (EV) Awareness</p> <p>This app detects electric vehicle (EV) charging at a residential customer's premises. It provides near real-time (5-minute timestep) disaggregation data with alarms when an EV starts or stops charging to create a time-series usage profile.</p> <p>You can use this data to promote multiple consumer marketing programs aimed at providing the best possible experience for electric vehicle owners and to manage the effects of EV charging on the low voltage infrastructure.</p>	<p>Benefits:</p> <ul style="list-style-type: none"> Identifies Level 1 and Level 2 EV charges in residential homes. Supports building an energy profile for the usage of each charging session. Identifies the charging session's maximum demand, start- and stop-time, and total energy consumed. Supports improved system planning and EV impact analysis.
	<p>Solar Awareness</p> <p>This app detects solar generation at the customer premises and calculates a time series profile of solar generation behind the revenue meter.</p> <p>You can use this data to detect improper or unregistered interconnects to the utility grid, and to prompt the marketing of energy management programs associated with generation, estimating generation standby requirements for cloud cover, and multiple other programs.</p>	<p>Benefits:</p> <ul style="list-style-type: none"> Identifies a PV system at the residential premises. Supports building an energy profile for PV system energy production. Identifies the PV system's maximum production, charging session start- and stop-time, and total energy supplied. Supports improved system planning and PV impact analysis.
	<p>HAN 2030.5 Application</p> <p>Provides the ability to share data locally via Wi-Fi and the IEEE 2030.5 protocol, providing a path to stream energy KWh, demand KW, apparent power KVA, and reactive KVAR, and other data, in real time.</p>	<p>Benefits:</p> <ul style="list-style-type: none"> Real-time notifications (customer, utility, and third-party). Secure access to real-time data-sharing mechanisms The app-based application layer protocol over Wi-Fi provides future proofing against other standards that may be developed in the future.
	<p>VRTU (for ADMS Customers)</p> <p>The Virtual Remote Terminal Unit (VRTU) app enables a transformer to integrate and share data with utility control systems (ADMS, DERMS, SCADA, etc.) by way of an intermediary "spokesmeter." The spokesmeter communicates with a back-office server by aggregating and converting AMI network protocols to DNP3 to stream grid edge data to the utility control systems.</p>	<p>The VRTU app allows a spokesmeter to provide distributed control system connectivity to non-networked devices, such as substation reclosers and tap changers on transformers.</p>

DI Apps Currently Deployed

The following table lists those Itron customers that have deployed or are piloting DI apps.

Utility	Profile	DI Apps
CenterPoint Energy	<ul style="list-style-type: none"> Customers: 155,000 Devices w/ DI: 146,320 	<ul style="list-style-type: none"> Active Temperature Monitoring Meter Bypass Theft High Impedance
Tampa Electric (TECO)	<ul style="list-style-type: none"> Customers: 840,000 Devices w/ DI: 750,971 	<p>In full production deployment:</p> <ul style="list-style-type: none"> Active Temperature Monitoring Bellwether Voltage High Impedance Location Awareness Meter Bypass/Theft Detection <p>Five more DI apps are to be piloted in 2023: (2 Transformer, 2 EV, and 1 Solar)</p>
Xcel Energy (Operates in 8 U.S. States)	<ul style="list-style-type: none"> Customers: 3.7M Devices w/ DI: 1,920 (field trials) 	<ul style="list-style-type: none"> IEEE 2030.5 HAN Contracted to deploy 3+ additional DI apps in 2023.
Other Companies Currently Piloting DI Apps	<ul style="list-style-type: none"> ComEd Exelon Measurement Canada 	<ul style="list-style-type: none"> PDI PEA (Thailand)

Several other utilities are in the early stages of full production deployments of Gen 5 Riva DI meters that will utilize DI apps. These include Avangrid (New York operating companies), Hydro One, Alectra, TNMP, and El Paso Electric.

Third-Party DI Apps

From the very beginning, a key strategy for the DI platform has been to encourage competitive innovation. For this reason, we have created our **Partner Enablement Program**, which provides a framework for utilities and third-party solution providers to independently develop an **ecosystem** of applications for the DI platform.

For example, Itron has already partnered with vendors such as **Sense**, **Bidgely**, **NET2GRID**, **Powerley**, and others to provide DI applications that perform load disaggregation and related services. These apps provide detailed information about energy production and consumption from various devices within the home. Each vendor offers a unique approach that both utilities and consumers can leverage, giving utility companies options to find the right mix of partners to serve their market needs. These apps can identify loads from such items as HVAC systems, hot water heaters, washers, dryers, refrigerators, pool pumps, EVs, EV equipment, PV solar systems, and more.

Itron DataHub™

Itron DataHub™: A Data Marketplace (Optional)

The Itron [DataHub](#), powered by Microsoft Azure, provides a secure, scalable, cloud-based platform for utilities and their customers to **authorize data sharing**—including DI data—with third parties through a simple, automated “1-click” authorization and authentication process.

DataHub can offer utility data from any metering system at any resolution. Examples include metering data (including **Green Button** data), DI application data, DER data, low voltage network data, and DI data pushed from meters over the customer’s Wi-Fi network and public internet connection from apps that support that functionality.

DataHub also provides a marketplace where utilities and third parties can offer data products for free or for purchase. Interested data customers use DataHub to explore, discover, and subscribe to data products, or to post their own data-based products and services.

Itron is a Participating Member of the Green Button Alliance

With distributed energy resources (DERs) such as residential solar and electric vehicles on the rise, there is growing demand for real-time insights into energy usage among consumers, utilities, and third-party stakeholders. Part of Itron’s mission is to help these stakeholders think of DERs as valuable grid assets that can help deliver improved reliability, resiliency, customer engagement, and sustainability.

To further this mission, in November 2023, Itron announced that it joined the [Green Button Alliance](#)™ (GBA) as a Participating Member. GBA is a U.S.-based non-profit organization that fosters the development, compliance, and widespread adoption of the Green Button® data access and sharing protocol for energy and water. The Green Button Connect My Data® and Green Button Download My Data® standards enable energy and water users to digitally access their usage data, to manage their energy consumption more efficiently, and to conserve resources while ensuring customer data privacy.

Joining the GBA as a Participating Member aligns Itron with other forward-looking industry leaders to further promote standards-based Green Button solutions. Participation also underscores Itron’s commitment to sustainability, grid-edge data standards, and adopting innovative technology in the energy and water sectors.

By joining the GBA, Itron will help maintain the evolving landscape of advanced metering infrastructure (AMI) and grid edge data. For example, Itron has shipped more than 8 million distributed intelligence (DI)-enabled endpoints, which have the capability to capture real-time data from electric vehicle chargers, solar panels, appliance load profiles, transformer loading and more through DI applications.

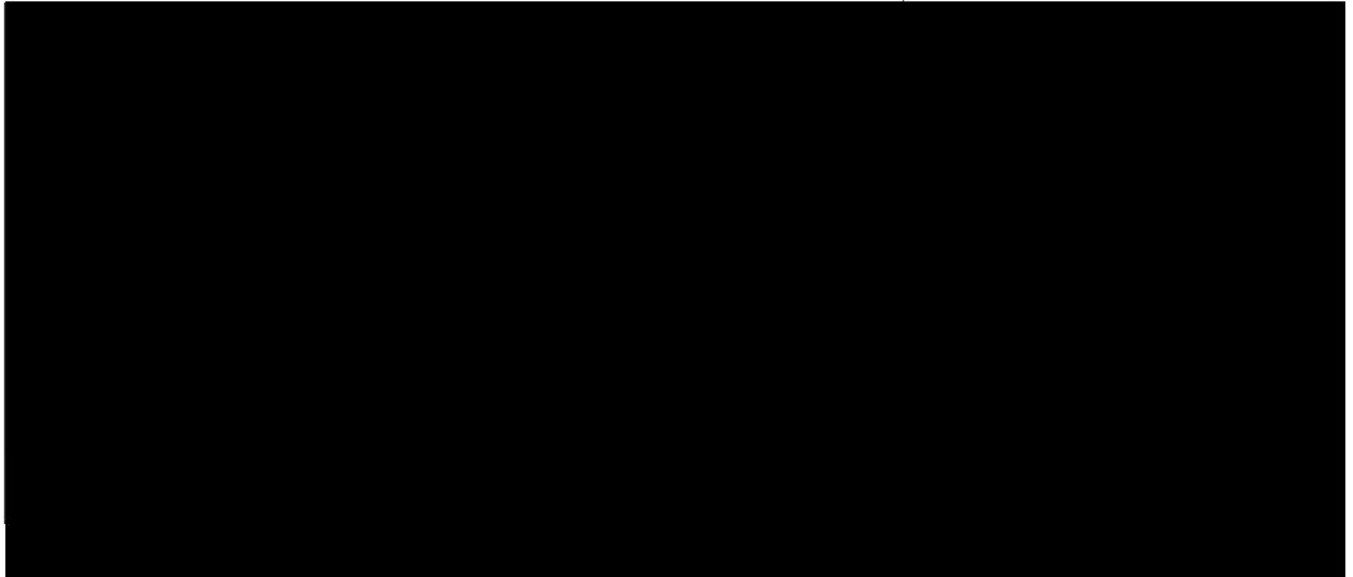
And Itron’s innovative DataHub™ platform provides a united, user-friendly platform for utilities and third parties to facilitate the sharing of not just metering and billing information, but also a wide variety of grid edge data. Aligning these solutions with the Green Button standard is critical to ensure all parties have secure access to data needed for a distributed energy future.

DI Platform Roadmap

Near-Term Roadmap for DI Applications

The Grid Edge Realized

DI applications and integration portfolio



New Communication and Network Strategies

Flexible Communications

Itron enables DI via multiple communications technologies, including the Gen5 RF mesh network, cellular networks, Wi-Fi, and PLC. The DI platform's ability to support multiple communication paths is a key advantage, as it supports peer-to-peer data sharing, which enables many creative edge-computing use cases. Itron is the only vendor with meters deployed at scale that concurrently supports three different communications media (900 MHz, PLC, and Wi-Fi).

DI Support for Cellular Platforms

Itron is currently developing our second-generation cellular IoT chipset as part of our Cellular Platform solution. The solution builds on 5G-compliant cellular chipsets from Sierra Wireless and Sequans. The solution supports both LTE-M and NB-IoT network operation. However, due to DI network speed, latency, and capacity dependencies, we have focused our product and DI strategy on LTE-M Cat-M1 operation.

The solution is both backward- and forward-compatible to the latest versions of 3GPP specifications, including future compatibility with new 5G and 6G releases. This **global** offering will support both Public Tier 1 cellular carriers across North America, EMEA, Latin America, and Asia-Pacific, as well as 3GPP-based Private LTE cellular networks, with future scope to include Anterix, CBRS, FirstNet, Dish, and satellite networks.

As DI solutions continue to evolve, Itron's DI platform is future-enabled to introduce third-generation Cat-1 and Cat-4 cellular operation with higher speed, higher capacity, and near real-time data processing. Our second-generation devices launch in 2024 2H, with DI support in our Cellular Platform release for electricity. Our third-generation products are targeted for later 2026.

Device and System Integration

This section discusses the devices, APIs, and functionality that support the ability to manage DI applications across endpoint devices and for external systems to manage the applications.





Back-Office System Integration

To support system integration with utility back-office systems, the solution exposes DI data on a data bus, allowing back-office applications to subscribe to the data. Applications subscribe via a connector API that interfaces with the control application's database, and is configured to pull specific information from the data bus.

Reporting

The EAC also includes exportable standard reports, including:

- » App and version, status, install and license dates for all apps on a device or list of devices
- » List of all devices on which a given app and version is installed, including status and license dates
- » Installed device counts by app and version
- » Resource utilization by app and version
- » Total available and utilized licenses by app
- » App Execution alerts
- » Multiple management functions

Control System Integration

Itron has also developed a Virtual Remote Terminal Units (VRTU) software gateway that simplifies integration with utility operational control systems, such as SCADA, ADMS, and DERMS. The VRTU gateway allows these control systems to procure DI data directly. The VRTU gateway can also aggregate DI data points relative to the grid's distribution infrastructure within definable groups and single device profiles, such as distribution transformer, protection control zones (such as lateral feeder segments), and voltage control zones. The VRTU gateway supports the following operational protocols: DNP 3.0, Modbus, SunSpec2 (IEEE 2030.5), and IEC 60870-5-104.