



Grid Edge Intelligence

Transforming data into actionable intelligence and control



NEW GRID CONDITIONS REQUIRE A NEW OPERATIONAL MODEL

Australia has the [highest per-capita rooftop solar penetration in the world](#), with more than 4.3 million rooftop solar systems installed. Combined with increasing electrification, electric vehicle (EV) charging and the rapid growth of Consumer Energy Resources (CER), this is fundamentally reshaping low-voltage (LV) networks, creating greater variability, localized constraints and increasingly complex bi-directional power flows across the LV network.

These pressures are increasingly concentrated at the edge of the network, where rooftop solar exports, EV charging and localized demand variability directly impact transformer loading, voltage performance and overall LV network operations. Traditional centralized operating models built around meter-to-cash processes offer limited visibility into increasingly dynamic low-voltage network conditions. Just as CCTV transformed physical security through continuous monitoring and faster response to emerging events, today’s grid operations require greater awareness at the grid edge.

At the same time, many first-generation AMI meter fleets are approaching the end of their operational design life.

Aging infrastructure, communications degradation, reduced visibility and growing maintenance requirements are increasing operational risk and placing additional pressure on utilities already managing a more complex grid. As a result, Distribution Network Service Providers (DNSPs) are finding it challenging to proactively manage emerging constraints, optimize existing infrastructure and respond to changing network conditions before customers are impacted.

Combined with increasing compliance obligations, bushfire exposure and evolving customer expectations, traditional approaches to low-voltage network operations are becoming increasingly difficult and costly to sustain.

DNSPs are therefore under growing pressure to improve reliability, resilience, safety and customer outcomes while maximizing existing infrastructure and maintaining affordability for customers.

As the grid continues to evolve, AMI is also evolving beyond traditional meter-to-cash functionality into a critical operational platform for managing increasingly distributed and decentralized networks.

GRID EDGE INTELLIGENCE: FROM METER-TO-CASH TO OPERATIONAL INTELLIGENCE

Grid Edge Intelligence (GEI) extends the role of AMI beyond meter-to-cash operations, enabling utilities to improve operational awareness, responsiveness and control across increasingly distributed networks.

Key operational outcomes enabled by GEI include:

Improve Low-Voltage Visibility and Transformer Awareness	Reduce Outage Duration Through Faster Fault Detection and Restoration	Optimize Existing Infrastructure and Defer Network Augmentation
As rooftop solar exports, EV charging and localized demand variability continue to increase, utilities require greater visibility into transformer loading and low-voltage network conditions. Grid Edge Intelligence helps DNSPs identify emerging constraints earlier, enabling more informed operational and planning decisions while maximizing the utilization of existing infrastructure.	As low-voltage networks become increasingly dynamic, utilities need faster awareness of outages, abnormal operating conditions and emerging network issues. By providing localized operational awareness closer to where events occur, Grid Edge Intelligence supports faster response, improved reliability and better customer outcomes.	As investment pressures increase and network conditions become more complex, utilities need to maximize the value of existing assets before committing to traditional augmentation. Greater visibility into network behavior, asset utilization and emerging constraints supports more targeted investment decisions while helping prepare the network for continued growth in rooftop solar, EV adoption and Consumer Energy Resources.

By combining distributed intelligence (DI) applications, edge-based analytics and intelligent orchestration, GEI enables DNSPs to detect, analyze and respond to network conditions closer to where they occur. This improves visibility into transformer loading, outage conditions, voltage performance and emerging LV network constraints.

Unlike traditional AMI environments that rely heavily on centralized collection and retrospective analysis, GEI enables more localized operational awareness directly at the edge of the network, helping utilities improve operational response, optimize existing infrastructure and proactively managing increasingly dynamic LV conditions.

Importantly, GEI enables operational value progressively from the first deployed meter, allowing DNSPs to enhance visibility and operational awareness as deployments scale over time.



THE FOUNDATION: UPGRADE FROM AMI 1.0 TO AMI 2.0

Transitioning from AMI 1.0 to next-generation AMI 2.0 is the first step in unlocking these operational capabilities. With the Itron Riva® electricity meter as a key foundation, DNSPs can securely orchestrate distributed intelligence applications and edge analytics at scale.

As meter fleets age and grid conditions become more dynamic, DNSPs need a smarter, more flexible platform for grid-edge visibility and control. The combination of Riva meters, DI-enabled devices and the Gen6™ network platform helps DNSPs modernize existing AMI infrastructure without costly replacement, enabling high-frequency data streaming, edge analytics and clearer operational insights across the LV networks.

Cost-Effective Modernization

With backward compatibility, DNSPs can easily upgrade to AMI 2.0 with the Itron Gen6 network platform and Riva meters without costly infrastructure replacement. UtilityIQ® (UIQ™), the universal headend system for AMI 2.0, provides centralized control of events, alarms, device provisioning and maintenance policies—helping DNSPs deliver timely, consistent updates across the entire meter fleet.

More importantly, DNSPs can opt to scale the deployment in phases, helping them unlock the value of DI applications and edge analytics over time while minimizing disruption to everyday grid operations and customer service.

The Itron Riva electricity meter is more than just an electricity meter — it is a high-frequency sensor, an analytics engine, a taker of action.

The Riva meter functions as an intelligent grid-edge sensor, delivering high-frequency, granular data essential for the timely detection of voltage sags, swells, flicker, rapid load changes and power quality events. Equipped with the CPU, it has compute capability to process and analyse data at the edge. This ability supports the implementation of GEI use cases such as advanced outage management, safety and real-time disaggregation of rooftop solar generation and EV load.

The Riva meter is designed to balance high-frequency data capture with signal fidelity, processing efficiency and cost-effectiveness—enabling DI applications to perform reliably and efficiently.

Secure, Open and Interoperable Platform

The Itron Gen6 network platform provides a secure, open and interoperable foundation that gives DNSPs the flexibility to choose the network connectivity best suited to their operational needs. Supporting industry-standard protocols such as IEEE 2030.5, along with Wi-Fi and power line communication (PLC) for peer-to-peer connectivity, the platform enables resilient, efficient communications for next-generation distributed intelligence applications.

PLC helps offload network demand, preserve core FAN capacity and support precise transformer-level device alignment with efficient one-to-many communications. Enhanced capabilities, including last-gasp functionality, strengthen the seamless deployment of GEI use cases such as safety and outage awareness. The interoperable platform also supports a broad spectrum of DI-enabled devices including Riva meters, while its defense-in-depth security approach helps protect critical data, devices and communications.

Future Proofing with Innovative, Modular Design

The modular meter architecture, featuring a hot swappable communications module, simplifies upgrades and maintenance while minimizing service disruption. Built-in remote connect, disconnect and load control capabilities enable faster service actions while reducing field visits.

Designed with secure isolation of core metrology functions, it protects the integrity of primary measurement data to ensure accurate, reliable meter-to-cash transactions across system upgrades and new project implementations.

Proven Scalability, Built to Last

Today, the DNSPs can easily deploy Itron's curated DI applications that support a wide range of GEI use cases, including reliability, LV visibility, and safety as well as CER management. With peer-to-peer communication supported by PLC, backed by a strong partner ecosystem and the Itron DI Developer Program, new and future DI applications can be developed, deployed and updated easily on Riva meters. The Riva meter is built for harsh climate conditions and designed for a proven value of more than ten years, supporting seamless adaptation to emerging use cases as the grid becomes more complex.

INTELLIGENT ORCHESTRATION WITH IEOS

The Itron Intelligent Edge Operating System (IEOS) provides the orchestration layer required to securely deploy, manage and scale Grid Edge Intelligence applications across distributed devices and increasingly complex LV networks.

By integrating edge intelligence with centralized operational systems, IEOS enables utilities to combine distributed analytics with broader operational applications and network management strategies while maintaining secure lifecycle management of edge applications at scale.

SECURE APPLICATION MANAGEMENT

The Itron Enterprise Application Center provides a secure framework for managing and deploying DI applications across the network, enabling utilities to maintain full control over application deployment, lifecycle management and operational monitoring of both Itron and authorized third-party applications.

MAXIMISING VALUE FROM EXISTING GRID INFRASTRUCTURE

GEI helps DNSPs maximize the value of existing infrastructure by improving reliability, enhancing operational efficiency, supporting safety outcomes, and enabling more effective utilization of network assets. By evolving existing AMI investments into an operational platform, utilities can unlock new value streams associated with outage awareness, fault prevention, grid visibility, electrification readiness and future flexibility services.

Unlike standalone operational technologies, GEI enables multiple operational capabilities through the same AMI infrastructure investment, supporting improved capital efficiency and more informed network investment decisions. Greater visibility into localized network conditions and emerging constraints helps DNSPs optimize existing infrastructure before committing to traditional network augmentation.

Itron has issued more than 27 million DI applications, shipped over 18 million DI-enabled endpoints, and now has more than 3 million endpoints actively running DI applications at the world's most innovative utilities.

ACCELERATING GRID EDGE INNOVATION

Itron's Melbourne Center of Excellence provides a collaborative environment for utilities to explore, validate and accelerate GEI initiatives through demonstrations, technical workshops, interoperability testing and operational use-case validation.



To set up an appointment to visit our center of excellence, please contact us at the Itron Melbourne Office +61-3-9236-5222.

To learn more visit itron.com

While Itron strives to make the content of its marketing materials as timely and accurate as possible, Itron makes no claims, promises, or guarantees about the accuracy, completeness, or adequacy of, and expressly disclaims liability for errors and omissions in, such materials. No warranty of any kind, implied, expressed, or statutory, including but not limited to the warranties of non-infringement of third party rights, title, merchantability, and fitness for a particular purpose, is given with respect to the content of these marketing materials. © Copyright 2026 Itron. All rights reserved. **102063BR-07 APAC 07.26**

We create a more resourceful world

Itron

2111 North Molter Road
Liberty Lake, WA 99019 USA