



# Distribution Transformer Awareness

Deploy and unlock value-based outcomes and establish a foundation for grid management solutions



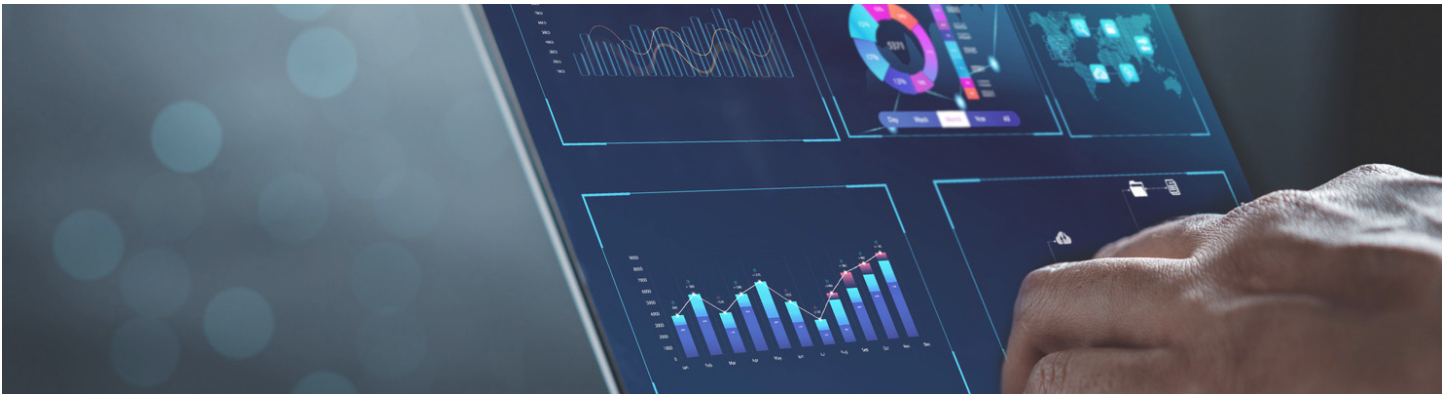
As utilities move forward climate adaptation and sustainability, managing distribution system assets becomes critical to address energy challenges arising from population growth, the increase on energy demand, extreme weather conditions and the influx of new distributed energy resources (DERs) connected to the distribution system. Utilities need a unified, highly reliable system that provides a strong foundation to deploy grid operations and management solutions.

Itron's Distribution Transformer Awareness (DTA) solution helps you manage your distribution system capacity and reliability, and sets a strong foundation to meet new industry challenges. We provide an integrated solution that is designed to address grid capacity and reliability challenges, minimise losses and integrate to deliver an easy path forward to adopt new industry energy models necessitated by the energy transition. With Itron, you will benefit from a strong, well-know, worldwide platform that enables high data quality and granularity, high-performance data collection, data unification, management and advanced grid edge analysis. This easily enables you to adopt key applications that address your current challenges by enhancing DTA with solutions like forecasting, demand response planning and DER management.

### The Value of Distribution Transformer Awareness

Distribution Transformer Awareness provides multiple benefits for utilities. It plays a crucial role in ensuring the effective and efficient operation of power distribution networks. DTA offers value that is multi-faceted:

- 1) Economic:** Proper asset management can lead to cost savings. Predictive maintenance, for example, can identify potential issues before they cause significant damage, preventing costly replacements or repairs. Optimized replacement scheduling based on the transformer's condition, instead of its age, can further save costs. This also ensures that investments are directed toward the transformers that need it most.
- 2) Operational Efficiency:** With effective asset management, organizations can maximize the use of their transformers, thereby increasing operational efficiency. This includes load management to prevent overloading of transformers and condition monitoring to keep them operating at optimal levels.
- 3) Reliability and Quality of Service:** By effectively managing transformer assets, utilities can maintain a high level of reliability and quality of service. This is particularly important because power distribution networks are critical infrastructure, and any downtime can have significant impacts.
- 4) Risk Management:** Effective asset management can help identify and manage risks associated with the transformer fleet. This can include risks related to aging infrastructure, changing load patterns, regulatory compliance and environmental impacts.
- 5) Sustainability:** Asset management can help in making decisions that consider the long-term sustainability of the distribution network. This includes considerations around energy efficiency, renewable energy integration and greenhouse gas emissions.
- 6) Data-Driven Decisions:** Utilizing data gathered from distribution transformer meters, asset managers can make more informed decisions about operation, maintenance and replacement strategies. This can greatly improve the overall efficiency and effectiveness of the distribution network.
- 7) Regulatory Compliance:** Effective transformer asset management also ensures that utilities are compliant with regulatory standards and guidelines, thereby avoiding potential fines and penalties.



In summary, the value of Distribution Transformer Awareness is multi-faceted, contributing to improved service reliability, cost savings, risk mitigation and sustainability. Beyond that, Itron's solutions establish a scalable, common and unified platform which enables:

- » Leveraging different data sources (DT meters, AMI, etc)
- » Ingesting data easily from third-party systems
- » Unifying data to get enhanced analytics (transformer monitoring, AMI data aggregation)
- » Preparing for the future (native integration with forecasting and demand response systems, the Itron Optimizer platform, and distributed intelligence options for grid management and DER adoption)

#### **CAPABILITIES**

Provides transformer load visibility and enables improved capacity planning.

- » Acquire transformer loading reports
- » Detect evolving transformer overload
- » Detect transformers with unbalanced loading across phases
- » Identify transformers with reverse power flow on one or more phases

Improves reliability, helps reducing outages and faults. Tracks key KPIs (CAIDI, SAIDI, SAIFI).

- Detect transformer winding short
- Detect transformer floating neutral
- Detect transformers that are overloaded or where the core is saturated using voltage data
- Detect transformers where load decreases to near zero for one or more phases
- Detect loss of one phase to transformer primary winding

- Monitor distribution voltage
  - Detect low voltages, determining if they are local to a transformer or feeder section
  - Detect high voltages
  - Detect transformers with unbalanced voltages
  - Provide voltage inputs for CVR and Volt/VAR control systems

Enables improving resources and asset management (e.g., optimization of the asset lifespan).

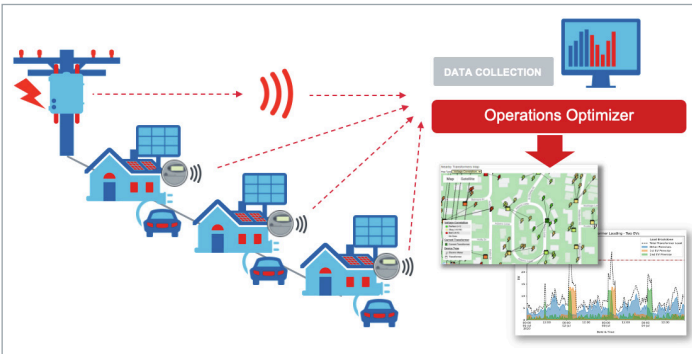
- Provide visibility on transformer aging
- Help pinpoint issues in field and reduce field operational drain
- Reduce faults and stress on assets extending their lifetime

Helps minimise losses.

- Reduce technical losses derived from load imbalances and overloads
- Bring revenue assurance use cases and energy balance (optional) in combination with AMI data
- Pinpoint where high incidence of theft are occurring with transformer load balancing
- Pinpoint specific service point location to investigate with theft investigation and AMI data
- Show geo-spatially where theft is occurring
- Reduce and eliminate unbilled energy consumption

Operations Optimizer provides a strong foundation to combine distribution transformer monitoring data with AMI data to deploy additional use cases like:

- Mapping grid connectivity:
  - Meter-to-transformer ID visibility
  - Meter phase-to-transformer mapping
- Providing visibility at the LV system level, identifying potential issues at the LV-line level
- Detecting EV/PV



DTA Architecture with Aggregated AMI Data

### SOLUTION ELEMENTS

Distribution Transformer Awareness is a fully integrated, end-to-end solution based on Itron's Operations Optimizer platform. Operations Optimizer is ready to ingest AMI and distribution transformer devices data from Itron and third-party systems. Itron's DTA end-to-end solution provides a full stack with Itron's distribution transformer monitoring devices as well as connectivity and data collection services that enable the key use cases around DT asset management and LV system capacity planning.

### OPERATIONS OPTIMIZER

**Operations Optimizer** is Itron's high-performance data analytics platform. This versatile solution provides a modular suite of market-leading data analytics applications that help maximize the benefits and full potential of AMI solutions. Operations Optimizer supports a wide range of use cases, including revenue assurance, AMI operations, network operations, load research and distribution planning among others. The platform supports electricity, gas and water services, and all meter-reading technologies.

Operations Optimizer provides transformer monitoring capabilities and LV visibility based on the source of data:

### Distribution Transformer Awareness with Transformer Load Management

This view monitors and analyzes distribution transformer loading levels and accurately reports on asset health using a distribution transformer monitoring device. This module provides a complete view of the load details for a particular transformer to identify over-utilized, under-utilized and at-risk transformers, assess unanticipated load increases that may result in asset failure and use loading history and peak seasonal loads to evaluate transformer sizing. It provides information about imbalances and voltage and power quality.

### AMI Data Aggregation

Operations Optimizer also allows you to aggregate and analyze metering loads across the distribution system to identify asset risks and connectivity mismatches, support load planning and estimate technical losses. With AMI data aggregation, the system can deliver additional use cases beyond distribution transformer asset visibility. Operations Optimizer helps determine correct meter-to-transformer relationships and directly improves outage identification and related restoration times. The system also calculates peak coincident loading to identify under- or over-loaded transformers, and it helps anticipate transformer loss of life and asset failures to proactively identify and prioritize the reallocation, servicing or replacement of these assets.

Operations Optimizer provides the benefit of combining sensor data at the transformer level with AMI data aggregation to provide full visibility at the low-voltage system level.



**OPERATIONS OPTIMIZER SOLUTION**

- ITRON AMI UIQ, SIQ, DI
- ITRON DTA DT METER
- 3RD PARTY AMI & CT METERS



DT & LV NETWORK VISIBILITY



AUTOMATION & INTEGRATION & EXTENSIBILITY



AD-HOC REPORTS



PROVEN USE CASES AT SCALE

Operations Optimizer: Single Pane for Back-office Analytics (Grid Operations, Distribution Transformer Monitoring, Revenue Assurance)

**DISTRIBUTION TRANSFORMER MONITORING DEVICE AND DATA COLLECTION SL7000**

Itron's ACE SL7000 meter offers a solution for all industrial and substation applications. Equipped with flexible communication technology combined with elements of traditional C&I metering, the ACE SL7000 meter range offers the versatility and flexibility required to meet today's rapidly changing markets.

Through the latest-generation metrological and communications technology, ACE SL7000 meters bring significant benefits to utilities and end users alike, adding value to every aspect of the metering process.

**Utility Benefits**

**Reduced Inventory Cost**

Thanks to a wide measuring range and an auto-ranging power supply for most variants, one type of meter covers many installation configurations.

**Reduced Data Collection Cost**

Read cycles are kept to a minimum by internal storage of all billing data, and powerful communications capabilities allow cost-effective remote meter reading. Conformance with the latest IEC communications standards ensures that the meters can be easily integrated into standard data collection systems.

**Reduced Non-Technical Losses**

Multiple safety features guard against human intervention. IEC7 evolution brings standard magnet detection and optional terminal cover opening detection.

**Feature Upgrades**

ACE SL7000 meters include an upgraded engine to further enhance functionality and keep metering costs to a minimum through the re-use of existing equipment. Starting with IEC7 version firmware, upgrades can now be performed remotely.

**Asset Management Capabilities**

Monitor transformer thermal conditions without external intrusive transformer probe and calculation of the ageing rate of the transformer.

The SL7000 can be commissioned on an existing powered installation. The DTM meter is installed on the transformer with three independent current sensors and voltage taps that allow accurate measurement without sacrificing security. The installation of the asset can be done in less than 30 min, without any disconnecting service for the end customer.



## Deployment and Support Services

Our experienced Global Delivery Services (GDS) teams provide the necessary services needed to help utilities to meet their challenges when deploying grid management solutions. They provide support with field surveys, design, roll-out planning, options for best technology selection, interoperability, back-end deployment, integration support, field deployment support, testing, training, security implementation and testing, ongoing operations, service level and technology longevity, firmware upgrades and warranty.

Our GDS team also utilizes a strategic, phased approach and provides support by identifying, understanding and prioritizing which use cases will deliver the most impact and value to your operations, as well as maximize your return on investment.

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