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Deep Dive Session on AI, ML Use Cases for Utilities

India Smart Utility Week 2025

Product Overview | 20 March, 2025

The Shift to AI Ecosystems

Why Indian Utilities Needs AI-Driven Solutions Now

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₹1.2 lakh crore

lost annually due to theft and inefficiencies (20–25% T&D losses vs. global avg. 6–8%)

AI-driven theft detection can cut losses by 30%

40%

outdated transformers cause grid instability, hindering renewable integration

Extend asset lifespan by 30%, reduce outages, and save billions annually

500 GW

targeted renewable capacity by 2030, requiring smarter grid planning tools

Fix legacy data gaps and create dynamic map to enable 80% faster grid planning

250M

targeted with 8 million already installed generate unused data which can be leveraged

AI-powered data analytics can unlock actionable insights

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Impresa Insights

Overview at a Glance

Impresa Insights is a utility centric data and AI platform that helps energy and water businesses draw value and drive business outcomes without being concerned about platforms and technology changes.

Unified Utility Data Platform

Seamlessly integrates data from multiple sources, including energy meters, GIS, SCADA, and customer information systems, offering a centralized and consistent view of operations.

Real Time Insights

AI driven real-time anomaly detection, load forecasting, customer insights to enable proactive grid management, improved resource allocation, service reliability."

Scalability and Flexibility

Flexibility to handle growing data volumes and expanding infrastructure, supporting new regions, assets, and services as the utility grows

Multi-Modal Data Delivery

Enables users to consume insights through various interaction modes—such as dashboards, reports, conversational interfaces, or automated alerts—across devices like PCs, operator workbenches, mobile phones, and tablets.

Solution Offerings

A Comprehensive Suite of AI-Powered Insights for Utilities

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AVAILABLE OOTB

- Load Forecasting
- Load Disaggregation
- Peak Load Calculation
- Smart Metering Analytics
- Loss Management Data Processes
- Missing Read Notifications
- Consumption Anomaly Detection
- Source of Supply Identification
- Consumption Tool
- Unbilled Calculation
- Transformer Load Monitoring
- Guaranteed Standard Process
- Impresa Interact, Impresa Mobile
- Loss Management Processes
- Meter data Subscription Service for Regulatory needs

CONFIGURABLE

- Power Quality Monitoring
- CVR Insights
- FLISR Insights
- VVO Insights
- EV Detection
- Risk Based Asset Operation Insights
- Other Grid Resiliency use cases

Deep dive

Key features

- ✓ Modular & Scalable Architecture
- ✓ Self-Learning AI Models
- ✓ Interoperability with Existing Systems
- ✓ Actionable Insights & Automation

ROI for Utilities

- ✓ Revenue Protection & Loss Prevention
- ✓ Operational Cost Reduction & Efficiency Gains
- ✓ Infrastructure Optimization & Capex Savings
- ✓ Customer Satisfaction & Revenue Growth

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How Impresa Insights AI Forms a Seamless Ecosystem for Utilities

Use Case	Problem	Solution	Impact
AI-Driven Source of Supply Identification (Foundation)	Incorrect meter-to-transformer mappings cause billing errors and poor planning.	AI uses voltage correlation + geospatial data to auto-map meters to transformers.	Ensures data accuracy, feeding load disaggregation, theft detection, and transformer monitoring.
Load Disaggregation: Unlocking Insights	Utilities see total load but lack appliance-level visibility.	AI disaggregates usage into HVAC, EV charging, appliances, etc.	Informs theft detection and grid planning with precise consumption patterns.
Energy Theft Detection: Protecting Revenue	Traditional theft detection is slow, reactive, and inaccurate.	AI analyzes consumption patterns to flag theft in real-time.	Reduces revenue losses by up to 30%, ensuring utilities get paid for actual consumption.
Transformer Monitoring & Grid Planning: Optimizing Infrastructure	Historical load assumptions lead to overloading & inefficient expansion.	AI uses real-time transformer health monitoring + predictive analytics.	Prevents failures, reduces downtime, and optimizes infrastructure investments.

AI Ecosystem in Action

A Real-World Utility Scenario

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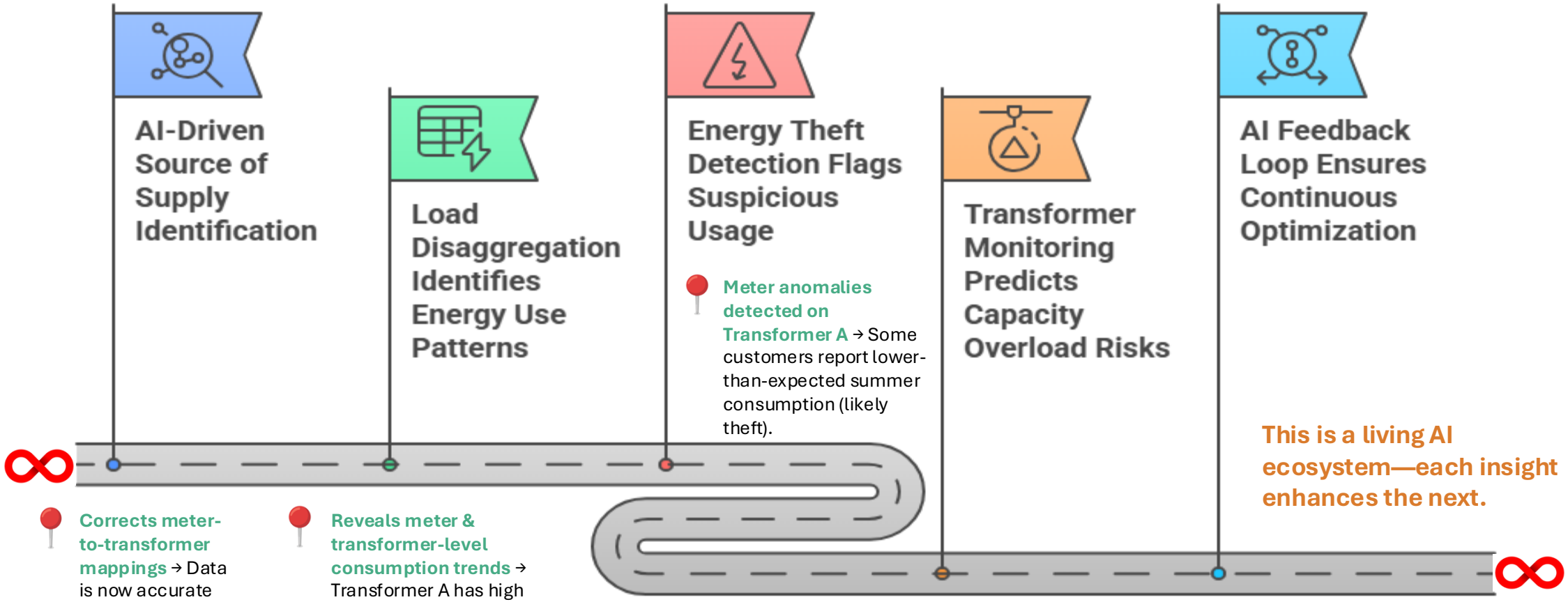
The true power of AI lies in its ability to create a self-learning, automated ecosystem for utilities.



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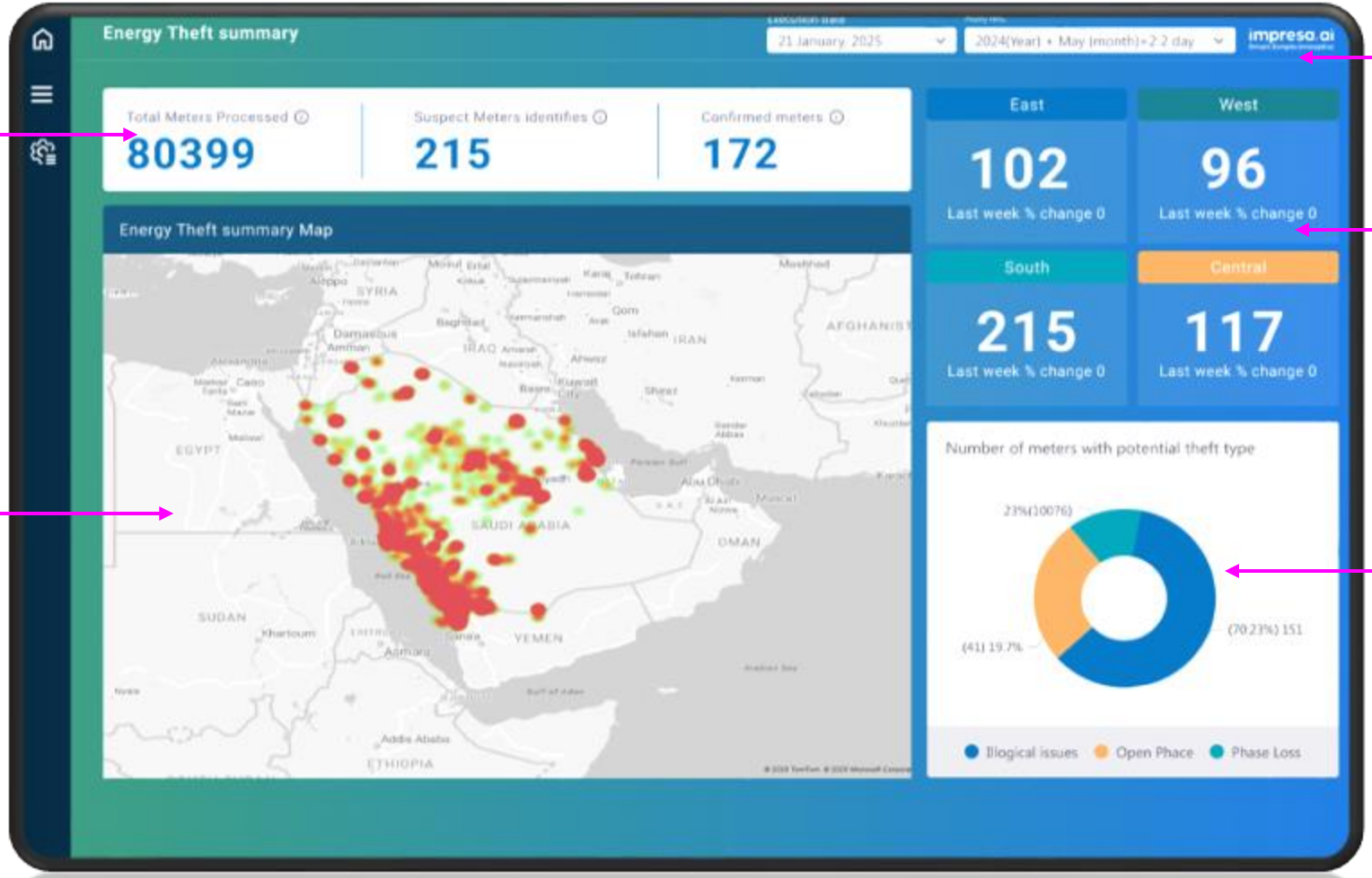
Energy Theft Detection



Insights Panel

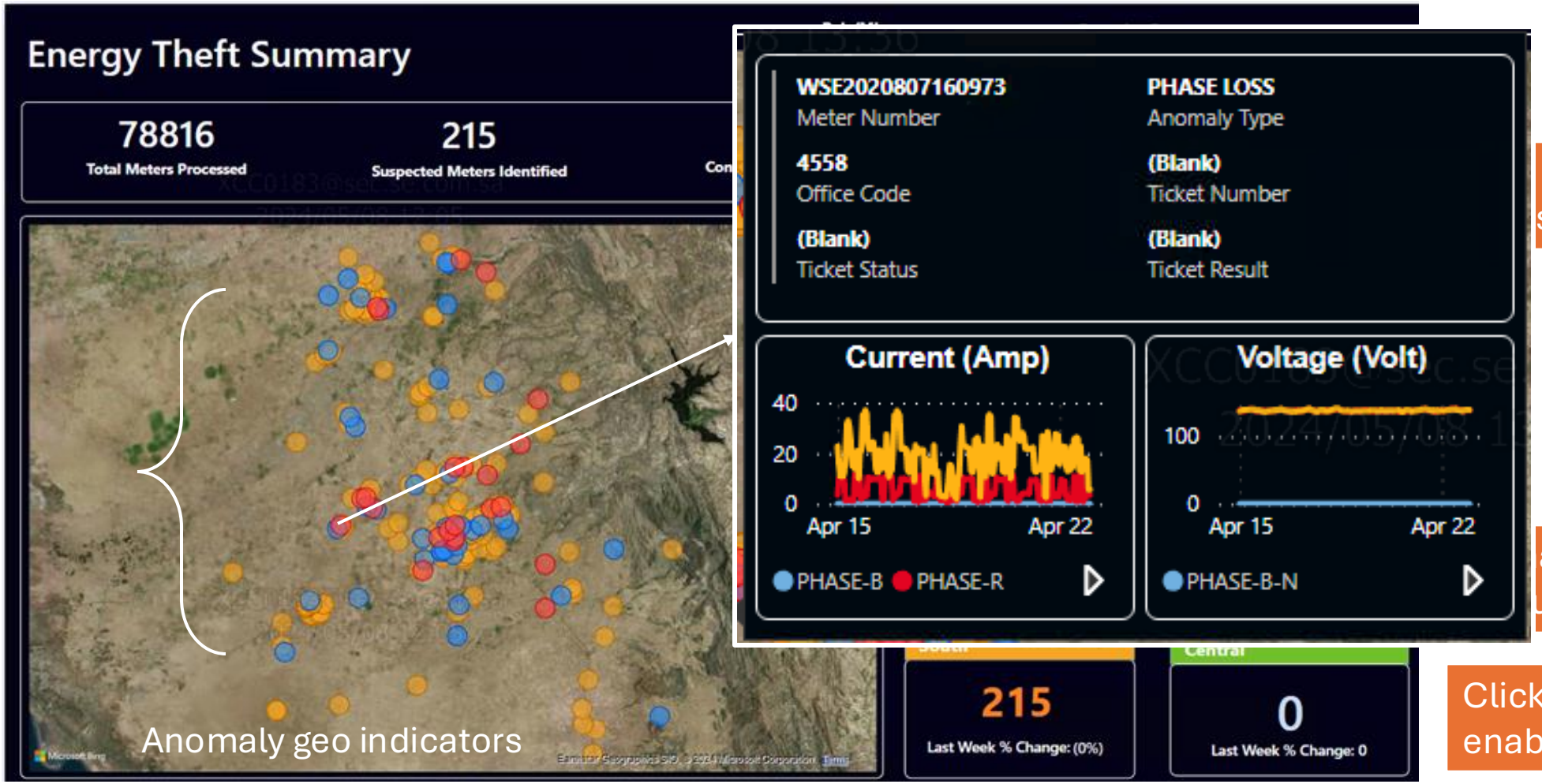
Filter & Selection Panel

Region wise Summary

Map View

NTL Distributiom

Energy Theft Detection



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Clickable drilldowns enabled

Energy Theft Detection

Actual Theft Case Identified: Phase Voltage Drop with Current Loss

Meter: KFM2020766044176

As seen in highlighted red box. Meter showed sudden drop in Y & B phase voltage and loss of current in B phase.

Meter ID	Date	VOLTAGE_AVG_PH1	VOLTAGE_AVG_PH2	VOLTAGE_AVG_PH3	CURRENT_AVG_PH1	CURRENT_AVG_PH2	CURRENT_AVG_PH3
KFM2020766044176	15-09-2024 22:15	226.668	127.899	129.617	25.754	24.54	0

Following events and alarm were seen on this meter .

Meter ID	Event group	Event type	Event time
KFM2020766044176	32	Tamper1	16-09-2024 05:36
	24	Power Line Cut	
	1	Power Failure	

Anomaly Details	Sudden drop in Y & B phase voltage (from normal ~226V to ~128V)	
	Complete loss of current in B phase	
	Multiple correlated events	Tamper1 alert Power Line Cut event Power Failure event
Significance	Pattern consistent with potential meter tampering	
	Abnormal phase behavior indicates possible bypass attempt	
	Multiple event correlations increase suspicion level	

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HAVE A QUESTION

To speak to a Abjayon representative
Contact us at **+1.510.824.3260.** or
Visit **www.abjayon.com**

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