CONCEPT

AI in Utilities: Smart Grid Analytics, Smart Meter Data and Water Loss Detection

4 – 8 January 2027
London - Central London four-star



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Ref: 122_9758 **Date:** 4 – 8 January 2027 **Location:** London - Central London four-star **Fees:** 25300 SAR

Introduction:

Electricity and water utilities collect smart meter readings, SCADA signals and network records at scale, yet losses, forecast errors and long outages persist because that data is rarely turned into decisions. AI in utilities closes this gap only when managers know where models add value and how to govern them. This Core Concept course equips utility practitioners, without coding, to apply AI to load forecasting, smart meter analytics, non-technical loss and leakage detection, network risk, outage response and customer service. Participants leave with a Utility AI Use Case Portfolio and Business Case.

Course Objectives:

- Map electricity and water utility data sources and rank AI use cases by value, data readiness and operational risk
- Specify AMI, meter data management and OT/IT integration requirements using the Common Information Model and IEC 62056 as reference points
- Evaluate load, net load and renewable generation forecasts against accuracy measures before they drive operating decisions
- Analyse smart meter, flow and pressure data to prioritise non-technical loss and water leakage alerts for field action
- Assess network asset risk, outage prediction and customer analytics outputs and set governance controls for their use
- Produce a Utility AI Use Case Portfolio and Business Case ready for sponsor approval

Target Audience:

- Managers responsible for electricity or water network operations, control rooms and outage response
- Metering and revenue protection managers accountable for meter data quality, electricity theft and non-revenue water
- Asset management leads who plan network renewal and distribution maintenance budgets
- Customer service and billing managers who own complaints, bill accuracy and collections
- Digital transformation and data leads who sponsor utility analytics platforms and OT/IT integration

Course Outline:

Day 1: Utility Data Landscape and AI Opportunity Assessment

- Utility Value Chain Map: Generation, Transmission, Distribution, Water Supply and Retail
- Utility Data Sources Inventory: SCADA, AMI, GIS, CIS and Work Order Records
- AMR Versus AMI Two-Way Metering Capability Comparison
- AI Use Case Long List Across Electricity and Water Operations
- Utility AI Readiness Scorecard for Data, Skills and Systems

Day 2: Utility Architecture, Data Standards and OT/IT Integration

- AMI Architecture: Meters, Data Concentrator Units, Head-End System and MDMS
- IEC 62056 DLMS/COSEM Metering Data Exchange Overview
- Common Information Model: IEC 61970 for Transmission and IEC 61968 for Distribution
- OT/IT Integration Pattern Linking SCADA, DMS, OMS, GIS and CIS
- Meter Data Validation, Estimation and Editing Rules in the MDMS

Day 3: Forecasting, Meter Analytics and Loss Detection in Practice

- Short, Medium and Long-Term Load Forecast Horizons with MAPE Accuracy Review
- Net Load, Solar and Wind Generation Forecast Interpretation
- Smart Meter Load Profile Clustering and Customer Segmentation
- Non-Technical Loss Detection: Meter Tampering and Theft Anomaly Scoring
- IWA Water Balance: Real Losses, Apparent Losses and DMA Night Flow Analysis

Day 4: Network Risk, Outages, Customer Analytics and AI Governance

- Network Asset Risk Ranking: Feeder, Transformer and Pipe Failure Likelihood Models
- Outage Prediction from Weather Data and Smart Meter Events for Restoration Planning
- Infrastructure Leakage Index Benchmarking and Pressure Management Prioritisation
- Billing Exception and Customer Complaint Analytics for Service Teams
- Utility AI Governance: Model Risk Register, Customer Data Privacy and Human Review Controls

Day 5: Utility Case Work and the AI Use Case Portfolio

- Electricity Distribution Case: Ranking Theft Alerts for Field Inspection
- Water Network Case: Locating Leakage Hotspots from DMA Flow and Pressure Data
- Utility AI Business Case Model: Loss Reduction, Forecast Savings and Platform Cost
- Utility AI Use Case Portfolio and Business Case Assembly
- Portfolio Presentation to a Mock Utility Investment Committee

Skills You Will Gain:

- Utility Data Landscape Mapping
- Metering Data Architecture
- Load Forecast Evaluation
- Revenue Protection Analytics
- Water Loss Analysis
- Network Risk Prioritisation
- Utility AI Governance
- AI Investment Appraisal

Why Attend This Course:

- Return with a Utility AI Use Case Portfolio and Business Case built around your own network and customer data
- Question vendor claims on theft detection, leak location and forecasting with clear tests of data quality and accuracy
- Direct field crews to the highest-value inspections by ranking loss and leakage alerts rather than chasing every anomaly
- Compare utility analytics practice with peers from electricity distribution, water supply, generation and municipal services in several countries

Conclusion:

Utility AI delivers value when metering, network and customer data are connected and every model output leads to a field or service action. This course moves from the utility data landscape and AMI architecture, through the Common Information Model and OT/IT integration, to load and renewable forecasting, smart meter analytics, non-technical loss and water balance analysis. It then covers network risk, outage prediction, customer analytics and governance, before the final day produces a Utility AI Use Case Portfolio and Business Case for sponsor review.