



Demand Side Management and Demand Response: Peak Load Programmes, Pricing and Evaluation

27 June – 1 July 2027

Riyadh - KAFD district five-star



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Introduction:

Demand side management lets an electric utility meet rising peak demand without building every new peaking plant, feeder and substation that the load forecast implies. Many utilities still run isolated pilots, cannot show how many megawatts a programme really delivers and struggle to justify budgets to planners and boards. This Core Concept course trains utility programme, planning and pricing staff to profile customer load, design demand response and time-varying price offers, screen them for cost-effectiveness and measure verified peak reduction. Participants build a DSM and Demand Response Programme Portfolio and Business Case for a case utility.

Course Objectives:

- Quantify the peak demand, reserve margin and network deferral value that demand side management can capture for a utility
- Analyse load research samples and class load profiles to locate controllable end uses and peak contribution by customer segment
- Design price-based offers such as time-of-use, critical peak pricing and peak-time rebates, and incentive-based offers such as direct load control and interruptible agreements
- Screen demand side programmes with the participant, ratepayer impact, utility cost and total resource cost tests
- Estimate delivered load impacts using customer baselines, control groups and event performance data
- Assemble a balanced DSM and demand response programme portfolio with targets, budget and a business case for approval

Target Audience:

- Utility planning functions that forecast peak demand and weigh demand side resources against generation and network investment
 - Customer programme functions that design, launch and run efficiency, load management and demand response offers
 - Pricing and rates functions that develop time-varying tariffs and incentive payments for demand reduction
 - Energy management functions in large commercial and industrial customers that enrol load in utility programmes
 - Programme evaluation functions that measure load impacts and report programme results to management
 - System operations liaison functions that dispatch or call demand response events during tight supply conditions
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Course Outline:

Day 1: Why Demand Side Management Matters and the Utility Load Picture

- Demand Side Management Objectives: Peak Clipping, Load Shifting, Valley Filling and Strategic Conservation
- Peak Demand Economics: Peaking Plant Cost, Reserve Margin and Network Capacity Deferral
- Load Duration Curve and Load Factor Analysis for a Utility System
- Load Research Sample Design and Interval Data Collection by Customer Class
- Current-State Review of Existing Utility Load Management and Efficiency Offers

Day 2: Demand Response Programme Models and Time-Varying Price Design

- Price-Based Versus Incentive-Based Demand Response Classification
- Time-of-Use Period Setting: Peak Window Selection and Peak to Off-Peak Price Ratio
- Critical Peak Pricing and Peak-Time Rebate Event Rules and Notification
- Direct Load Control of Air Conditioners and Water Heaters: Cycling Strategies
- Interruptible and Curtailable Service Agreements for Large Industrial Loads

Day 3: Customer Segmentation, Enabling Technology and Aggregation

- Customer Segmentation Matrix: Controllable End Uses, Flexibility and Willingness to Enrol
- Enabling Technology Overview: Interval Meters, Smart Thermostats and Behind-the-Meter Storage
- Demand Response Aggregation of Commercial, Industrial and Residential Loads
- Programme Marketing Plan: Enrolment Channels, Messaging and Participation Forecast
- Event Dispatch Procedure: Triggers, Notice Periods and Customer Opt-Out Rules

Day 4: Cost-Effectiveness Screening, Load Impact Measurement and Evaluation

- Standard Cost-Effectiveness Tests: Participant, Ratepayer Impact, Utility Cost and Total Resource Cost
- Avoided Cost Inputs: Generation Capacity, Energy, Network and Reserve Values
- Customer Baseline Methods: High X of Y Days, Weather Adjustment and Control Groups
- Load Impact Evaluation: Ex Post Event Results and Ex Ante Peak Reduction Forecasts
- Programme Risk Review: Free Riders, Snapback, Participant Fatigue and Rebound Peaks

Day 5: Modelling Build: DSM and Demand Response Portfolio and Business Case

- Case Utility Brief: Peak Forecast, Capacity Shortfall and Customer Mix
 - Programme Screening Model Build in Excel with Benefit-Cost Ratios per Offer
 - Portfolio Mix Optimisation Against a Megawatt Target and Budget Ceiling
 - Programme Implementation Roadmap with Enrolment, Event and Evaluation Milestones
 - Business Case Presentation to a Mock Utility Investment Committee and Peer Challenge
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Skills You Will Gain:

- Load Research Analysis
- Load Profile Interpretation
- Time-Varying Price Design
- Demand Response Programme Design
- Customer Segmentation for Energy Programmes
- Benefit-Cost Screening
- Customer Baseline Estimation
- Programme Portfolio Planning

Why Attend This Course:

- Return with a DSM and Demand Response Programme Portfolio and Business Case built on a case utility peak shortfall
- Show planners and boards how many verified megawatts each offer delivers and at what cost per kilowatt
- Avoid common failures such as weak baselines, low enrolment and rebound peaks before a programme launches
- Compare programme designs with planning, pricing and customer programme peers from utilities and large energy users

Conclusion:

Peak demand can be managed as a resource rather than simply served with new capacity. The course moves from the economics of peak demand, load research and load profiles, through price-based and incentive-based demand response design, to customer segmentation, enabling technology, aggregation and event dispatch. It then covers cost-effectiveness screening, customer baselines and load impact evaluation. The final day builds a DSM and Demand Response Programme Portfolio and Business Case for a case utility, ready for review by planning and management.
