Energy Transition with AI Training Course: Grid Forecasts, Demand Flexibility and Capital Choices

11 – 15 January 2027
Barcelona

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Programme Summary

Energy transition with AI is the subject of this one-week training course for energy ministry, utility and regulatory leaders at strategic level, ending in a decision pack on grid forecasts, demand flexibility and capital choices. Power systems now carry more variable supply and new loads, and leaders are asked to approve AI tools they cannot easily test. The programme moves from use-case selection to forecast evidence, flexibility design, investment screening and vendor control, using prepared system data. Mars Training Centre UK delivers this programme on energy transition with AI to mixed-organisation cohorts.

The Business Case

Utilities, ministries and developers must decide where AI earns a place in grid operation, demand programmes and capital plans, and where simpler methods serve better. Leaders who can read a forecast test and challenge a vendor claim spend less on weak tools.

- Forecast Error: Falls when renewable output and load forecasts are tested against metered results and bias is tracked by horizon.
- Capital Efficiency: Improves when investment cases state the data, benefit and risk assumptions behind each AI claim.
- System Reliability: Is protected when automated grid decisions carry limits, escalation rules and a named owner.

Principles and Evidence Base

- IEA Energy and AI analysis: The international assessment of AI uses and the electricity demand of data centres, applied in Sessions 1 and 4 to frame use cases and planning assumptions.
- IRENA digital and AI technologies for power systems: The agency's review of forecasting and grid automation, applied in Sessions 2 and 3 to judge forecasting and flexibility options.
- Net present value analysis: The time value of money principle, applied in Session 4 to compare investment cases on equal terms.

Intended Participants

- Leaders who approve grid, renewable and demand programmes that rely on forecasting or automation.
- Planners who prepare capacity, network and investment cases for boards and funders.
- Policy and regulatory officers who set rules for flexibility, data access and new loads.
- Commercial and procurement managers who buy analytics services and software for energy operations.

Typical settings include electricity utilities, energy ministries, renewable developers and industrial energy users.

Learning Outcomes

1. Participants will be able to evaluate candidate AI uses in power systems by decision value and data readiness.
2. Participants will be able to compare renewable output and load forecasts by error, bias and horizon.
3. Participants will be able to construct a demand flexibility design with eligibility, signals and measurement rules.
4. Participants will be able to prioritise grid and generation investments using comparable cost and benefit cases.
5. Participants will be able to diagnose weak vendor claims and data dependencies in proposed AI tools.
6. Participants will be able to justify a decision pack to a board or investment committee.

Programme Structure

Day 1: Energy Transition with AI Use Cases and Data

Which energy transition decisions justify an AI tool?

- Decision Value Screening Matrix
- Power System Data Inventory
- IEA Energy and AI Use Case Review
- Data Readiness Scorecard
- Baseline Method Comparison

Day 2: Grid Forecasts and Evidence

How is a renewable output or load forecast judged against metered results?

- Forecast Error and Bias Table
- Weather Input Sensitivity Check
- Horizon and Location Accuracy Grid
- Forecast Override Log
- Imbalance Cost Estimate

Day 3: Demand Flexibility and Grid Operation

How are flexible loads and automated grid actions designed and limited?

- IRENA Grid Automation Mapping
- Flexible Load Eligibility Screen
- Demand Signal Design Sheet
- Baseline Measurement Rules
- Operator Escalation Protocol

Day 4: Capital Choices and Vendor Control

Which investments and AI purchases survive comparison and challenge?

- Net Present Value Comparison
- Data Centre Load Planning Case
- Storage and Network Option Screen
- Vendor Claim Test Sheet
- Model Ownership and Exit Terms

Day 5: Decision Pack for One Energy System

Do the findings join into a pack a committee can approve?

- Applying the Session 1 Screening Matrix
- Testing the Session 2 Error Table
- Checking the Session 3 Escalation Protocol
- Reviewing the Session 4 Vendor Test Sheet
- Completing the Decision Pack

Methodology

The programme is a data workshop built on prepared system records for a regional grid and an industrial site. Participants read forecast tests, compare investment options and challenge supplier claims, then defend a pack to peers acting as an investment committee.

- Suggested activity: Comparing two renewable output forecasts for three sites.
- Suggested activity: Drafting eligibility and measurement rules for a flexible load scheme.
- Suggested activity: Scoring a vendor proposal against the vendor claim test sheet.

Capstone Output

Each participant completes a decision pack for one energy system. It holds the screening matrix, a forecast error table, a flexibility design, an investment comparison and a vendor test sheet. At work the pack goes to the board or investment committee for approval and sets the routine for reviewing later AI proposals.

Frequently Asked Questions

Is energy transition with AI suitable for leaders who are not data scientists?

Yes. Energy transition with AI is taught through prepared system records and templates. You need responsibility for grid, demand or investment decisions, but no programming or statistics background.

Which sources does energy transition with AI rest on in this programme?

Energy transition with AI here rests on the IEA Energy and AI analysis, IRENA work on digital and AI technologies for power systems, and net present value analysis, each applied to a use case, forecast or investment decision.

How is the decision pack from energy transition with AI used at work?

You take the decision pack to your board or investment committee, use its flexibility design to shape demand programmes, and keep its vendor test sheet as the routine for later proposals.

How does energy transition with AI differ from a programme on renewable energy economics?

Energy transition with AI concentrates on judging and governing AI forecasts, grid automation and flexibility decisions, while a programme on renewable energy economics concentrates on project returns and tariffs.