AI for Green Hydrogen Plants Training Course: Electrolyser Control, Forecasting and Safety

16 – 20 May 2027
Muscat

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Programme Summary

AI for green hydrogen plants is the subject of this one-week training course for energy, utility and hydrogen project leaders, ending in a hydrogen plant AI use case dossier for one facility. Plants produce dense electrolyser, compressor and storage data, yet load, maintenance and alarm decisions often rest on manual review and untested tools. The programme shows how to choose use cases, test forecasts and alerts against plant data, and keep safety decisions with people. Mars Training Centre UK delivers this programme on AI for green hydrogen plants to mixed-organisation cohorts.

The Business Case

Green hydrogen output depends on variable renewable power, electrolyser condition and safe storage handling. Artificial intelligence can support each task, but poor data, opaque models and alerts that nobody owns add cost and weaken trust. Leaders who judge evidence, set decision rules and assign ownership adopt AI in smaller, safer steps.

- Production Cost per Kilogram: Falls as electrolyser load plans are tested against renewable supply forecasts.
- Unplanned Downtime: Falls as compressor and storage warnings are ranked and sent to maintenance teams with clear ownership.
- Safety Exposure: Falls as leak and pressure alerts follow tested thresholds and defined human review.

Principles and Evidence Base

- ISO 22734: The standard for water electrolysis hydrogen generators frames the electrolyser performance and degradation measures used in Sessions 1 and 2.
- ISO/TR 15916: Its guidance on hydrogen system safety shapes the alert and escalation rules built in Session 3.
- ISO/IEC 42001: The AI management system standard guides model ownership, oversight and records in Session 4.
- Time Series Forecasting: Session 2 applies its treatment of trend, seasonality and error to renewable supply and load models.

Intended Participants

- Project leaders who decide where AI is worth funding in hydrogen production and storage.
- Plant and operations managers who run electrolysers, compression and storage.
- Asset and maintenance leaders who plan inspections and repairs.
- Safety and risk managers who set alarm and escalation rules.
- Data and technology leads who supply and govern plant data.

Typical sectors include power utilities, oil and gas, chemicals and heavy transport fuelling.

Learning Outcomes

1. Participants will be able to prioritise AI use cases by value, data readiness and operating risk.
2. Participants will be able to evaluate electrolyser and renewable supply forecasts against plant records.
3. Participants will be able to diagnose weaknesses in compressor, storage and leak alerts.
4. Participants will be able to design human review rules for safety-critical decisions.
5. Participants will be able to justify data, model ownership and oversight measures for AI tools.
6. Participants will be able to construct a governed adoption plan for one facility.

Programme Structure

Day 1: Hydrogen Plant Data and AI Use Cases

Where can AI support a hydrogen plant, and where is the data not ready?

- Plant Decision Map
- Electrolyser and Storage Data Inventory
- Use Case Scoring Grid
- Data Readiness Checklist
- ISO 22734 Performance Measure Link

Day 2: Electrolyser Control and Forecasting

How are load plans and degradation forecasts built, tested and trusted?

- Renewable Supply Pattern Review
- Load Forecast Comparison Sheet
- Error Measure Table
- Degradation Trend Chart
- Forecast Use Rules

Day 3: Storage, Compression and Safety Alerts

How are faults found, ranked and escalated without raising false alarms?

- Pressure and Leak Signal Analysis
- Anomaly Alert Threshold Sheet
- False Alarm and Missed Event Trade-Off
- Maintenance Priority Matrix
- ISO/TR 15916 Escalation Rules

Day 4: Digital Twins and Governance

How are twins and models kept under control once they influence decisions?

- Digital Twin Scope Statement
- Model Validation Record
- Human Review Rule Set
- Supplier Evidence Questionnaire
- ISO/IEC 42001 Ownership Register

Day 5: Applying the Tools to One Facility

Do the use case, forecast, alert and governance tools hold together for one facility?

- Applying the Session 1 Use Case Scoring Grid
- Testing the Session 2 Forecast Use Rules
- Tuning the Session 3 Anomaly Alert Threshold Sheet
- Checking the Session 4 Ownership Register
- Completing the Hydrogen Plant AI Use Case Dossier

Methodology

The programme uses a data workshop method built on anonymised electrolyser logs, renewable output series, pressure readings and maintenance records. Participants work in mixed operations, safety and project teams on one shared facility, challenge each other's thresholds, and receive written facilitator feedback on each exercise.

- Suggested activity: Comparing two load forecasts against a held-back week of plant readings.
- Suggested activity: Setting a pressure alert threshold and ranking the resulting alerts for maintenance.
- Suggested activity: Drafting human review rules for a storage leak scenario.

Capstone Output

Each participant completes a hydrogen plant AI use case dossier for one facility. It holds a scored list of use cases, a data readiness note, forecast and alert rules, a maintenance priority table, human review rules and an ownership register. The dossier is used at work to brief executives, question suppliers on evidence and plan a first pilot.

Frequently Asked Questions

Is AI for green hydrogen plants suitable for leaders without a data science background?

Yes. AI for green hydrogen plants is taught through cases and checklists, so the programme assumes plant, project or safety experience but no coding.

Which standards does AI for green hydrogen plants training draw on?

AI for green hydrogen plants training draws on ISO 22734, ISO/TR 15916 and ISO/IEC 42001, alongside time series forecasting for supply and load models.

How is the dossier from AI for green hydrogen plants used at work?

You use the hydrogen plant AI use case dossier to brief executives, question suppliers on evidence and plan a first pilot at one facility.

How does AI for green hydrogen plants differ from general hydrogen economics training?

AI for green hydrogen plants centres on daily forecasting, alerts and oversight of plant data, while general hydrogen economics training centres on market and investment cases.