JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Advanced Low-Carbon Generation Fleet Transition Planning Training Course

21 June – 2 July 2027
Geneva

Advanced Low-Carbon Generation Fleet Transition Planning Training Course

Ref: 2566_97614 **Date:** 21 June – 2 July 2027 **Location:** Geneva **Fees:** 12500 GBP

Low-Carbon Generation Fleet Transition Planning is a 2-week advanced training course for energy strategists, utility planners and project developers, who build a fleet transition roadmap that sequences thermal plant retirements against new renewable, storage and firm low-carbon capacity. Utilities face rising electrification demand and emissions targets while keeping supply reliable, so closure and replacement choices now carry large reliability and capital consequences. Jupiter Prime Training delivers low-carbon generation fleet transition planning as a decision-focused course.

Why Low-Carbon Generation Fleet Transition Planning Matters Now

Three forces now shape generation planning. Electrification of transport, industry and cooling lifts demand just as ageing coal, oil and gas units approach end of life. Investors, lenders and owners expect credible emissions pathways backed by bankable projects. System operators, meanwhile, warn that retiring synchronous plant faster than firm replacements arrive can erode inertia, reserves and adequacy margins. Utilities that sequence closures well protect reliability and avoid stranded assets; those that move badly face emergency procurement, idle capital or missed targets. The course rests on capacity expansion modelling, resource adequacy assessment and system value economics.

Who Gains Most from Low-Carbon Generation Fleet Transition Planning

- Specialists who own long-term generation resource plans and capacity expansion studies
- Strategists responsible for decarbonisation targets and emissions pathway reporting
- Developers originating renewable, storage and hydrogen-ready projects for replacement capacity
- Asset owners deciding the retirement, conversion or repowering of thermal units
- Analysts advising boards and lenders on transition investment sequencing

Utilities and independent power producers that send planning, development and finance staff together gain most, because each discipline sees how its assumptions move the shared closure and build schedule.

Low-Carbon Generation Fleet Transition Planning Capabilities

Participants leave able to turn a fossil-heavy fleet into a staged, reliability-tested low-carbon portfolio:

- Assess each thermal unit for retirement, conversion or repowering — asset owners and boards
- Weigh renewable, storage, hydrogen and firm low-carbon replacement options — resource planners
- Test replacement portfolios against adequacy and system strength limits — system operators
- Calculate retirement timing value and system cost of each pathway — finance committees
- Design phased capital and closure sequences under supply chain constraints — project developers
- Communicate transition trade-offs to regulators, staff and communities — executive sponsors

Key Low-Carbon Generation Fleet Transition Planning Terms

- Capacity expansion model — an optimisation tool that chooses which plants to build and retire over time at least total system cost.
- Resource adequacy — the ability of a power system to meet demand with acceptable risk of shortfall across all hours and seasons.
- Effective load carrying capability — the share of a plant's rated capacity that reliably supports peak demand, used to value variable renewables and storage.
- Stranded asset — a plant whose remaining book value cannot be recovered because it must close or run far less than planned.
- System strength — the grid's ability to hold voltage stable after disturbances, traditionally supplied by synchronous generators.
- Hydrogen co-firing — burning a blend of hydrogen with natural gas in a turbine to cut emissions without full plant replacement.

Low-Carbon Generation Fleet Transition Planning Day by Day

Day 1: Forces Reshaping the Generation Fleet

- Fleet Age and Emissions Profiling — Which Units Face Earliest Pressure
- Carbon Pricing Signals — Effect on Thermal Unit Dispatch Order
- Load Growth From Electrification — Size of Future Capacity Gap
- Investor and Lender Climate Expectations — Cost of Transition Capital
- Stakeholder Mapping for Plant Communities — Social Licence for Change

Day 2: Baseline Fleet Assessment

- Unit-by-Unit Technical Condition Review — Remaining Useful Life Estimate
- Heat Rate and Emissions Intensity Benchmarking — Retirement Candidate Ranking
- Fuel Supply Contract Exposure — Lock-In Risk Before Retirement
- Must-Run and Reliability Duties Inventory — Units Hard to Replace
- Stranded Asset Screening — Book Value at Risk

Day 3: Low-Carbon Supply Options

- Utility-Scale Solar and Wind Resource Assessment — Siting Priorities
- Gas Turbine Hydrogen Co-Firing Readiness — Conversion Versus Replacement
- Carbon Capture Retrofit Screening — Which Thermal Units Qualify
- Nuclear and Small Modular Reactor Options — Long-Lead Firm Capacity
- Biomass and Waste Fuel Switching — Feedstock Security Trade-Offs

Day 4: Storage and Flexibility Resources

- Battery Energy Storage Duration Sizing — Peak and Ramp Coverage
- Pumped Hydro and Long-Duration Storage — Seasonal Balancing Choices
- Demand Response Portfolios — Deferring Peaking Plant Investment
- Flexible Thermal Operation and Minimum Load — Wear and Cost
- Interconnector Capacity Sharing — Reserve Requirements Across Systems

Day 5: Grid Integration Limits

- Hosting Capacity Studies — Where New Plant Can Connect
- Inverter-Based Resource Behaviour — System Strength and Inertia Gaps
- Synchronous Condenser Conversion — Reusing Retired Generator Sites
- Transmission Reinforcement Lead Times — Sequencing With Plant Closures
- Curtailment Forecasting — Revenue Risk for Renewable Additions

Day 6: Capacity Expansion Modelling

- Least-Cost Capacity Expansion Models — Optimal Build and Retire Paths
- Resource Adequacy Metrics — Loss of Load Expectation Targets
- Effective Load Carrying Capability — Firm Value of Variable Plant
- Hourly Production Cost Simulation — Testing Dispatch Feasibility
- Scenario Design for Fuel and Technology Costs — Plan Robustness

Day 7: Economics and Investment Sequencing

- Levelised Cost and System Value Comparison — Beyond Plant Cost
- Retirement Timing Net Present Value — Early Versus Planned Closure
- Capital Phasing and Construction Pipelines — Supply Chain Constraints
- Power Purchase Agreement Structures — Allocating Transition Risk
- Green and Transition Finance Instruments — Matching Funding to Assets

Day 8: Transition Risk and Resilience

- Risk Register for Fleet Transition — Reliability, Cost and Delivery
- Extreme Weather Stress Testing — Low Wind and Heatwave Events
- Fuel Security During Phase-Down — Backup Supply Arrangements
- Workforce Reskilling and Site Repurposing — Just Transition Choices
- Contingency Triggers and Off-Ramps — When to Delay a Closure

Day 9: Governance and Stakeholder Alignment

- Board Decision Papers for Retirements — Approval Evidence Needed
- Regulatory Filing Narratives — Justifying Prudent Investment
- Community and Employee Engagement Plans — Managing Closure Impacts
- Emissions Pathway Tracking Indicators — Progress Reporting to Owners
- Interfaces With System Operator Planning — Aligning Connection Queues

Day 10: Practising the Fleet Transition Roadmap

- Applying Baseline Assessment to a Case Fleet — Retirement Shortlist
- Applying Expansion Modelling Results — Preferred Replacement Mix
- Applying Investment Sequencing — Phased Capital and Closure Calendar
- Applying Risk Stress Tests — Contingency and Off-Ramp Choices
- Completing the Fleet Transition Roadmap — Decision Pack for Approval

Applying Low-Carbon Generation Fleet Transition Planning After the Course

- Run a baseline screening of the home fleet, ranking units by condition, emissions intensity and must-run duties to shortlist retirement candidates.
- Lead a capacity expansion scenario review that tests one preferred replacement mix against low-wind and heatwave stress cases.

Low-Carbon Generation Fleet Transition Planning Questions FAQ

What is low-carbon generation fleet transition planning and why does it matter now?

It is the discipline of deciding when fossil units close and what low-carbon capacity replaces them. It matters now because demand growth, emissions targets and ageing plant are converging, so poor sequencing risks shortages or stranded capital in both utility and industrial power systems.

Which roles gain most from low-carbon generation fleet transition planning?

Resource planners, decarbonisation strategists, project developers and asset owners gain most. Finance and regulatory analysts also benefit, because they must justify the timing and cost of each closure and new build to boards, lenders and regulators.

How does low-carbon generation fleet transition planning differ from a renewable grid integration course?

It looks at the whole fleet rather than connecting individual plants. A grid integration course focuses on connection studies and inverter behaviour; this course uses those limits as inputs to retirement timing, replacement mix and investment sequencing decisions.

What do you bring back from low-carbon generation fleet transition planning?

You bring back a fleet transition roadmap built on a case fleet: a retirement shortlist, a tested replacement mix, a phased capital and closure calendar and contingency triggers, ready to adapt to your own generation portfolio.

Low-Carbon Generation Fleet Transition Planning: The Way Forward

The fleet transition roadmap gives planners and owners a staged view of closures and replacements. Its first use is often the decision on which thermal unit to retire or convert next, taken by the board with system operator input. After that first decision, revisit the adequacy and stress-test assumptions, since storage costs and demand forecasts shift quickly.