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COURSE BROCHURE

Circular Energy and Material Loops for Industrial Sites Training Course

25 – 29 April 2027
Manama

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Circular Energy and Material Loops for Industrial Sites Training Course

Ref: 2734_104467 **Date:** 25 – 29 April 2027 **Location:** Manama **Fees:** 5500 GBP

Circular Energy and Material Loops for Industrial Sites is a 1-week training course for plant engineers, energy managers and operations leads who leave with a site material and energy loop map with ranked recovery opportunities. Rising energy costs, scarce critical minerals and buyer scrutiny of embodied carbon now reward sites that put rejected heat, by-products and retired equipment back to work. Jupiter Prime Training offers this course for power and manufacturing professionals.

Why Circular Energy and Material Loops for Industrial Sites Matters Now

Three pressures meet on the plant floor. Plants discharge large volumes of heat through stacks and cooling towers. Solar panels, battery systems and transformers are reaching retirement, carrying copper, silicon and electrical steel that suppliers want back. A site that ignores its flows pays twice: to buy materials and to discard them. The course rests on material flow accounting, pinch analysis for heat and the waste hierarchy.

Who Gains Most from Circular Energy and Material Loops for Industrial Sites

- Engineers responsible for steam, compressed air and process cooling utilities
- Energy managers who track site consumption and justify heat recovery spending
- Operations leads who decide how scrap, off-specification product and spent consumables leave the site
- Asset engineers who plan the retirement of panels, battery racks, transformers, motors and cables
- Design and procurement engineers who specify new equipment and its end-of-life terms

A site group gains most when its utilities, asset and procurement members attend together.

Circular Energy and Material Loops for Industrial Sites Capabilities

Participants move from counting waste to designing loops.

- Build a site mass and energy balance exposing recoverable streams — operations leads
- Calculate the temperature, flow and timing match between heat sources and sinks — energy managers sizing recovery
- Assess retired panels, battery modules and transformers for reuse, repurposing or recycling — asset retirement decisions
- Specify take-back, disassembly and material passport terms in equipment purchases — procurement and design engineers
- Weigh recovery options on payback, carbon avoided and operating risk — site leadership approving spending
- Communicate a ranked loop map — investment committees

Key Circular Energy and Material Loops for Industrial Sites Terms

- Material flow account — a record of every material entering and leaving a site, by mass per period.
- Heat cascade — reusing rejected heat from a hot process to serve a cooler need before discharge.
- Industrial symbiosis — an exchange in which one site's by-product, heat or water becomes another site's input.
- Second-life battery — a battery module retired from demanding duty and reused in lighter duty such as stationary storage.
- Design for disassembly — choosing fasteners, joints and materials so equipment can be separated cleanly at end of life.
- Material passport — a record of the materials, quantities and recovery instructions held within a product or asset.

Circular Energy and Material Loops for Industrial Sites Day by Day

Day 1: Site Flows and Loss Points

- Waste Hierarchy — Ranking Reduce, Reuse, Recover and Dispose for Site Streams
- Material Flow Accounting — Locating Where Mass Leaves the Site Boundary
- Utility Energy Balance — Separating Useful Duty from Rejected Heat
- Metering Gap Review — Deciding Which Flows Need New Measurement
- Stream Inventory Sheet — Recording Quantity, Quality and Variability per Stream

Day 2: Heat Recovery and Energy Cascades

- Pinch Analysis Basics — Matching Hot Streams to Cold Demands
- Heat Pump and Recuperator Selection — Lifting Low Grade Heat to Useful Temperatures
- Thermal Storage Options — Bridging Timing Gaps Between Source and Sink
- Combined Heat and Power Integration — Balancing Electrical Output Against Heat Demand
- Recovery Payback Model — Testing Savings Against Fouling and Downtime Risk

Day 3: By-Products and Component Recovery

- By-Product Valorisation Screening — Finding Buyers for Ash, Slag and Off-Cuts
- Industrial Symbiosis Matching — Pairing Neighbouring Sites on Heat and Material
- Component Remanufacturing Criteria — Choosing Rebuild Over Replacement for Rotating Parts
- Spent Consumables Loop — Returning Lubricants, Filters and Catalysts to Suppliers
- Contamination and Purity Limits — Protecting Recovered Material Value

Day 4: End-of-Life Electrical Assets

- Solar Panel Retirement Pathways — Reuse, Glass Recovery and Silicon Reclaim
- Battery Module Grading — Sorting Cells for Second Life or Recycling
- Transformer Decommissioning — Recovering Copper, Core Steel and Insulating Oil
- Design for Disassembly Rules — Specifying Fasteners, Labels and Separable Materials
- Take-Back and Material Passport Clauses — Securing Supplier Recovery Duties

Day 5: Practising the Site Loop Map

- Stream Inventory Consolidation — Merging Day One Flows into One Site View
- Heat Cascade Shortlist — Applying Pinch Results to Candidate Projects
- Asset Retirement Schedule — Aligning Panel, Battery and Transformer Exits
- Recovery Option Scoring — Ranking Payback, Carbon Avoided and Operating Risk
- Loop Map Completion — Presenting Ranked Opportunities to Site Leadership

Applying Circular Energy and Material Loops for Industrial Sites After the Course

- Lead metering of the three largest rejected heat streams and rerun the pinch match.
- Review assets due for retirement and add take-back clauses to the next purchase order.

Circular Energy and Material Loops for Industrial Sites Questions FAQ

What are circular energy and material loops for industrial sites, and why do they matter now?

They are routes that return rejected heat, by-products and retired equipment to productive use. They matter now because energy, minerals and disposal all cost more.

Who gains most from circular energy and material loops for industrial sites?

Utilities engineers, energy managers, operations leads and asset engineers in manufacturing plants and power stations gain most, with procurement engineers who write end-of-life terms.

How does circular energy and material loops for industrial sites differ from a circular business models course?

It is an engineering course built on site flows, heat matching and asset condition, not on pricing or returns logistics. You work with balances and retirement schedules rather than market strategy.

What do I bring back from circular energy and material loops for industrial sites?

You bring back a site loop map that ranks heat, by-product and asset recovery opportunities, with a stream inventory and an asset retirement schedule.

Circular Energy and Material Loops for Industrial Sites: The Way Forward

The site material and energy loop map with ranked recovery opportunities first informs which heat or asset project receives capital in the next budget round. Energy managers, asset engineers and finance partners use it together. After the first project runs, revisit the map with measured savings, because secondary material markets keep shifting.