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COURSE BROCHURE

Advanced Process Plant Optimisation and Energy Conservation Training Course

21 March – 1 April 2027
Abu Dhabi

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Registered in the United Kingdom and Saudi Arabia

Advanced Process Plant Optimisation and Energy Conservation Training Course

Ref: 233_7250 **Date:** 21 March – 1 April 2027 **Location:** Abu Dhabi **Fees:** 9900 GBP

Process Plant Optimisation and Energy Conservation is a 2-week training course for process engineers, energy managers and plant operations managers who cut fuel, steam and electricity use in refineries, chemical plants and food factories, and who leave with an Energy Savings Opportunity Register costed with payback periods. Rising energy costs and decarbonisation targets now press every site to prove its efficiency. Jupiter Prime Training delivers this course on process plant optimisation and energy conservation.

Why Process Plant Optimisation and Energy Conservation Matters Now

Three forces drive process plant optimisation and energy conservation today. Energy has become one of the largest controllable operating costs, so finance directors ask engineers for credible savings rather than general intentions. Corporate emission targets and customer carbon questionnaires require measured reductions in fuel and power per tonne of product. Ageing utilities such as boilers, steam traps, compressors and pumps waste more each year they run without attention. A plant that treats energy as a managed variable lowers unit cost and frees capacity; one that does not loses margin quietly. The course rests on established thermodynamic methods, pinch analysis and recognised energy audit practice.

Who Gains Most from Process Plant Optimisation and Energy Conservation

- Process engineers responsible for heat exchanger networks, distillation and reactor energy balances
- Energy managers who run site audits, metering and savings verification
- Utilities engineers who operate boilers, steam distribution, cooling water and compressed air
- Operations managers who set operating targets and approve efficiency projects
- Maintenance planners who schedule steam trap, insulation and motor improvement work

A site energy committee in a refinery, petrochemical complex or large food plant gains most when its process, utilities and maintenance members attend together.

Process Plant Optimisation and Energy Conservation Capabilities

Participants trace where each unit of fuel and power goes, then rank the losses by recoverable value and engineering effort.

- Build a site energy balance from metering and design data — baseline agreed with finance
- Apply pinch analysis to set heat recovery targets — heat exchanger network retrofit decisions
- Assess steam system losses from traps, insulation and condensate return — utilities improvement priorities
- Calculate compressed air leak and pressure savings — compressor sequencing choices
- Specify variable speed drives and high-efficiency motors for pumps and fans — capital approval requests
- Weigh savings options by payback, risk and production impact — plant management investment boards

Key Process Plant Optimisation and Energy Conservation Terms

- Energy performance indicator — a measured ratio such as energy per tonne of product used to track efficiency over time.
- Pinch point — the temperature at which hot and cold process streams come closest, limiting further heat recovery.
- Specific energy consumption — the energy used to make one unit of product, the basis for comparing operating modes.
- Steam trap — a valve that removes condensate and air from steam lines while holding back live steam.
- Affinity laws — relationships showing that pump and fan power varies with the cube of speed.
- Simple payback — the capital cost of a measure divided by its yearly savings, a first screen for projects.

Process Plant Optimisation and Energy Conservation Day by Day

Day 1: Energy Context and Site Baseline

- Energy Cost Structure of Process Plants — Fuel, Steam and Power Shares
- Decarbonisation Pressures on Industry — Emission Targets and Customer Questions
- Metering Hierarchy and Data Quality — Trustworthy Baseline Inputs
- Site Energy Balance Construction — Inputs, Conversions and Losses
- Energy Performance Indicators — Choosing Ratios That Drive Action

Day 2: Energy Audit Methods

- Walk-Through Versus Detailed Audits — Scope and Effort Choice
- Portable Measurement Instruments — Flue Gas, Flow and Power Readings
- Regression of Energy Against Production — Baseline Normalisation
- Audit Findings Format — Measure, Saving, Cost and Owner
- Savings Measurement and Verification — Proving Results to Finance

Day 3: Pinch Analysis and Heat Integration

- Stream Data Extraction — Supply and Target Temperatures
- Composite and Grand Composite Curves — Minimum Utility Targets
- Minimum Approach Temperature Selection — Capital Versus Energy Trade-Off
- Heat Exchanger Network Retrofit — Cross-Pinch Transfer Removal
- Utility Placement Rules — Furnace, Steam Level and Cooling Choices

Day 4: Fired Heaters, Boilers and Combustion

- Combustion Efficiency and Excess Air — Burner Tuning Targets
- Flue Gas Heat Losses — Economiser and Air Preheater Options
- Boiler Blowdown Control — Water Chemistry and Heat Recovery
- Fouling Monitoring in Furnaces — Cleaning Interval Decisions
- Fuel Switching Assessment — Gas, Oil and Waste Fuel Comparison

Day 5: Steam System Optimisation

- Steam Balance Across Pressure Levels — Letdown and Venting Losses
- Steam Trap Survey and Failure Rates — Replacement Programme Priorities
- Insulation Assessment and Thermal Imaging — Bare Surface Losses
- Condensate Return and Flash Steam Recovery — Feedwater Savings
- Back-Pressure Turbines and Cogeneration — Power from Pressure Drops

Day 6: Compressed Air and Cooling Systems

- Compressed Air Demand Profiling — Leak, Artificial Demand and Misuse
- Compressor Control and Sequencing — Part-Load Efficiency Gains
- Pressure Reduction and Dryer Selection — Energy Versus Air Quality
- Cooling Tower Performance — Approach, Range and Fan Control
- Chiller Plant Efficiency — Condenser Temperature and Load Matching

Day 7: Motors, Pumps and Fans

- Motor Efficiency Classes and Rewind Losses — Replace or Repair Rule
- Pump System Curves and Throttling Losses — Impeller Trimming Choice
- Variable Speed Drive Application — Affinity Law Savings Estimate
- Fan and Blower Optimisation — Damper Versus Speed Control
- Power Factor and Harmonic Effects — Electrical Distribution Losses

Day 8: Process Operation and Control

- Distillation Column Energy Optimisation — Reflux and Pressure Settings
- Advanced Process Control Benefits — Tighter Operation Near Constraints
- Operating Envelope and Set Point Review — Energy-Aware Targets
- Batch Scheduling for Energy — Peak Demand and Idle Time
- Real-Time Energy Dashboards — Shift-Level Accountability

Day 9: Economics and Project Selection

- Simple Payback and Net Present Value — Investment Screening Methods
- Marginal Energy Cost by Utility — True Value of Saved Steam
- Risk and Production Impact Rating — Ranking Beyond Pure Savings
- Bundling Quick Wins with Capital Projects — Funding Strategy
- Energy Savings Business Case — Board Presentation Structure

Day 10: Practising the Energy Savings Opportunity Register

- Applying Site Energy Balance — Selected Plant Baseline Confirmation
- Applying Pinch and Steam Findings — Heat Recovery Measures for the Case
- Applying Motor and Compressed Air Estimates — Electrical Savings for the Case
- Applying Payback and Risk Ranking — Prioritised Measure List
- Energy Savings Opportunity Register — Costed Measures for Peer Review

Applying Process Plant Optimisation and Energy Conservation After the Course

- Lead a steam trap and insulation survey on one plant area and convert the losses found into a costed replacement list.
- Extract stream data for one heat exchanger train and run a pinch target to compare actual utility use against the minimum.

Process Plant Optimisation and Energy Conservation Questions FAQ

What is process plant optimisation and energy conservation, and why does it matter now?

Process plant optimisation and energy conservation is the systematic reduction of fuel, steam and power per unit of product. It matters now because energy is a leading controllable cost and emission targets demand measured, verified reductions from every site.

Which roles gain most from process plant optimisation and energy conservation training?

Process engineers, energy managers, utilities engineers and operations managers gain most. You benefit if you run audits, operate boilers and compressors, set operating targets or prepare efficiency projects for capital approval.

How does process plant optimisation and energy conservation differ from a building energy efficiency course?

A building energy course focuses on lighting, air conditioning and the building envelope. This course works inside the process, covering heat integration, furnaces, steam networks, compressed air, rotating equipment and process control in continuous and batch plants.

What do you bring back from process plant optimisation and energy conservation training?

You bring back a ranked list of savings measures for your own plant, each with an estimated saving, cost, payback and owner. It gives your site committee a ready starting point for the next budget round.

Process Plant Optimisation and Energy Conservation: The Way Forward

The Energy Savings Opportunity Register first informs which measures enter the next capital budget and which proceed as quick operational fixes. Energy managers and operations managers use it to assign owners and track verified savings. After its first use, revisit the marginal steam and power costs behind each payback, since fuel prices and plant loads shift the ranking over time.