

COURSE OVERVIEW PE1092

Energy Optimization of Oil Refineries

Course Title

Energy Optimization of Oil Refineries

Course Date/Venue

July 12-16, 2026/TBA Meeting Room, Aloft Dharan Hotel, Al Khobar, KSA

Course Reference

PE1092

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Energy Optimization of Oil Refineries. It covers the importance of energy efficiency in refining operations, energy consumption patterns in oil refineries, economic and environmental drivers for optimization and refinery energy systems; the refinery process overview and energy flows, energy performance indicators (EnPIs) and energy auditing techniques; the utilities and energy infrastructure, energy management systems (EnMs) and crude distillation unit (CDU) optimization; and the vacuum distillation unit optimization, catalytic cracking unit energy efficiency and hydroprocessing unit optimization.



During this interactive course, participants will learn the reforming and conversion units, process control for energy savings and heat exchanger network optimization; the furnace and boiler efficiency, steam system optimization, cooling water system efficiency and fuel and combustion management; the waste heat recovery systems, advanced process control applications and digitalization and energy analytics; the equipment performance monitoring, cogeneration, power integration, hydrogen and energy optimization and carbon reduction and energy efficiency; the energy saving opportunities, economic evaluation of energy projects and refinery energy benchmarking; and the energy optimization roadmap and sustaining energy performance improvements.



Course Objectives/Outcomes & Benefits for the Participants

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on energy optimization of oil refineries
- Discuss the importance of energy efficiency in refining operations, energy consumption patterns in oil refineries, economic and environmental drivers for optimization and refinery energy systems
- Illustrate refinery process overview and energy flows, energy performance indicators (EnPIs) and energy auditing techniques
- Discuss utilities and energy infrastructure, energy management systems (EnMs) and crude distillation unit (CDU) optimization
- Carryout vacuum distillation unit optimization, catalytic cracking unit energy efficiency and hydroprocessing unit optimization
- Identify reforming and conversion units and apply process control for energy savings and heat exchanger network optimization
- Employ furnace and boiler efficiency, steam system optimization, cooling water system efficiency and fuel and combustion management
- Recognize waste heat recovery systems and carryout advanced process control applications and digitalization and energy analytics
- Implement equipment performance monitoring, cogeneration, power integration and hydrogen and energy optimization and carbon reduction and energy efficiency
- Identify energy saving opportunities and apply economic evaluation of energy projects and refinery energy benchmarking
- Develop an energy optimization roadmap and sustain energy performance improvements

Exclusive Smart Training Kit - H-STK®



Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes electronic version of the course materials conveniently saved in a Tablet PC.

Who Should Attend

This course provides an overview of all significant aspects and considerations of energy optimization of oil refineries for refinery managers, operations managers, process engineers, refinery engineers, production engineers, process specialists, energy managers, energy efficiency engineers, utilities, steam and power system engineers, maintenance engineers, reliability engineers, instrumentation, control and automation engineers, technical services engineers, process optimization and performance improvement specialists, HSE engineers involved in energy management initiatives, project engineers, engineering supervisors, plant managers, section heads, department heads responsible for energy performance, professionals involved in refinery energy audits, benchmarking and sustainability programs, personnel seeking to improve refinery energy efficiency, reduce operating costs and enhance environmental performance and other technical staff.

Course Certificate(s)


Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations: -

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Dimitry Rovas, CEng, MSc, PMI-PMP, is a **Senior Engineer** with extensive industrial experience in **Oil, Gas, Power** and **Utilities** industries. His expertise includes **Refinery** Process Efficiency & Performance Improvement, Advanced **Energy** Management for **Refining** Operations, Heat Integration & Utility Systems **Optimization**, Process Plant **Energy** Conservation Techniques, **Refinery** Utilities, Steam & Power System Management, **Energy** Auditing & Performance Assessment in Process Industries, **Petroleum Refining, Gas Conditioning & Processing, Process Plant** Optimization, Effective **Production Operations** in the Oil & Gas Fields, Advanced Process Safety Management (**PSM**), **Process Equipment** Design, **Process Plant & Tank Farm Operation, Tank** Design & Engineering, **Tank Shell, Tanks & Tank Farms**, Applied **Process** Engineering, **Oil Production & Processing** Facilities, **Process Plant Optimization & Rehabilitation, Process Plant** Troubleshooting & Engineering Problem Solving, **Operations Abnormalities & Plant Upset, Glass Reinforced Plastics, GRP Resins, Pipe Products & Applications, Pipe** System Designs & Installation, **Steel & Fiberglass** Construction, **GRP Linings & Method** Application, **Rubber Compounding, Elastomers, Thermoplastic, Industrial Rubber Products, Rubber** Manufacturing Systems, **Heat Transfer, Vulcanization** Methods, **Energy Conservation, Energy Loss** Management in Electricity Distribution Systems, **Energy Saving, Thermal Power Plant** Management, **Thermal Power Plant** Operation & Maintenance, **Gas & Steam Turbines, Turbine Operations, Heat Transfer, Machine Design, Fluid Mechanics, Heating & Cooling Systems, Heat Insulation Systems, Heat Exchanger & Cooling Towers, Mechanical Erection, Heavy Rotating Equipment, HAZMAT & HAZCOM, Hazardous Materials & Chemicals MSDS, Modern Heating, Ventilation, Air-Conditioning (HVAC) & Refrigeration** Systems, Emergency **Air Compressors, Gas Turbine** Condition Monitoring & Fault Diagnosis, Modern **Valve** Technology, **Pumps & Valves**, Detailed Engineering Codes & Standards, **Hydraulic** System Overhaul & Troubleshooting, **Hydraulic** System Design & Troubleshooting, **Boiler** Maintenance & Inspection, **Pipe Stress** Analysis, Material Unloading & Storage, Commissioning & Start-Up. Further, he is also well-versed in MS project & AutoCAD, EPC Power Plant, Power Generation, Combined Cycle Powerplant, Leadership & Mentoring, Project Management, Strategic Planning/Analysis, Construction Management, Team Formation, Relationship Building, Communication, Reporting and Six Sigma. He was the **Project Manager** wherein he was managing, directing and controlling all activities and functions associated with the domestic heating/cooling facilities projects.

During his life career, Mr. Rovas has gained his practical and field experience through his various significant positions and dedication as the **EPC Project Manager, Field Engineer, Process Engineer, Preventive Maintenance Engineer, Researcher, Instructor/Trainer, Telecom Consultant** and **Consultant** from various companies such as the Podaras Engineering Studies, Metka and Diadikasia, S.A., **Hellenic Petroleum Oil Refinery** and COSMOTE.

Mr. Rovas is a **Chartered Engineer** of the **Technical Chamber** of Greece. Further, he has **Master** degrees in **Mechanical Engineering** and **Energy Production & Management** from the **National Technical University of Athens**. Moreover, he is a **Certified Instructor/Trainer**, a **Certified Project Management Professional (PMP)**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management (ILM)** and a **Certified Six Sigma Black Belt**. He is an active member of Project Management Institute (**PMI**), Technical Chamber of Greece and Body of Certified Energy Auditors and has further delivered numerous trainings, seminars, courses, workshops and conferences internationally.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

Course Fee

US\$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Sunday, 12th of July 2026

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| 0730 – 0800 | <i>Registration & Coffee</i> |
| 0800 – 0815 | <i>Welcome & Introduction</i> |
| 0815 – 0830 | PRE-TEST |
| 0830 – 0930 | Introduction to Energy Optimization in Refineries <i>Importance of Energy Efficiency in Refining Operations • Energy Consumption Patterns in Oil Refineries • Economic & Environmental Drivers for Optimization • Overview of Refinery Energy Systems</i> |
| 0930 – 0945 | <i>Break</i> |
| 0945 – 1030 | Refinery Process Overview & Energy Flows <i>Crude Oil Processing Fundamentals • Major Refinery Process Units & Energy Demands • Energy Flow Mapping Across Refinery Operations • Identification of Major Energy Consumers</i> |
| 1030 – 1130 | Energy Performance Indicators (EnPIs) <i>Key Refinery Energy Metrics • Specific Energy Consumption Calculations • Benchmarking Refinery Performance • Establishing Energy Baselines</i> |

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| 1130 – 1215 | Energy Auditing Techniques Types of Energy Audits in Refineries • Data Collection & Measurement Methods • Energy Balance Development • Audit Reporting & Recommendations |
| 1215 – 1230 | Break |
| 1230 – 1330 | Utilities & Energy Infrastructure Steam Generation & Distribution Systems • Fuel Gas Networks & Management • Electrical Power Systems Overview • Water & Cooling Utility Integration |
| 1330 – 1420 | Energy Management Systems (EnMS) ISO 50001 Framework Principles • Energy Policy Development • Continuous Improvement Methodologies • Roles & Responsibilities in Energy Management |
| 1420 – 1430 | Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow |
| 1430 | Lunch & End of Day One |

Day 2: Monday, 13th of July 2026

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| 0730 – 0830 | Crude Distillation Unit (CDU) Optimization Furnace Efficiency Improvement • Heat Integration Opportunities • Column Operating Parameter Optimization • Energy Loss Identification & Reduction |
| 0830 – 0930 | Vacuum Distillation Unit Optimization Vacuum System Energy Performance • Heater Operation Optimization • Heat Recovery Enhancement Techniques • Operational Best Practices |
| 0930 – 0945 | Break |
| 0945 – 1100 | Catalytic Cracking Unit Energy Efficiency Energy-Intensive Equipment Analysis • Regenerator Heat Recovery Opportunities • Air & Combustion Optimization • Process Control Improvements |
| 1100 – 1215 | Hydroprocessing Unit Optimization Hydrogen System Energy Management • Reactor Temperature Optimization • Heat Exchanger Performance Enhancement • Utility Consumption Reduction Strategies |
| 1215 – 1230 | Break |
| 1230 – 1330 | Reforming & Conversion Units Furnace & Reactor Efficiency Improvements • Heat Recovery from Process Streams • Utility Integration Approaches • Energy Performance Monitoring |
| 1330 – 1420 | Process Control for Energy Savings Advanced Process Control Fundamentals • Energy-Focused Control Strategies • Real-Time Optimization Systems • Performance Monitoring & Adjustment |
| 1420 – 1430 | Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow |
| 1430 | Lunch & End of Day Two |

Day 3: Tuesday, 14th of July 2026

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| 0730 – 0830 | Heat Exchanger Network Optimization <i>Pinch Analysis Fundamentals • Heat Exchanger Network Assessment • Energy Recovery Maximization • Retrofit Opportunities Identification</i> |
| 0830 – 0930 | Furnace & Boiler Efficiency <i>Combustion Optimization Principles • Excess Air Management • Flue Gas Heat Recovery Methods • Furnace Performance Monitoring</i> |
| 0930 – 0945 | <i>Break</i> |
| 0945 – 1100 | Steam System Optimization <i>Steam Generation Efficiency Improvement • Steam Distribution Loss Reduction • Condensate Recovery Enhancement • Steam Trap Management Programs</i> |
| 1100 – 1215 | Cooling Water System Efficiency <i>Cooling Tower Performance Optimization • Pump Energy Reduction Techniques • Water Circulation Management • Cooling System Monitoring Practices</i> |
| 1215 – 1230 | <i>Break</i> |
| 1230 – 1330 | Fuel & Combustion Management <i>Refinery Fuel Gas Optimization • Fuel Blending Strategies • Emissions & Energy Efficiency Balance • Combustion Control Technologies</i> |
| 1330 – 1420 | Waste Heat Recovery Systems <i>Waste Heat Source Identification • Heat Recovery Technologies • Economic Evaluation Methods • Implementation Considerations</i> |
| 1420 – 1430 | Recap <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow</i> |
| 1430 | <i>Lunch & End of Day Three</i> |

Day 4: Wednesday, 15th of July 2026

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| 0730 – 0830 | Advanced Process Control Applications <i>APC Architecture & Functions • Energy Optimization Algorithms • Constraint Management Strategies • Performance Evaluation Methods</i> |
| 0830 – 0930 | Digitalization & Energy Analytics <i>Data-Driven Energy Management • Industrial IoT Applications • Energy Dashboard Development • Predictive Analytics Techniques</i> |
| 0930 – 0945 | <i>Break</i> |
| 0945 – 1100 | Equipment Performance Monitoring <i>Condition Monitoring Technologies • Performance Degradation Detection • Energy Loss Diagnostics • Reliability & Efficiency Integration</i> |
| 1100 – 1215 | Cogeneration & Power Integration <i>Combined Heat & Power Systems • Refinery Power Generation Optimization • Grid Interaction Strategies • Economic Performance Assessment</i> |
| 1215 – 1230 | <i>Break</i> |
| 1230 – 1330 | Hydrogen & Energy Optimization <i>Hydrogen Network Management • Hydrogen Recovery Technologies • Energy-Efficient Hydrogen Production • Optimization of Hydrogen Consumption</i> |

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|-------------|---|
| 1330 – 1420 | Carbon Reduction & Energy Efficiency Energy-Carbon Relationship Analysis • Decarbonization Opportunities • Carbon Intensity Measurement • Sustainability Integration Strategies |
| 1420 – 1430 | Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow |
| 1430 | Lunch & End of Day Four |

Day 5: Thursday, 16th of July 2026

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| 0730 – 0830 | Identification of Energy Saving Opportunities Opportunity Screening Methodologies • Prioritization Techniques • Technical Feasibility Assessment • Savings Estimation Methods |
| 0830 – 0930 | Economic Evaluation of Energy Projects Cost-Benefit Analysis Techniques • Return on Investment Calculations • Lifecycle Cost Assessment • Risk Evaluation Methods |
| 0930 – 0945 | Break |
| 0945 – 1100 | Refinery Energy Benchmarking Industry Benchmarking Practices • Best-in-Class Performance Indicators • Gap Analysis Methodologies • Improvement Planning Approaches |
| 1100 – 1230 | Case Studies in Refinery Energy Optimization Distillation Unit Optimization Examples • Utility System Improvement Cases • Heat Integration Success Stories • Lessons Learned from Implementation |
| 1230 – 1245 | Break |
| 1245 – 1315 | Developing an Energy Optimization Roadmap Strategic Planning Framework • Project Portfolio Development • Resource Allocation Considerations • Implementation Scheduling |
| 1315 – 1345 | Sustaining Energy Performance Improvements Continuous Monitoring Systems • Performance Review Processes • Organizational Engagement Strategies • Long-Term Improvement Programs |
| 1345 – 1400 | Course Conclusion Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course |
| 1400 – 1415 | POST-TEST |
| 1415 – 1430 | Presentation of Course Certificates |
| 1430 | Lunch & End of Course |

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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