Training - Process Energy Efficiency Improvement for Industrial Plants

AMENER-EN-P | Face-to-face only | 3 days

This course provides comprehensive and applied knowledge of pinch analysis and covers how to improve energy efficiency in existing plants or new projects

Level

Expert

Public

Engineers from process, engineering, R&D departments of industrial plants in various industries (oil, gas, petrochemical, chemical, energy, paper, food, etc.)

Objectives

Attendees will be able to implement the following skills:

- List the energy efficiency improvement methods
- Carry out an energy efficiency analysis on a simple process

Pedagogical & technical resources

- Practical course and case studies based on industrial data and adjustable to trainee's concern
- Use of an expert software to compare to the initial evaluation

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ENERGY EFFICIENCY & CONTEXT — 0.5 day

Definition of Key Performance Indicators: energy intensity and efficiency, units and use.
Motivations and constraints: energy dependence and regulation.
Different approaches for energy efficiency: operation improvement, operating conditions optimization and other significant improvement solutions (pinch analysis, alternative technology, process design, best available techniques).

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PINCH ANALYSIS & MAIN RULES — 0.5 day

Temperature Interval Method (TIM) and PINCH Method.
Composite curves (hot and cold streams): building, description and interest.
Pinch point: characteristics and help for solutions design. Key parameters: ΔTmin, integration ratio.
Main rules: “cross pinch”, “plus or minus principle”,...
Illustration through examples.
Advantage of an expert software dedicated to energy analyses.

METHODOLOGY FOR ENERGY ANALYSIS: MAIN STEPS & CASE STUDIES — 2 days

Several case studies proposed and based on a methodology for energy analysis, adapted for industrial plants or new projects.
At this step, trainees will be able to:

- Characterize the energy needs and potential of a process.
- Design the most consuming pieces of equipment.
- Define savings targets.
- Propose potential solutions and options.
- Simplify it in order to select most profitable and operational options.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.
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Training - Boilers Safe Operation and Optimization

BOILER-EN-P | **Face-to-face only** | **4 days**

This course provides in-depth knowledge of boilers operating conditions and constraints for a safe and reliable operation

Level

Skilled

Public

- Operators, panel operators, supervisors and plant managers involved in steam production facilities operation and optimization
- Maintenance, instrumentation technicians and supervisors working on boilers

Objectives

Attendees will be able to implement the following skills:

- Describe the main types of industrial boilers and their components, including their operating conditions
- Explain how the main control loops work
- List the main phases of a safe boot procedure

Pedagogical & technical resources

- Use of case studies or exercises based on actual cases from the industry
- Special emphasis on safety issues and abnormal situations that can lead to accidents

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

BOILER DESCRIPTION & OPERATING CONDITIONS — 0.75 day

Different types of boilers and their characteristics. Operating conditions. Fuel consumption. Distribution of the heat supply as a function of the steam pressure and temperature. Construction of the vaporization and superheating tube bundles, the economizer and the drum.
Application: calculation of heat distribution between water wall, superheaters, economizer and air preheater.

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COMBUSTION - BURNERS — 1.5 days

Combustion conditions: fuel characteristics.
Conventional and low NOx burner technology and operation.
Combustion quality: analysis of oxygen and unburned material in the flue gases.
Safe combustion: flame detection, control and safety devices on the fuel circuits.
Air and flue gas circulation. Flue gas pressure profile in the boiler, draft control.
Application: flue gas composition calculation, air and flue gas pressure profile drawing.

STEAM PRODUCTION — 0.75 day

Water preparation: drawbacks arising from the impurities in the water, water quality measurement, characteristics of feed water and water in the boiler, thermal degassing, water chemical conditioning.
Control loop systems: steam pressure, feed water flow rate, superheated steam temperature, disruptions and control principles.

BOILER OPERATION — 1 day

Steam generation inside tube coil and steam superheating.
Heat flux, parameters influencing heat transfer, impact of fuel type, fouling impact.
On-stream boiler operations: routine monitoring, operating condition changes, analysis of disturbances, soot blowers, drains, etc.
Start-up and shutdown: preparation, ignition procedures, pressure build-up, connection to network, normal or emergency shutdown.
Application: study of start-up and shutdown procedure. Accident case studies.

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Training - Cogeneration - Combined Cycles

COGENE-EN-P | Face-to-face only | 3 days

This course deals with cogeneration units in existing plants or new projects

Level

Skilled

Public

Graduate engineers and technicians whose activities are related to the design and/or operation of these installations: engineers and technicians from engineering companies, technical and HSE support, operation team, personnel from insurance companies

Objectives

Attendees will be able to implement the following skills:

- Describe the conditions for combined thermal and mechanical power generation
- List the criteria for evaluating and monitoring the performance of the various elements constituting a cogeneration

Pedagogical & technical resources

Several practical applications related to actual industrial cases

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

DIFFERENT CYCLES AND MAIN CONSTITUENTS — 1 day

Operating principle and operating conditions of cogeneration and combined cycles - Typical schemes.
Main parts of the different cycles: Biomass and conventional cogeneration cycle:

- Boiler, steam turbine (back-pressure or condensation).
- Gas turbine, waste heat recovery boiler.
- Alternator: Available technologies, operating modes: hard-coupled grid connection or stand-alone operation..

Energy balance and energy performances of each elementary operation: compression, combustion and expansion.

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Efficiency enhancement, heat recovery from exhaust gases (air preheater, waste heat recovery boiler).
Different operating modes (simple waste heat recovery, post-combustion, separate boiler) and performances.
Application: comparison of performance, mechanical and thermal energy split.

GAS TURBINE — 0.5 day

Operation: operating principle, ISO power rating vs site power rating, low-NOx combustion, control principle.
Technologies: classification, types of construction, auxiliary equipment, safety devices.

STEAM PRODUCTION — 0.5 day

Boiler Feed Water (BFW) quality, description of the physical and chemical required treatments.
Description of conventional boilers and waste heat boilers (HRSG / OTSG): water circuit, steam circuit, fuel circuits.
Operating conditions - Fuel consumption per ton of steam, depending on boiler type and operating conditions.
Main process control loops: boiler feed water, pressure and steam temperature, combustion, flue gas circulation draft.
Combustion monitoring, analyzers, aim and meaning of each measured parameter. Safety equipment and sequences.

STEAM END-USES — 0.5 day

Steam as a heating medium and mechanical driving fluid.
Conditions for its distribution and efficient utilization.
Steam turbines: operating principle, expansion work and efficiency, and produced energy.
Static expansion: expanded steam characteristics, steam de-superheating.

INDUSTRIAL OPERATIONS AND MAINTENANCE — 0.5 day

Operation of a CCGT unit – Cycle and plant optimization
Key stages of start-up and shutdown.
Monitoring the unit’s performance.
Routine monitoring.

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Training - Energy Transition: Positioning of the Key Players

DETE-EN-P | Face-to-face only | 2 days

As governments and public opinion debate the way forward on the energy transition, companies are trying to position themselves in consequence. The purpose of this course is to cut through the noise and sometime conflicting information to provide a summary of the pros and cons of various alternatives to fossils fuels, the challenges linked to development of these, and of the positioning of key stakeholders from Society to Governments and the incumbent Oil & Gas sector. This to help companies, and or public decision makers adopt the most appropriate strategy for their activities

Level

Awareness

Public

Strategic planning, Business development, Marketing staff, and other staff of various sectors wanting to understand better the potential impact of the energy transition on their business. Public decision makers having to make choices with regards to energy policy, subsidies, and/or promotion

Objectives

Attendees will be able to implement the following skills:

- Understand the impact of energy on greenhouse gas emissions, and analyze the challenges faced by decision-makers in choosing alternatives to fossil fuels
- Appreciate societal, political and individual trends and their ambivalence in the face of the challenge of the energy transition
- Have learned how some Oil & Gas companies are adjusting their activities facing the energy transition challenge

Pedagogical & technical resources

- Self-discovery based on real life documentation
- Exercises in small groups
- Quiz

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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THE NEW ENERGY MIX — 1 day

The role of energy consumption in CO2 emissions.

- Fundamentals of climate change theory.
- Overview of greenhouse gases emissions.
- Energy mix and CO2 intensity.

Energy consumption and CO2 emissions trends:

- Key drivers underpinning energy consumption growth
- Geographic differences.
- Energy consumption growth and energy mix scenarios (IEA, Oil & Gas companies' scenarios): quiz; global energy consumption game (based on a few questions participants in small groups to assess energy demand annual growth % - to better understand key drivers underpinning energy growth).

The energy transition in the transport and power sector:

- Alternatives to fossil fuels in each of these sectors and pros and cons of these.
- What could accelerate the energy transition or slow it down?
- Self-discovery: participants in small groups to identify the pros and cons of various alternatives to fossil fuels in these sectors based on a dossier they will be given by the presenter during the session, containing relevant news articles, Oil & Gas companies' investor presentations and annual reports extracts. Each group to work on a separate theme and brief the others in plenary for debate (e.g. one group to focus on electricity for transport, one group on biofuels, one on Wind for power, one on solar...).

STAKEHOLDERS BEHAVIORS & STRATEGIES — 1 day

Government intervention policies:

- Dealing with a global challenge: regulation international cooperation.
- Status of progress vs. the Paris agreement.
- Positioning of the key players: US, Europe, China and India.

Societal trends and ambivalence:

- Social reactions to climate change.
- Compared analysis of various countries "climate plans" and/or climate initiatives.
- Advocacy against fossil fuels.
- Participants to compare in small groups different approaches to climate change policy from a social acceptability point of view e.g. Dutch climate change plan which strongly influenced subsequent election vs. the carbon dividend plan of the energy council.

Reaction of incumbent Oil & Gas companies:

- How have companies adjusted their strategy?
- Communication and advocacy with governments and society at large.
- Ability to compete with new clean energy small players.
- Participants to debate in small groups on strengths and weaknesses of Oil & Gas companies vs. news smaller players.

Sessions

Rueil-Malmaison - From 05/26/2026 to 06/27/2026 — **1920 €/HT**

Rueil-Malmaison - From 11/26/2026 to 11/27/2026 — **1920 €/HT**

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Training - Energy and Climate Change

ECCL-EN-P | Face-to-face only | 2 days

This training will enable participants to better understand the evolution of the energy mix and the pros and cons of various alternative energies. An overview of the main regulatory and fiscal mechanisms introduced, as well as the evolution of green finance, complete this curriculum in order to address the issue of energy transition from a technical, economic and societal perspective

Level

Knowledge

Public

- Private sector personnel responsible for strategic planning, market analysis (regulation mechanisms and price creation), energy procurement, financing and management of energy projects to anticipate technical constraints, to understand the risks (economic, legal, technical, environmental, geopolitical)
- State organisation in charge of energy policy choices, subsidies and/or promotion, as well as those in charge of missions within administrations and local authorities

Objectives

Attendees will be able to implement the following skills:

- raise awareness of the global challenges of the energy transition and analyse the long-term changes in the energy mix and its impact on climate change
- understand public policies, their impact on the environment and understand the global societal challenges of renewable energies

Pedagogical & technical resources

- Quiz on the different renewable energies
- Videos
- Case study
- Examples of practices in various countries

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

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Responsable

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Program

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WHY MAKE AN ENERGY TRANSITION NOW? 1 day

Evolution of the energy scene: myths and realities:

- Energy as a resource to be shared: the changing energy landscape up to 2050.
- Energy demand and economic growth.
- Theory and threat of global warming, growth of CO2 and GHG emissions.
- Problems of energy access.
- The new geopolitical challenges associated with renewables: emissions reduction, security of supply and competitiveness.

Environmental impacts and climate change challenges:

- International negotiations on climate and the environment: history and prospects.
- Diversity of public action: environmental policy tools.
- Energy demand and economic development: principles of sustainable development and the circular economy.
- Prospects for alternative mobility (electric, gas, hydrogen, biofuels) and challenges of electromobility.

Techno-economic and financial instruments for environmental management:

- The levers of a controlled transition.
- Green finance.
- Energy efficiency.
- Carbon taxation to control CO2 emissions.
- Footprint indicators.

FUTURE SOLUTIONS TO DECARBONATE THE ENERGY MIX 1 day

Overview of renewable energies: solar, wind, hydraulic and marine energy, geothermal, hydrogen, biogas and biomass:

- Technical characteristics of the different energies, advantages and limitations.
- Evolution of production costs.
- New development trends.
- Innovations behind new modes of production and consumption.
- Associated environmental risks.
- Economic challenges - Competitiveness of renewables.

Problems of energy storage:

- Intermittent source management.
- Distributed generation systems.
- Network integration.
- Smart grids.
- Power to gas.

Stakes of the CO2 capture and storage sector.
The place of nuclear power in the energy transition.

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Training - Energy Efficiency and Low Carbon Strategy, Industrial Solutions

ELCS-EN-P | **Face-to-face only** | **5 days**

As part of adapting their activities to the energy transition, industrial companies, particularly oil and gas firms, will need to manage CO_2 emissions and actively participate in the energy transition. This training focuses on the main challenges industries will face, both in transitioning to low-carbon energy consumption and in increasing energy efficiency. These companies will need to integrate new energies (renewables, hydrogen, etc.) into their energy mix. Furthermore, CO_2 economics must be considered when implementing their low-carbon plans

Level

Knowledge

Public

Industrial operators and national (NOC) or international (IOC) oil and gas companies. It is suitable for technical managers as well as executives and managers at all levels.

Objectives

Attendees will be able to implement the following skills:

- Integrate the new energy landscape with strategies to reduce carbon footprint
- Understand the evolution of the renewable energy sector and opportunities in this field
- Assess energy efficiency and manage its improvement potential
- Develop CCS and CCUS opportunities in future or existing projects
- Implement a roadmap for decarbonizing industrial facilities considering CO2 economics

Pedagogical & technical resources

- Questionnaires
- Team games
- Case studies
- Calculations using economics and KPIs

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

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Program

GLOBAL ENERGY LANDSCAPE — 0.5 day

Energy basics: definitions, characteristics, units, conversion factors, orders of magnitude.
Oil chain: technologies, supply and demand, prices, reserves, transition scenarios.
Gas chain: technologies, market players, producing and consuming countries, economic issues.
Case study: crude oil price.

CARBON, CLIMATE AND ENERGY STRATEGY — 0.5 day

Current scientific observations. Evolution of greenhouse gas emissions.
Other planetary environmental limits. Energy mix and CO_2 intensity of energy sources.
Case study: European energy mix. Energy trilemma concept.
Emission distribution by economic and geographic sectors. Oil & gas sector outlook in the energy transition: IEA scenarios, societal pressure, stranded asset risks.
Case study: production decline and oil investment pace.
Public actor mobilization, North-South debate, just transition concept.
Consumer mobilization. Global strategy for decoupling economic growth and carbon emissions. Debate and case study on transition scenarios.

DECARBONIZED INDUSTRIAL SOLUTIONS — 1 day

Global statistics review. Massive rise of renewables. Collapse of solar, wind, and battery costs. Shortened investment cycles, societal barriers, grid transmission impacts. Cross-over of global investment curves: green vs fossil energy.
Mixed results of a two-speed transition versus technologies and geographic sectors.
Overview of solar and wind energy. Presentation of main low-carbon sources: solar, wind, bioenergy, etc.
Case study: comparison of economic models for different electricity sources (solar, wind, gas). Economic concepts: capital cost, key performance criteria : net present value (NPV), internal rate of return (IRR), levelized cost of electricity (LCOE). Growth of competitive renewables without subsidies in the economic landscape. Practical examples.
Intermittency and energy storage: grid balancing constraints, technical and commercial challenges. Emerging solutions: hybrid projects, pumped hydro storage, utility-scale batteries. Emerging economic trends : new business models, emerging technologies, innovations.

CO2 ECONOMICS AND EMISSIVE INDUSTRIES — 1 day

State mobilization, carbon pricing markets (national/regional), European example. International economic implications, carbon market trends.
Industrial and economic actors mobilization. Corporate low-carbon strategies: role of carbon accounting (GHG Protocol). Case study for a SME, utilisation of ADEME database on emission factors in French economy. Key steps after carbon footprint assessment (emission reduction targets, action plan, integration into low-carbon strategy).
Target sectors, “hard-to-abate” industries, persistent supply-demand challenges. CCUS value chain: examples of CCS projects in Europe and the USA, costs trends, sectors applicability, impact of carbon footprint.
Technological and economic barriers to CCUS deployment, industry deployment status in France.
Hydrogen value chain: current supply and demand, hydrogen “colors” (grey, green, blue, etc.), technological and economic barriers to hydrogen economy.

LOW CARBON STRATEGY AND ENERGY EFFICIENCY — 1 day

Electrification of demand. Growth of low-carbon energy supply and electrification of demand across various sectors Case example of Global South and Sun Belt countries. Technological levers for global energy efficiency.
Gas vs renewables: competition and complementarity. Critical minerals challenge for energy transition. Environmental, economic, and geopolitical barriers.
Efficiency levers for residential, commercial, and industrial heat. Heat pump technology: residential, urban, industrial applications, technical limits. Regulatory and economic barriers.
Thermal storage technologies: practical examples and applications.

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LOW CARBON STRATEGY FOR THE OIL & GAS INDUSTRY — 1 day

Energy independence goals of importing countries as a transition driver. Impact of China's electric mobility revolution on fuel demand reduction. Oil & gas sector adaptation: examples from major companies, diverse strategic approaches.
The challenge of methane emissions and flaring reduction: differentiation by actors (majors, independents, NOCs, mining companies, utilities) and countries in their power to influence the outcome.
Emission management systems: typical emission reduction plan format for oil & gas companies.
Technological levers for operational optimization and facility design, flaring reduction, methane elimination, CCUS projects, energy efficiency, renewable energy use.
Examples and case studies with economic calculations.

Sessions

Rueil-Malmaison - From 12/07/2026 to 12/11/2026 — **4470 €/HT**

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Training - Rotating machinery electrification

ELECMT-EN-P | Face-to-face only | 2 days

This course explains how to assess the efficiency of a rotating machinery (pump, compressor) electrification project, in order to achieve savings in fuel consumption and as a result equivalent CO2 emissions to atmosphere

Level
Skilled

Public
Engineers and technicians involved in rotating machinery electrification projects

Objectives
Attendees will be able to implement the following skills:

- Explain how to calculate the work and the power of a rotating machine
- Explain how to select an electrical motor
- Explain how to assess the benefits of such an electrification project

Pedagogical & technical resources

- Interactive course
- Case studies coming from actual situations.

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ROTATING MACHINERY WORK AND POWER — 1 day

Pumps and compressors

- Basics of construction.
- Hydraulics and gas compression basics
- Application: work and power calculations/on-site checks

Drivers: electrical motors, diesel engines, gas turbines, steam turbines, expanders

- Basics of construction.
- Combustion and gas expansion basics
- Application: work and power calculations/on-site checks

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ROTATING MACHINERY ELECTRIFICATION 1 day

Pumps and compressors of various sizes electrification case studies, allowing:

- The calculation/check of the required works and powers
- The assessment of the project benefits, in terms of: fuel consumption savings, CO2 emissions to atmosphere savings, footprint savings...

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IFP Training

This training course is offered under the **Alliance4Training** brand

Training - Steam Turbines Operation

EXTAV-EN-P | **Face-to-face only** | **5 days**

This training provides an appropriate knowledge of steam turbine technology, performance and operation

Level

Skilled

Public

Engineers and technicians in charge of steam turbine operation, maintenance and steam turbine projects

Objectives

Attendees will be able to implement the following skills:

- Explain the operating principle and the basics of steam turbine control
- Recognize the technology and different components of single- and multi-stage turbines
- List the main criteria for selecting a steam turbine

Pedagogical & technical resources

Study of industrial cases:

- Different examples of steam turbines design and on-site layout
- Use of a dynamic simulator to demonstrate typical features

Assessment of achievements

Quiz

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

STEAM TURBINE PERFORMANCE — 1.25 days

Steam properties, inlet and exhaust conditions. Ideal and actual expansion.
Monitoring steam characteristics on the Mollier diagram: expansion, heating, efficiency, etc.
Expansion mechanisms: impulse stage, reaction stage and different types of multistage turbine.
Overall performance. Efficiency, steam consumption related to power supply.
Application: analysis of industrial turbine operation.

TECHNOLOGY — 1.5 days

Main types of turbines, new designs.
Technical components: rotor, wheels, casing, bearings and thrust bearings, sealing devices.
Vibrations and critical speeds. Condenser and vacuum devices.
Application: study of different types of turbines and related auxiliary systems.
Practical workshop: study of component parts using a dismantled turbine.

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STEAM TURBINE CONTROL SYSTEMS — 0.75 day

Speed control systems. Controllers: characteristics of conventional and digital controllers.
Equipment technology: sensors, transmitters, controllers.
Safety devices: overspeed, vibrations, temperature.

OPERATION — 1 day

Lubrication and sealing devices.
Important parameters for turbine operation.
Monitoring of steam circuit and lubrication circuit.
Start-up and shutdown sequences of different types of turbines.
Incidents occurring in the steam network, the machine or the ancillary equipment.
Safety and prevention.

DYNAMIC SIMULATION - APPLICATIONS — 0.5 day

Preparation and start-up of a steam turbine driving a centrifugal compressor.

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Training - Furnaces: Safe Operation and Optimization

FURNSOO-EN-P | **Face-to-face only** | **4 days**

This course provides in-depth knowledge of furnace operation in the petroleum and petrochemical industries. The course covers also the safety and reliability constraints

Level

Skilled

Public

- Operators, panel operators, supervisors and plant managers of refining, chemical and petrochemical plants, involved in furnace operation
- Engineers and supervisors concerned with safety, optimization and operating issues of furnaces

Objectives

Attendees will be able to implement the following skills:

- Describe the phenomena involved in industrial combustion and establish the conditions necessary for efficient combustion
- Identify the optimization parameters of a furnace and explain the operation of the main control loops
- List the main phases of a start-up procedure

Pedagogical & technical resources

- Use of a dynamic simulator to understand the impact of operating conditions on thermal performance and furnace operation
- Use of case studies and exercises based on industrial situations
- Special emphasis on safety issues and abnormal situations that can lead to accidents
- The course content can be tailored to different types of furnaces and includes specificities linked to some processing units such as the steam reformer or steamcracker

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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FURNACE CONSTRUCTION & OPERATING CONDITIONS — 0.75 day

Different types of furnace and operating conditions. Scope and limitations for improving furnace efficiency.
Construction of heat exchange areas and refractory materials: tube bundle arrangement, insulation, type of material used and operating limits.

COMBUSTION - BURNERS - DRAFT — 1.25 days

Combustion conditions: liquid and fuel gas characteristics, liquid spray.
Burners: fuel and air supply and mixture. Conventional and low NOx burners operation.
Combustion quality: analysis of the oxygen and the unburned material in the flue gases, control of combustion air flowrate and air/fuel ratio.
Combustion safety: flame detection, control and safety devices.
Air and flue gas circulation: natural draft, forced draft, pressure differential control, automatic safety devices.
Damper or induced draft fan role.
Application:

- Natural and forced draft pressure profile drawing. Review of draft constraints.
- Different types of burners and spraying systems.

HEAT TRANSFER & FURNACE OPERATION — 2 days

Heat transfer to the tube coil: control parameters. Impact of internal or external fouling.
Heat control: process fluid outlet temperature, fuel flowrate control.
Most important furnace temperature and constraints: skin temperature, bridgewall temperature, limits and risk of overcoming.
Application: furnace temperature profile and heat recovery distribution as a function of fuel burned and combustion air excess.
On-stream furnace operations: monitoring of combustion and heating. Modifying operating conditions. Analysis of disturbances. Key points for safe operation.
Start-up and shutdown: preparation, safe ignition procedures, ignition after a short shutdown, normal shutdown, emergency shutdown.
Incidents.
Troubleshooting. Prevention.
Application:

- Case study of furnace accidents.
- Start-up procedure study.

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Training - Day-to-Day Energy Optimization for Industrial Plants

MENERG-EN-P | Face-to-face only | 4 days

This course aims to optimize energy consumption and operational costs by improving operation of thermal equipment and steam network balance

Level
Skilled

Public
Operation, technical staff & supervisors involved in the technology and operation of thermal equipment, and interested in energy consumption optimization of the plant

Objectives
Attendees will be able to implement the following skills:

- Identify opportunities to improve energy balances on an industrial site
- Define operating conditions and means of adjustment to optimize combustion in furnaces and boilers
- Identify key points in the production and economic use of steam and electricity in factories

Pedagogical & technical resources

- Practical course and case studies based on industrial feedbacks
- Numerous exercises to improve understandings

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

ENERGY BALANCE - EFFICIENCY & CONTEXT — 0.25 day

KPI's definition (Key Performance Indicators): energy intensity and efficiency, units and use.
Motivations and constraints: energy dependence and regulation.
Different approaches for energy efficiency: operation improvement, operating conditions optimization, significant improvement solutions, Best Available Techniques (BAT).

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ENERGY CONSUMPTION INSIDE FURNACES & BOILERS — 0.75 day

Main type of furnaces and boilers. Operating conditions.
Heat balance, efficiency estimate. Scope and limitations to improve efficiency.
Material and equipment used to improve efficiency and heat recovery.
Applications and exercises:

- Heater efficiency estimate and flue gas composition calculation.
- Boiler operating conditions analysis - Heat recovery in radiant and convection zone.
- Impact of fuel composition on atmospheric emissions.

ELECTRICITY & STEAM PRODUCTION — 1.25 days

Cogeneration cycles: boiler-steam turbine, gas turbine-waste heat boiler.
Operating conditions (extraction or discharge pressure, single recovery or post-combustion waste heat boiler's operation) and thermal performance.
Steam network operation and balance. Mechanical energy produced by steam expansion, energy recovery and electricity production optimization.
Sources of margin: technology and use of steam traps.
Application:

- Study of a power plant.
- Estimation of production cost for steam (HP, MP, LP) and electricity.

HEAT & MECHANICAL ENERGY RECOVERY — 1.25 days

Scope and limitations of heat recovery inside heat exchangers. Parameters impacting heat flux and heat transfer.
Sources of margin: heat exchangers performance follow-up, impact of fouling, cleaning strategy and optimum cleaning frequency calculation.
Low temperature heat recovery: heat pumps solutions or mechanical compression of gases (main operating constraints).
Mechanical energy recovery inside process-gas turbines.
Application:

- Heat exchanger train performance follow-up.
- Optimum cleaning frequency calculation.

PROCESS OPERATION — 0.5 day

Limitation of losses: mechanical (operating conditions) and thermal (insulation).
Ways to reduce energy consumption by adjusting operating conditions (pressure, recycle gas flowrate...), thermal integration.
Applications:

- Study of different flow control system on compressor.
- Impact of a distillation column operating parameters on energy consumption.
- Impact of a lack of thermal insulation.

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Training - Overview and Challenges of the Energy Mix

MXE-EN-P | Face-to-face only | 4 days

This course aims to provide an updated overview of the energy sector and the upcoming economic, political and environmental challenges (Covid-19, climate change, supply and demand crisis, unconventional Oil & Gas...). Participants will get a complete overview of both fossil fuels and renewable energy sources, with their respective benefits and burdens

Level

Knowledge

Public

Engineers from the energy sectors (oil, gas, renewables, power), industrial partners, executives (banking, insurance, consulting), public administration staff, PhD and postgraduate students

Objectives

Attendees will be able to implement the following skills:

- Describe the main stages (upstream, downstream, trading) of the oil and gas sectors and understand the technical and economic characteristics of hydrocarbons (production, outlets, availability, market)
- Analyze the advantages and disadvantages of each energy and interpret the evolution of factors affecting the supply and demand of the energy mix
- Identify the actors of the energy scene and their strategic lines (states, international organizations, public and private companies in the sector)
- Understand the role of renewable energies in the energy mix (maturity, intermittency, carbon footprint)

Pedagogical & technical resources

- Quiz and videos on the fundamentals of the energy sector
- Board game about the different steps of an oil or gas project
- Team game on the composition of the energy mix and the role of renewables
- Team game on factors affecting crude prices, the upstream sector and trading

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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INTERNATIONAL ENERGY SCENE — 0.5 day

Energy resources: definition, characteristics, conversion factor.
Climate change & energy transition: supply/demand asymmetry, Kaya's identity analysis.
Short and long-term forecasts (Covid-19 crisis, supply situation, climate change) and IEA scenarios.

OIL SECTOR ISSUES — 1 day

Stakeholder's strategy: NOC, IOC, majors, international organizations.
Upstream: stages and technical-economic aspects of the Exploration-Production.
Oil contracts and principles of oil rent sharing.
Downstream: refining economics and margins, capacity and new projects.

GAS SECTOR ISSUES — 1 day

Structure of the gas value chain: production, treatment, transportation, storage.
Pros and cons: natural gas and LNG in the energy transition.
Markets & grids, introduction to gas contracts.
Focus on current trends: crisis, market, evolutions, technological breaks...

RENEWABLES ISSUES & ENERGY TRANSITION — 1 day

Overview of the main renewables: solar, wind, hydro, bio, geothermal.
Comparison and competition: outputs, costs, availability, pros, limits.
CCUS technology and use of renewables in the Oil & Gas sector.
Stakeholders' strategy and supply chain presentation.

CASE STUDIES — 0.5 day

Economic calculations on Oil & Gas and renewables projects.
Opex, capex, revenues, assumptions, taxable income, cash flows, IRR.

Sessions

Rueil-Malmaison - From 09/29/2026 to 10/02/2026 — **3360 €/HT**

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Training - Energy Transition Engineer

NRJENG-EN-P | Face-to-face only | 60 days

This course aims to provide the in-depth technical knowledge of energy transition necessary to hold rapidly, and very effectively, the position of field operations engineer or project engineer

IFP Training Certificate

Graduate Certificate

Level

Skilled

Public

Engineers (particularly recently graduated operation, design or project engineers) interested in a specialization in energy transition

Objectives

Attendees will be able to implement the following skills:

- Grasp fundamentals of energy production in the context of energy transition
- Explain fundamental concepts underlying electricity production
- Analyze operating conditions and basic design of processes
- Describe the technology of static equipment and rotating machinery used in production facilities
- Identify main risks related to projects, including economics and societal
- Contribute to the dynamics of projects studies

Pedagogical & technical resources

- Highly interactive training with industry specialist lecturers
- Numerous applications and illustrations
- Multiple teamwork sessions. Use of dynamic simulations and industrial case studies
- Numerous simulations performed using the PRO/II™ or HYSYS™ or UNISIM™ software
- Several tutorials with equipment in a workshop. Site/field visits

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives, including a presentation in front of a jury

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

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Program

ENERGY PRODUCTION & MANAGEMENT IN THE CONTEXT OF ENERGY TRANSITION — 5 days

Energetic worldwide context - Low carbon energy production.

NATURAL & BIOGAS PROCESSING — 10 days

Thermodynamics applied to hydrocarbons processing.
Gas processing.
Process design case studies using process simulation software.

TECHNOLOGY OF PRODUCTION FACILITIES & PROCESS EFFICIENCY — 10 days

Piping systems and process equipment, metallurgy, corrosion management.
Electrical systems, instrumentation, process control and safety instrumented systems.
Energy optimization and heat exchangers network.

ELECTRICITY PRODUCTION — 10 days

Gas turbines.
Power generator.
Offshore wind challenges.

ECONOMICS & PROJECT MANAGEMENT — 10 days

Fundamentals of contracts - Project profitability evaluation - Risk analysis of energy transition projects.
Project cost estimation and control.
Cost of energy: conventional and renewables (biogas, solar, wind), LCOE, grid parity...

PROCESS SAFETY MANAGEMENT — 5 days

Process hazard analysis: HAZID, HAZOP, plant layout...
Operating procedures, mechanical integrity, organizational elements.

SOCIAL & ENVIRONMENTAL IMPACT MANAGEMENT — 5 days

Societal consequences and problem linked to new energies development.
Communication challenges and constraints, managing the relationships with partners.

BIOGAS DEVELOPMENT PROJECT — 5 days

Teamwork on a biogas project using actual data.

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Training - Developing a low Carbon Strategy: From Carbon Footprint Measurement to transition Plan

SBC-EN-P | Face-to-face only | 3 days

Since the Paris Agreement, countries have agreed on a global warming threshold that should not exceed 2°C above 1850 levels by 2100. This implies, first and foremost, reducing anthropogenic GHG emissions, which governments are translating into their own legislation. Companies must therefore transform and act to measure their carbon footprint and build a robust climate strategy

Level

Knowledge

Public

Anyone wishing to discover and/or deepen their knowledge of GHG emissions quantification and reporting methods (GHG Protocol, Bilan Carbone®, ISO 14064/69).
This course is aimed at: company and engineering office staff working as HSE or CSR coordinators, project managers & consultants on sustainability

Objectives

Attendees will be able to implement the following skills:

- Master the main principles of a carbon footprint assessment.
- Differentiate between the different available national & international standards for carrying out your company's carbon footprint (GHG Protocol, Bilan Carbone®, ISO 14064/69).
- Identify the key stages following the completion of a carbon footprint (emissions reduction target, action plan, integration into low-carbon strategy .... etc.).

Pedagogical & technical resources

- Quiz.
- Case studies.

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

Basic knowledge on climate change and MS Office Excel.

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

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WHY TAKE THE DECARBONIZATION ROUTE — 0.5 day

Identify the causes and consequences of climate change.
Understand the nature of climate change.
Climate change and its impact on business.
Identify the challenges raised by the energy transition.

KEY STEPS IN A CARBON FOOTPRINT ASSESSMENT — 1 day

Identify regulatory requirements for carbon footprint.
Carbon accounting standards (GHG Protocol, Bilan Carbone®, ISO 14064/69).
Describe the objectives of a carbon footprint.
Identify the scope of the carbon footprint (organizational, operational and temporal).
Drawing up flow maps.
Data collection and processing.
Handling carbon footprint measurement units.
Interpreting the results of a simple carbon footprint case study.
List existing reporting formats for publishing carbon inventory.
Case study: Evaluating a company's GHG emissions according to carbon accounting standards.

HOW TO SET A GHG REDUCTION TARGETS — 0.5 day

Identify the steps that follow a carbon footprint (emission reduction target, action plan, contribution to carbon sequestration, etc.).
Define the notion of carbon neutrality within the SBTi framework (Science Based Target Initiative).
Setting a science-based GHG reduction targets (commitment timeframe and scope).
Examples of targets setting according to SBTi standards (Absolute Approach ACA and Sector Approach SDA).

HOW TO BUILD A LOW CARBON ROADMAP — 0.5 day

Diagnose the risks and opportunities of the ecological transition.
Diagnose physical risks.
Define a strategy and an ecological transition project.

SETTING A TRANSITION PLAN — 0.5 day

Identification of potential actions to implement the strategic plan.
Selection of the most relevant set of actions for implementation.
Identify the levers for actions within the company, depending on its structure and sector.
Monitoring and guiding the implementation of the action plan.
Case studies: Building a company's transition plan according to international standards.

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Training - Gas Turbines

TAG-EN-P | Face-to-face only | 5 days

This course provides a good knowledge of gas turbine technology and enhance competency in the selection, operation and maintenance of gas turbines

Level
Expert

Public
Engineers and managers involved in gas turbine operation, maintenance, engineering and purchasing

Objectives
Attendees will be able to implement the following skills:

- Explain the operation and operation of gas turbines
- List the essential elements for the selection of a gas turbine according to the process and conditions at the operating site
- List potential gas turbine incidents

Pedagogical & technical resources

- Case studies of actual gas turbines
- Various illustrations of actual systems
- Interactive course
- Groupwork: overall study of a gas turbine

Assessment of achievements
Quiz

Prerequisites
No prerequisites are necessary to follow this course

Responsable
IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

GAS TURBINE EQUIPMENT — 2 days

Classification: typical cycles, heavy duty and aeroderivative designs, applications.
Presentation: main components. Standard and specific machines available.
Construction and design: compression, combustion, expansion. Rotor dynamics, coupling.
Auxiliary equipment:

- Internal cooling, lubrication, control system, safety devices.
- External auxiliaries: air inlet filters, exhaust stack.

PERFORMANCE — 1.5 days

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Thermodynamics: ideal and actual gas, behavior during compression and expansion, isentropic and polytropic processes.
Centrifugal and axial compression. Performance, stability and other limits.
Combustion operation. Influence of fuel type. Afterburning for cogeneration purposes. Low NOx designs.
Expansion: single or double shaft design operation. Performance influence of atmospheric conditions, fuel selection. API charts.
Available load characteristics: rotation speed, T3 firing temperature, IGV influences. Open cycle, combined cycle examples.
Case studies: actual performance vs. basic design; troubleshooting and solutions.

SELECTION — 0.5 day

Selection criteria according to availability, operational and maintenance requirements.
Bidding: significant information for data sheet definition.

OPERATION — 1 day

Start-up and shutdown operation: sequences and trips. Air filtering, lubrication and fuel systems operation.
Performance monitoring and mechanical operation. Maintenance during operation: compressor cleaning devices.
Maintenance objectives and scheduling: operation, load, fuel influences; inspection schedules.
Factors related to available load: rotation speed, T3, IGV. Typical approaches related to Brayton cycle, cogeneration, combined cycle.

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