2019

Specialized Course Packages for Energy Sector EURO ENERGY SOLUTIONS COURSE CENTER













International Course Package 1/10/2019



Contents

Introduction

Α.	ISO 50001: Fundamentals of Energy Management	2
В.	Energy Efficiency for Managers	3
C.	Low/Zero Carbon Energy Technologies for Non-engineers	4
D.	Energy, Energy Technologies, and Energy System Integration	5
E.	Energy Technology Modelling	6
F.	Energy System & Scenario Modelling	7
G.	The Next Generation Energy System Models	8
Н.	Building Energy Management Systems, BEMS	9
I.	New Technologies for Sustainable City Development	. 10
J.	Climate Change and Energy Transition	. 11
K.	Carbon Policy and Markets	. 12
L.	Renewable Energy Management and Finance	. 13
М.	Design, Installation, and Maintenance of Solar Power Plants	. 14
N.	Poly-generation and Combined Cooling, Heating, and Power (CCHP)	. 15
О.	Measuring Techniques for Turbomachinery Application	. 16
Ρ.	Instrumentations and Monitoring for Machines and Plants	. 17
Q.	Smart Grids	. 18
R.	ICTs for a Sustainable Energy Future - from Design to Practice	. 19
S.	Energy Informatics	. 20
Т.	Economics of Energy Markets	. 21
U.	Petroleum Sector Driven Hydrogen Economy	. 22
V.	The Future of Gas-fired Technologies in the Energy Sector	. 23
W.	The Geopolitics of Energy and Environmental Policy	. 24
Х.	Energy Efficiency in Emerging Economies	. 25

A. ISO 50001: Fundamentals of Energy Management

Course name	ISO 50001: Fundamentals of Energy Management
Goal	The ISO 50001:2018 standard for energy management systems aims to establish a systematic approach for reducing energy consumption with application to different cases. An organization that implements this standard will achieve a full understanding of its energy consumption (as well as production for onsite generation). It will also be able to set achievable reduction targets in line with relevant industry best practices. The possible relevant financial benefits related to government energy and tax/funding policy are also learnt.
Target groups	Managers, Business owners, Technical specialists and engineers
Prerequisites	Relevant education and experience
Course length	2 days
Main elements of training program	 Introduction to the ISO 50001 standard Scope and policy definition Initial energy review Energy use and driving factors Legal obligations Management commitment Documentation and its role Monitoring and measurement needs/focus Operational control including procurement Internal audit requirements
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Energy Efficiency for Managers & Business Owners
Goal	This course allows business leaders to recognize the state-of-the-art energy cost reduction strategies and approaches. It highlights the fundamentals required to implement an energy management program in the workplace. This training emphasizes the importance of energy management by covering applicable tools, codes, and standards. The workshop deals with energy consumption, energy efficiency, rate structures as well as understanding of savings.
Target groups	Managers of energy efficiency units/government/private or public agencies, Commercial & industrial business owners
Prerequisites	Relevant education and experience
Course length	1 day
Main elements of training program	 Energy management, codes and standards Power purchasing Energy analyses Analytical instruments Motors Heat recovery Cogeneration Green and sustainable buildings Control systems Measurement and verification (M&V) Monitoring and targeting Action plans Maintenance and commissioning Financing
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

www.energiring.com

3

C. Low/Zero Carbon Energy Technologies for Non-engineers

Course name	Low/Zero Carbon Energy Technologies for Non-engineers
Goal	The objective of this course is to provide non-engineers with a good and general insights on concept of energy, energy efficiency, and energy conversion systems. It will include both conventional and non-conventional energy systems.
Target groups	All interested people with different non-technical background
Prerequisites	University graduates
Course length	2-3 days
Main elements of training program	 Electrical and heat power concept Energy efficiency Thermal power plants and gas-fired energy technologies Energy transmission and distribution Energy storage Energy usage in various sectors: industry, transport, buildings Renewables: Wind power Solar PV and solar thermal Geothermal energy Hydro-power Biofuels Tidal and wave energy
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

D. Energy, Energy Technologies, and Energy System Integration

Course name	Energy, Energy Technologies, and Energy System Integration
Goal	This course gives the participants basic insights into what energy is, how it is measured, different types of energy that exists and various energy conversion technologies. It then moves on to present various energy technologies and the deficiencies of different energy technologies (fossil and non-fossil based) and the challenges the current shortcomings present for a transition to a low carbon society. It further discusses the role different energy technologies can play in the transition to a low carbon society, the challenges and opportunities represented by digitalization and ICT related to energy system integration, and various configurations of possible solutions for energy system integration.
Target groups	Individuals (with different engineering background) intending to improve their insights and understandings from energy and energy technologies in general.
Prerequisites	University graduates
Course length	3 days
Main elements of training program	 Basic knowledge of energy, energy vectors, and energy technologies Advanced knowledge of the challenges of different energy technologies in relation to the environment Advanced knowledge of energy system integration Knowledge of challenges and opportunities represented by digitalization and ICT
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Energy Technology Modelling
Goal	The training is designed to teach the principles and application of bottom-up energy system analysis for a portfolio of technologies. It focuses on the TIMES model for exploring least-cost, long-term strategies in a country's or region's energy sector. A combination of theory and practical exercises prepare participants to use TIMES in their home country, as well as to be able to design their own energy models.
Target groups	Energy analysts and other professionals with a strong background in energy economics and/or energy technologies
Prerequisites	Relevant education and experience in the field
Course length	2 day
Main elements of training program	 Introduction to energy modelling - model types, benefits and limitations Fundamentals of the TIMES energy model: mathematical approach, technology structure, time dimension and regions Inputs and outputs of the TIMES model - data and equations for energy technologies and commodities Power sector modelling - load curves, storage technologies, reserve capacity, CHP plants Building multi-regional models and describing energy trade between regions Analysing the results of a TIMES model - replicating result tables from the energy balance and interpreting the cost and price results
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Energy System & Scenario Modelling
Goal	This course discovers the principles, methods and techniques employed to generate comprehensive medium to long-term energy system projections as presented in the energy outlooks. Its objective is to familiarise course participants with the complex inputs and analysis necessary to produce plausible scenarios in order to inform policy decisions
Target groups	Professionals in government and industry with a background or involvement in energy statistics, energy economics, or energy modelling
Prerequisites	Relevant education and experience
Course length	2 days
Main elements of training program	 Introduction to the IEA's World Energy Model (WEM) Input requirements - sources of energy and economic statistics; assumptions used Scenario development - parameters, accuracy and sensitivity; business-as- usual vs. climate-friendly scenarios Country-wide energy demand modelling - by sector and fuel Power generation modelling - technologies and fuel mix needed to meet future demand Transport sector modelling - by mode of transport Oil, gas and coal production modelling Carbon dioxide (CO2) emissions modelling
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	The Next Generation Energy System Models
Goal	This one-day course has been designed to briefly investigate, discuss, and analyse different aspects of the next generation energy system models.
Target groups	Professionals in government and industry with a background or involvement in energy statistics, energy economics and/or energy modelling
Prerequisites	Relevant education and experience in energy engineering
Course length	1 day
Main elements of training program	 Why one should study the real world not models, and how to do this Energy transition Game theory optimization for energy systems integration Lessons from policy scenario modelling and questions of modelling requirements Analyzing flexibility of the power system in the GCC Smart meter controlling system for dynamic and non-dynamic IP environments On model validation/calibration/data Forecast uncertainties Temporal resolution approach of urban residential electricity consumption Unequal time intervals within the optimization horizon Representation of reservation services while modelling long term power sector development A Smart-Energy OS for enabling flexibility in the entire energy system Using a high level of operational detail: relevance and pitfalls Whole-system models for coordinated decarbonization of heat and electricity sectors Spatial aggregation of nodal systems in the Spine Toolbox
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Buildings' Energy Management System, BEMS
Goal	To create energy and financial savings by reducing energy consumption and CO2 emissions produced in a building, a comprehensive building energy management system is required in which the current energy consumption will be assessed and an action plan on how to reduce consumption will be proposed. This course is aimed to investigate the issue from different points of view.
Target groups	Individuals intending to improve the energy efficiency in a building including architects, engineers, consultants, and building owners.
Prerequisites	Relevant education or experience
Course length	3-4 days
Main elements of training program	 Energy context of the buildings: residential and commercial Physical principles and building envelope Energy performance certificates, regulations, and standards Building energy system monitoring and auditing Building information modelling, BIM Building design best practice BEMS (BMS) benefits and control systems overview BEMS architectures Energy saving schemes ICT and communication protocols Smart homes Energy sharing and electricity bills Data management for privacy and security Artificial intelligence and novel technologies Advanced approaches for building-smart grid interoperation
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

I. New Technologies for Sustainable City Development

Course name	New Technologies for Sustainable City Development
Goal	Disrupting new ideas often precedes disruptive new-engineered technologies or the two interact. The course aims at discussing such technologies and ideas and the many relationships between them, assuming that they will have a great impact on cities in the near and more distant future. If applied properly they could ensure a more sustainable development of cities. The course aims at studying some selected such technologies and ideas and to train our ability to detect them in advance and to apply them.
Target groups	The target audience for this course are individuals or organizations who are interested in future cities.
Prerequisites	University graduates
Course length	3-4 days
Main elements of training program	 The full day workshop based course is relevant to audiences interested in the disruptive technologies and ideas shaping our future. The five workshops will contain lectures, discussions and project work related to five connected main themes: Forecasting Ethics Climate change and its risks The renewable energy and battery revolution Notopia
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Climate Change and Energy Transition
Goal	This course takes climate change and the Paris Agreement as its point of departure and deals with the transition to a low carbon society and the envisioned transformation of the energy system therein. It brings attention to the political controversies associated with climate change mitigation and adaptation and the different, and sometimes competing, strategies envisioned to reduce greenhouse gas emissions (GHGs). It discusses different energy scenarios and visions about the future energy system and the ways in which transition and transformation can take place.
Target groups	Managers, strategists, decision makers, investors, renewable developers and policy staff involved in the energy transition. Also, technical specialists and individuals considering a consultancy role in the energy world of future.
Prerequisites	Relevant education or experience
Course length	3-4 days
Main elements of training program	 Basic knowledge of climate change and climate change policies An understanding of the energy challenges associated with the Paris Agreement Knowledge about emission targets and climate policies in Norway and elsewhere Advanced knowledge of various mitigation and adaptation strategies related to the energy system Knowledge of different energy scenarios and the competing visions of the future energy mix Advanced knowledge of transition theory and the multi-level perspective in particular Extended insights on the relationship between energy and climate change, and the challenges associated with transition to a low carbon society
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Carbon Policy and Markets
Goal	This module looks at the different climate policy options for putting countries on a low-carbon growth path. It explores domestically focused policies, as well as market mechanisms linked to the international carbon market.
Target groups	Government officials in charge of formulating climate policies. Private or public sector entities subject to GHG reduction policies (voluntary or binding), and in particular those with an interest in using international carbon markets in reaching their goals. Financial sector players interested in entering the international carbon markets.
Prerequisites	Relevant education and experience
Course length	1 day
Main elements of training program	 Policy instruments for climate mitigation: An overview of existing and available policy tools Choice of policies to address different objectives and sectors How to best combine policy instruments Introduction to carbon market mechanisms: Today's global carbon market – characteristics and key players Domestic market mechanisms for reducing greenhouse gas emissions and how they work - cap-and-trade, certificate schemes Principal international market mechanisms and how they work - CDM, JI Future outlook of the carbon market - sectoral mechanisms, NAMA crediting Carbon market readiness: Domestic market framework and mechanisms and ways to access the international carbon markets Technical, policy and institutional requirements for establishing domestic or international market mechanisms
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

L. Renewable Energy Management and Finance

Course name	Renewable Energy Management and Finance
Goal	This course has been revised to take account of the changes in government support policy for all types of Renewables. The training will fully equip delegates with the latest information on financing all types of renewable energy projects to allow them to continue to participate successfully in the renewables industry. The course is applicable to those with a basic and advanced understanding of the sector, considering the initial concept design through to final completion
Target groups	Individuals considering a consultancy job and/or those who have to evaluate the benefits of adopting renewable energy technology. Managers and directors intending to invest in the renewable energy sector.
Prerequisites	Relevant education and experience
Course length	2 days
Main elements of training program	 Introduction to Renewable Energy Finance and Sustainable Design Methods of Financing Project Risk and Financial Management Basic Project Finance & Technical calculations – e.g. energy, economics, emissions, NPV, IRR Life Cycle Assessment (LCA) and approach Incentives and barriers to Investment Government Policy and Support Schemes Project Finance examples Practical International Case Studies
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

M. Design, Installation, and Maintenance of Solar Power Plants

Course name	Design, Installation, and Maintenance of Solar Power Plants
Goal	This professional course on solar photovoltaic (PV) system design, installation & maintenance provides detailed technical information and step-by-step methodology for design, installation, testing, commissioning and maintenance of grid-connected and off-grid solar PV systems. The course also includes a description of procedures to conduct site surveys for system sizing and installation, and performing testing, commissioning, maintenance activities in accordance with relevant international standards relating to grid-connected and off-grid solar PV systems
Target groups	Technical specialists and engineers
Prerequisites	Relevant education and experience
Course length	2 days
Main elements of training program	 Photovoltaic effect Photovoltaic cells and materials Daily / annual energy Positioning of the modules Photovoltaic energy Photovoltaic illumination Planning and designing a photovoltaic installation The electric load Costs and evaluation of the economical solutions Maintenance and reliability Practical solutions Typologies and modality of installation Integration of the photovoltaic modules in the building structure Payback time Economical perspectives
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

N. Poly-generation and Combined Cooling, Heating, and Power (CCHP)

Course name	Polygeneration and Combined Cooling, Heating, and Power (CCHP)
Goal	To understand what are different combinations of poly-generation systems and how CCHP works, their applications, latest technologies and evaluate the benefits of adopting CCHP plants. Both large-scale (central plants) and small- / micro- scale (distributed generation) projects will be discussed and assessed.
Target groups	Engineers, architects, professional installers. Managers and directors intending to invest in this technology or who wish to find out how CCHP works, and those who have to evaluate real projects in terms of EPCF factors.
Prerequisites	Relevant education and experience
Course length	2-3 days
Main elements of training program	 Poly-generation concept and design System integration, control, and optimization The physics principles (energy content, types of technologies) Design guidance (types, sizing, selecting, manufacturers) Simulation and modelling tools Environmental impact and analysis Finance, regulation, and incentives (MCS, RHI, CCL) Standards Case studies, best practice analysis Market, resources, and targets overview
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

0. Measuring Techniques for Turbomachinery Application

Course name	Measuring Techniques for Turbomachinery Application
Goal	The course gives a deep understanding of all types of measuring techniques and related instruments in turbomachinery fields, its applications, and failures.
Target groups	Technical specialists and engineers in the field
Prerequisites	Relevant education and experience in turbomachinery
Course length	2 days
Main elements of training program	 Load and pressure measuring techniques Temperature measuring techniques Measurement of overall values Flow Visualisation Measurement of pressures and temperatures in flows Hot wire and hot film anemometry Laser anemometry and laser techniques Two Phase Flows Noise measurement Vibration and Stress Measurements Measuring failures Data acquisition and treatment
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

P. Instrumentations and Monitoring for Machines and Plants

Course name	Instrumentations and Monitoring for Machines and Plants
Goal	The course is designed to give a deep understanding of all kinds of plants' monitoring and control and relevant instruments for different machines in a typical (power generation and/or refinery) plant.
Target groups	Technical specialists and engineers in the field
Prerequisites	Relevant education and experience in power plants sector
Course length	2 days
Main elements of training program	 Introduction in instrumentation & measurement Sensor faults and accuracy improvement Data transmission Analysis of measuring data Monitoring Examples for monitoring systems Remote monitoring
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Smart Grids
Goal	To find out more about smart grids, micro-grids and the technology behind them. Explore the role of energy storage, demand response, and distributed systems
Target groups	All individuals like technical experts and engineers, managers involved in smart grids projects
Prerequisites	Relevant education and experience in mechanical/electrical/computer engineering
Course length	3 days
Main elements of training program	 Smart grid: goals, history, scale and scope, and functions Features of smart grid Smart grid components & systems Communication technologies for the smart grid Controlling, operating, and monitoring the smart grid The customer side of the smart grid The utility side of the smart grid Renewable energy integration to smart grid Smart grid business case Safety & security systems Micro-grids and their technology Etc.
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

R. ICTs for a Sustainable Energy Future - from Design to Practice

Course name	ICTs for a Sustainable Energy Future - From Design to Practice
Goal	The course will cover future smart energy systems and intelligent transportation systems, two key components that constitute the smart city vision. The use of distributed renewable energy resources is a promising way to solve today's climate and energy problems. In a city context, decentralized renewable energy production mostly imply thermal and photovoltaic (PV) solar energy, possibly complemented with battery storage, as it can be installed on roof tops and facades. At the same time, energy demand will change: electric vehicles (EVs) will become our means of transportation, (hybrid) heat pumps will keep our houses warm during cold winter nights and EV charging will start when solar power peaks or demand is low. Advancements in ICT make this scenario feasible. ICT will give us direct insight into our energy consumption, and become a major controlling component in our entire energy system. Intelligent software will seamlessly match energy supply and demand without human interaction, ensuring uninterrupted availability of energy whenever we need it, leading to the concept of Internet of Energy (IOE).
Target groups	All individuals like technical experts/engineers and managers involved in smart cities projects
Prerequisites	Relevant education and experience
Course length	2-3 days
Main elements of training program	 Intelligent e-mobility systems Sustainable energy management in neighborhoods and buildings Integration of renewable energy resources into the city distribution grid Demand-response management Charging infrastructures for electric vehicles Future energy information networks and cyber-physical energy systems Security and privacy, citizen engagement, and data analytics Advanced vehicle safety and autonomous driving and the role of Internet of Things (IoT) Recent trends and modern approaches in each domain such as artificial intelligence and blockchain for smart energy systems
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Energy Informatics
Goal	Energy informatics exploits the state-of-the-art ICT (information and communication technology) to tackle the global warming and climate change challenges. The scope of energy informatics includes computing and communications technologies and their applications for sustainable energy sectors - e.g., smart grid, solar, electric vehicles, and storage. This course lay the foundations to understand where and how computer engineering techniques apply in the energy systems.
Target groups	Professionals in government and industry with a background or involvement in ICT-enabled energy systems
Prerequisites	Having basic ICT knowledge and knowing principal of energy systems
Course length	3 days
Main elements of training program	 Knowledge about different energy systems - e.g., smart grid, electric vehicles, vehicle-to-grid, storage, transport, buildings Knowledge about renewable energy resources - e.g., solar and wind, and their impacts on energy systems An understanding for smart grid concepts & components, including smart meters, advanced metering infrastructure, information networks, demand response, and pricing schemes An understanding of where and how computer science techniques - e.g., cloud computing, fog computing, 5G, software defined networking, big data, game theory, optimization, apply for future sustainable energy systems Learned how to model power systems with software tools and real data sets to assess impact of smart grid concepts, integration of renewable resources, storage and electric vehicles Met invited speakers from industry and understand the good connection between principles and their applications in real systems
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Economics of Energy Markets
Goal	This course builds understanding of the global energy situation, energy and climate policies, and the market outlook for various energy carriers. Coverage includes conventional power generation, wind power, solar energy, oil and natural gas. Drivers of demand, supply and price formation will be explored, including their relationship to resource scarcity, technology and innovation, economic factors, and policy variables. Finally, the course explores the macroeconomics of energy market developments for importers and exporters of energy resources.
Target groups	All individuals eg. technical experts and engineers, managers involved in smart buildings
Prerequisites	Bachelor degree in science, business administration, finance, or economics
Course length	2-3 days
Main elements of training program	 Economics of energy: Global energy (drivers of energy demand, supply, energy and climate policies) Economics of climate change (causes and consequences of climate policies, efficiency issues, impact on energy markets) Economics of energy markets: Renewable energy sources (electricity investment and production, conventional power generation, economics of wind power and solar energy) Non-renewable energy sources (oil and natural gas, investment and production, geography and technology, market structure, price formation, applied market analysis) Energy and the economy: Macroeconomics of energy (energy-importers and energy-exporters) Energy resource management (The Dutch Disease, the Resource curse, topics in resource revenue management, policy formation and sovereign wealth fund design)
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

www.energiring.com

Course name	Petroleum Sector Driven Hydrogen Economy
Goal	Development of hydrogen society/economy have been pointed out as possible roadmap for accelerated decarbonization, by solving the problem of affordable large scale energy storage from intermittent renewables and enabling continuous use of combustion based technologies without carbon emission. The goal of this course is paving the way for and realization of the future hydrogen economy by utilization of natural gas and petroleum-related knowledge, technologies, experience, and infrastructure. Large scale hydrogen production via conversion of existing technologies for grey hydrogen (hydrogen from natural gas without carbon capture and storage) to blue hydrogen (hydrogen from natural gas with carbon capture and storage), will create a functioning hydrogen market and support development of hydrogen based energy conversion technologies to pave the way for green hydrogen (hydrogen from renewable energy sources).
Target groups	All individuals and organizations interested in just, sustainable, and peaceful energy transition from fully fossil fuel dependent society to 100% renewables
Prerequisites	Relevant education and experience
Course length	2 days
Main elements of training program	 Possible energy transition roadmap supported by petroleum sector Deeper cross-sectorial decarbonization Hydrogen Economy: A Pathway for Society with a Sustainable Future A Social, Technological, Economic, Environmental, and Political (STEEP) analysis for future hydrogen society Role of blue/green hydrogen in the future societies Hydrogen technology Production: CH4 reforming and CCS Transport/export Storage Technological stimuluses, enablers and barriers A geopolitical point of view for launching a hydrogen hub for the Gulf region Hydrogen utilization, discussing various alternatives Hydrogen in the future energy systems
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

V. The Future of Gas-fired Technologies in the Energy Sector

Course name	The Future of Gas-fired Technologies in the Energy Sector
Goal	Natural gas-fired power generation has been growing since the early 1990s. Gas turbine power plants are relatively cheap and quick to build and they emit less CO2 per unit of electricity generated than coal-fired plants. Combined cycle power plants built around high-efficiency gas turbines are one of the most efficient types of fossil fuel power plants available today and, provided gas is cheap, they offer competitively priced electricity. Yet gas turbines and gas engines are sophisticated, high-technology, and beneficial transition methodology to produce heat and electricity in near and mid-term future. This course will focus on innovation and upgraded technology in the low-carbon fossil fuel sector that will provide an important impetus for low-carbon transition, as a phase lasting until the middle of the century. However, the transition toward a sustainable energy future of gas-fuelled solutions has challenges from the social, technical, economic, geographical, and political points of view, which will be also discussed during the course.
Target groups	Managers and engineers in thermal power plants, Innovation-based ESCOs, Authorities interested in low-carbon transition, and Politicians and decision- makers, and so on
Prerequisites	Relevant education and experience in gas turbines and thermal power plants
Course length	3-4 days
Main elements of training program	 Natural gas a transition fuel Gas turbines cycles and performance Gas turbine components: compressor, combustor, turbine Thermal power plant configurations The role of technology and innovation in future gas turbines RES-dependent grid stability and backup Carbon capture, utilization, and storage: CCUS Novel cycles: CCGT, CSP, etc. Large-scale polygeneration: CCHP plants Microturbine driven distributed generation Bi-fuel vehicles Power to gas technology Cross-country investigation A comprehensive STEEP analysis
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

W. The Geopolitics of Energy and Environmental Policy

Course name	The Geopolitics of Energy and Environmental Policy
Goal	This course provides insight in the role of energy and the environment in international politics. Starting with concepts for the understanding of the relationship between energy supply, political power and international affairs, it discusses important preconditions of reaching global and regional agreements on energy and environmental issues. This discussion covers different countries, actors and geographical areas, for example Norway, rising nations like China, the European Union, and energy producing regions such as the GCC. By studying these cases from varying theoretical angles such as energy security, (neo-) realism and (neo-) liberalism, the course aims at developing a better understanding of the geopolitics of energy, which is energy on the highest level of the political system. Beyond classic issues of the geopolitics of energy such as the struggle over oil and gas resources, the course has a strong focus on energy transition and renewable energy.
Target groups	All individuals involved in improving the energy efficiency of buildings like: energy managers, consultants, engineers, developers, facility / building managers, architects
Prerequisites	Relevant education and experience in engineering and/or political science
Course length	2 days
Main elements of training program	 Description of different cases with an importance to the geopolitics of energy Explanation of theoretical concepts related to the geopolitics of energy, e.g. energy security Application of a (number of) perspective(s) to a given case Addressing various challenges with regard to global energy governance Showing an understanding of international environmental negotiations and governance Assessing the links between the geopolitics of energy the energy transformation Critically assessing and evaluating different energy- and environment-related policy measures Demonstrating an understanding of the range and substance of political and policy issues related to energy politics and energy security concerns
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081

Course name	Energy Efficiency in Emerging Economies
Goal	This course offers a combination of lectures, interactive discussions, and practical exercises. Advanced courses are offered on each of the following end- use sectors: a) buildings, b) lighting, appliances and equipment, c) industry, and d) transport. The courses will help participants ask the following questions regarding their countries' energy efficiency policies: Where to start? What are the steps? Did it work? Where do I get the help? Furthermore, cross-sectoral sessions on assessing the potential for energy efficiency, tracking progress, communication campaigns and finance will be offered to the participants.
Target groups	Professionals in government and industry with a background or involvement in energy efficiency issues
Prerequisites	Relevant education and experience
Course length	4 days
Main elements of training program	 Buildings: Understanding building energy use Energy efficiency potential in buildings Building technologies for low energy buildings Linking buildings energy efficiency policy to investments and finance Building energy codes and standards Building energy efficiency policies Evaluating the multiple benefits of energy efficiency in buildings Tracking progress with energy efficiency indicators Lighting, appliances, and equipment: Planning energy efficiency programs Selecting products for standards or labels Assessing current performance of appliances and equipment Monitoring, Verification and Enforcement (MV&E) of standards and labelling programmes Do energy labels reflect reality? Stakeholder involvement & communication Use of ICT to make Programs Smarter Tracking progress and assessing the multiple benefits Industry: Patterns in industrial energy use and the case for industrial energy efficiency program grammes in some countries and success factors Linking industrial energy efficiency policy to investments and finance Challenges and successes with implementing industrial energy efficiency programmes in some countries and success factors Transport: Quantitative transport & energy demand: historical overview and main parameters Fundamentals of transport policies for energy efficiency and emission mitigation: Avoid, Shift, Improve Policy instruments allowing to favor "avoid and shift" policies
Location	Norway / GCC countries
Learning materials	Course handouts and/or online course material
Contact information	info@energiring.com; +4790361081