APPLIES TO ACADEMIC YEAR 2016/2017

GRA 8506 Energy Transition in a Carbon Constrained World

Programme
Executive Master of Management in Energy (EMME)

Responsible for the course
Jon Lereim, (IFP)

Department
Department of Leadership and Organizational Behaviour

Term
According to study plan

ECTS Credits
5

Language of instruction
English

Introduction
This course is part of the Executive Master of Management in Energy in cooperation with BI Norwegian Business School and IFP School.

This course will offer participants the opportunity to discuss the requirements to provide energy for all in a 10 billion people world, while coping with the challenges of a changing climate.
As the world economy is today mostly fueled by fossil resources, the Energy transition module will present the tools (carbon pricing mechanisms, climate governance) and the solutions for a future decarbonized world (renewable energies, energy efficiency).
Through several lectures and discussions regarding technologies and their implementation in different sectors, the course will provide the participant with a vast and general overview of sustainable energy systems and their impact on the industries, society, environment, markets and our everyday life.

Learning outcome
Acquired knowledge
Each session will be an opportunity to discover, review, analyze and discuss major recent developments in deployment of low-carbon technologies and energy transition policies, to explore key technical, economic, financial, social and political issues relevant to this area, such as financing of renewable energy projects, and energy efficiency policies review.

Acquired skills
Upon completion of this module, participants will be able to:
· describe the main factors influencing the climate change and their economic implications
· have an overview of the different types of emissions regulations : standards, carbon tax, cap-and-trade schemes…
· understand the impact of renewable sources of energy over electricity markets and the different support schemes to support their development
· set up a renewable energy project based on given geographic, economic and legal conditions
· get an overview of the different energy efficiency measures and their specific financing mechanisms

Reflection
· get an analytical understanding of the energy transition issues, sustainability in the energy sector
· understand the key concepts, tools and techniques of project management and how they are applied in the renewable and energy efficiency sectors

Prerequisites
Granted admission to the Executive Master of Management in Energy programme.

Compulsory reading
Books:
ARAUJO. 2014. The emerging field of energy transitions: Progress, challenges, and Opportunities
Jones et al.. 2016. The 21st century population-energy-climate nexus. Energy Policy

Articles:
GILLINGHAM et al.. 2014. Energy efficiency economics and policies. Resources for the future

Other:
IEA Key world energy statistics 2016
UNEP Report. 2016. Global trends in renewable energy investments

Recommended reading

Articles:
CRUCIANI. 2013. Year 2 of Germany's energy transition. French Institute of International Relations (IFRI).
POLLITT. 2012. The role of policy in energy transitions: lessons from the energy liberalisation era. Cambridge University Electricity Policy Research Group

Other:
Christof RÜHL, BP Chief Economist. 2014. Energy consumption growth – one hump or two?. LinkedIn post
Liebreich State of the industry keynote BNEF global summit 2016. http://about.bnef.com/video/liebreich-state-industry-keynote-bnef-global-summit-2016/
REN21. 2016. Renewables Global Status Report
TEDx Rainier, Amory LOVINS (2012), Reinventing Fire. https://www.youtube.com/watch?v=u-Kq89M0t18

Course outline
The issue of climate change
- The climate system and the physical aspects of climate change
- Sources and drivers of greenhouse gases emissions
- Challenges ahead: the +2°C ceiling

Renewable energies: economic challenges & opportunities
- Renewable markets overview (costs, installation volume,…)
- Economics of renewable energies, market integration challenges and new business models
- Renewable project management case-study

Energy efficiency: finance & policy
- Energy efficient solutions overview in different sectors (transport, building, industry)
- Assessment of energy efficiency policies and finance mechanisms (national and international action plans, political challenges, financing)

Greenhouse gases emissions regulations
- Climate international governance: from Rio to COP21 & the Paris Agreement business implications
- Carbon regulation: carbon markets (focus on EU, US, China)
- Environmental fiscal regulation and norms

Computer-based tools
It's Learning and e-mail.

Learning process and workload
1 ECTS credit corresponds to a workload of 26-30 hours.

Attendance to all sessions in the course is compulsory. If you have to miss part(s) of the course you must ask in advance for leave of absence. More than 25% absence in a course will require retaking the entire course. It's the student's own responsibility to obtain any information provided in class that is not included on the course homepage/ It's learning or other course materials

Examination
The students are evaluated through an individual 2 hours written exam, counting for 5 credits.

Specific information regarding student evaluation beyond the information given in the course description will be provided in class.

Examination code(s)
GRA 85061 - Wriitten exam; counts for 100% to pass the course GRA 8506; 5 credits.

The course is a part of a full Executive Master of Management in Energy (EMME) and examination in all courses must be passed in order to obtain a certificate.

Examination support materials
None

Re-sit examination
Re-takes are only possible at the next time a course will be held. When course evaluation consists of class participation or continuous assessment, the whole course must be re-evaluated when a student wants to retake a

exam. Retake examinations entail an extra examination fee.

Additional information