

## Vak: Energy Policy, Markets, Finance and Law

credits: 5

<b>Vakcode</b>	SUVH18MFL
<b>Naam</b>	Energy Policy, Markets, Finance and Law
<b>Studiejaar</b>	2020-2021
<b>ECTS credits</b>	5
<b>Taal</b>	Engels
<b>Coördinator</b>	D.G. Tempelman

<b>Werkvormen</b>	Werkvorm 1
<b>Toetsen</b>	Assignment - Overige toetsing Markets, Finance & Law WE - Computer, organisatie tentamenbureau

### Leeruitkomsten

Upon completion of the module the student is able to:

1. Explain how energy markets function and what types of market failures can occur.
2. Use insights from micro-economics, finance and international economics to discuss the way energy markets could be regulated
3. Understand academic papers on the design of regulation of energy markets and how the effects of regulation could be evaluated.
4. To perform investment analysis for investment decisions purpose, by choosing and applying the correct scientific models (e.g. NCW, DCF, IRR, and WACC) and to perform scenario analysis, sensitivity analysis and ratio analysis on the scientific models.
5. To identify valuation issues by collect and assess relevant data, analyze the relevant data and using the relevant data to develop a model.
6. To analyze and advise on financing requirements (e.g. divided policy) based on predictions about the exploitation and cash flows.
7. To evaluate a financing proposal after considering various possible forms of financing, taking into account the requirements of potential capital providers.
8. To understand the functioning of different legal systems and apply different ways of finding legal documentation such as case law or legislation.
9. To analyse different developments in the energy markets from a legal perspective and identify legal bottlenecks.

To have demonstrated knowledge and understanding of:

- 1) The way different energy markets interact with each other.
- 2) The energy business environment in terms of markets, policies and economic mechanisms and institutions.
- 3) The role of technological options and aspects in energy system integration processes and energy transition.
- 4) The legal and regulatory environment of the energy business.
- 5) The different aspects of sustainable business design and implementation.

### Inhoud

#### Energy Markets, Policies and Technologies (40 % of content)

This module will provide the students with a thorough understanding of the functioning of energy markets, the underlying processes and stakeholder behaviour, and how energy markets interact with their policy, technology and societal context. The module will teach the student about the economic mechanisms that makes the various parts of the energy system to be aligned together. The module will discuss the concepts of liberalisation, regulation, restructuring and privatisation. Specific items to be addressed are: characteristics, role and functioning of different types of electricity and gas wholesale markets (forward, day-ahead, intraday and balancing markets), as well as energy retail markets, design of tariff and quality regulation of transmission and distribution grids, and methods to increase international integration of markets (such as market coupling). This module will also pay attention to the interaction between energy markets and environmental policies, such as the EU Emission Trading System (ETS) and policies to foster the supply by renewable energy sources, for instance by subsidies or quota systems. Finally, the module will discuss the potential role of different technologies, as storage and power-to-gas, to deal with the impact of the growing supply from intermittent renewable energy sources on the stability of energy networks and markets.

#### Business Finance & Economics (40% of content)

Methodologies to design business models & business modelling techniques are introduced with the task to conceptualize the value proposition to customers. The design of a business network to deliver the value proposition is discussed and the way to evaluate the viability of the business model including law and socio-economic aspects. Items as risk analysis, sensitivity analysis (with entrepreneurs) to design and evaluate business models. Environmental and social impact assessment is discussed. Aspects addressed:

- o Stochastic modelling
  - o Investments (cash flow, Net Present Value (NPV), (socio-economic) Return On Investments (ROI), IRR, Project Finance)
  - o Sustainable Business Case Design (Templates and Modelling)
- This module also involves an in-depth assessment of a real life SE system case by applying the various module concepts and the various relevant techniques to find variable business case options.

#### Energy Transition and Law

The term 'energy transition' refers to a long-term structural change in energy systems. Whereas in the past energy transition involves a shift to fossil fuels such as coal (industrial revolution) and oil (after world war II), modern energy transition aims at shifting from fossil fuels to sustainable energy sources such as renewables and energy efficiency instruments. Any process of energy transition requires technical innovation and a variety of economic incentives but also changes to the legal regime in order to facilitate such a change. This article will focus on the legal issues relating to energy transition. We will first discuss the concept of 'law'. Thereafter we will focus on the meaning of 'energy law' and its impact on energy transitions.

#### Market Liberalisation & Energy Transition

Energy market liberalization provides for the introduction of competition. This is specifically challenging in the network-bound

electricity and gas sector. Instead of developing parallel and competing networks, market liberalization in Europe requires a separation of production and supply on the one hand and the networks on the other hand. In order to provide consumers, producers and suppliers non-discriminatory access to the grid, it is a prerequisite that the networks are exploited by independent network operators. This article will discuss the legal measures introduced in the European Union (EU) to guarantee that network operators act independently and how they deal with the increasing levels of renewable energy sources.

#### **Emission Allowances in the EU, causes, effects and solutions**

This lecture deals with emissions trading in general and the European Union Emissions Trading Scheme (EU ETS) in particular. There is an over-allocation of allowances in the EU ETS, due to the economic crisis and due to industry lobbying. This leads to a low allowance price, weakening investments in low-carbon technology. Various reform measures have recently been adopted that are likely to stimulate such investments, but they will also reduce the cost-effectiveness of the EU ETS in the short term.

#### **Smart Grids from a legal perspective.**

The organization of the conventional electricity supply system is gradually changing from a centralized to a decentralized regime. This is also referred to as change from a top-down to a bottom-up approach. Examples of such a change include the introduction of decentralized electricity production and the concept of 'prosumption' (traditional consumers who, at the same time, also produce electricity). Both developments have technical implications for the organization and integrity of the grid, but also entail legal implications with regards to rights and responsibilities of grid operators and prosumers.

#### **Opgenomen in opleiding(en)**

European Master in Sustainable Energy System Management

#### **School(s)**

Instituut voor Engineering

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