



## Research Programme Energy & Sustainability

### 1. INTRODUCTION

The research programme Energy & Sustainability within the Faculty of Law conducts multidisciplinary and internationally oriented legal research on energy transition. Energy transition is the dual process in which the application of fossil fuels is reduced and in which the use of renewable energy sources (such as solar, wind and water) and energy saving measures are stimulated. A research programme on Energy & Sustainability within the Faculty of Law in Groningen is:

- unique in the Netherlands (since no other law faculty focuses on this combination);
- typically Groningen (since energy research is one of the three spearheads of the University);
- appealing for the Faculty (for attracting additional (European) research funds).

The combination Energy & Sustainability is in line with current developments at the University of Groningen. Within the Faculty of Natural Sciences there is ESRIG (Energy and Sustainability Research Institute Groningen) and the Faculties of Economics and Psychology jointly hold the ESC (Energy and Sustainability Centre). Together with our Groningen Centre of Energy Law (GCEL), these institutions participate in the Groningen Energy and Sustainability Programme (GESP) that focuses, amongst others, on attracting European research funds (including KP7 and Horizon 2020) and has employed a staff member to support such funding opportunities (Dr. Anne Beaulieu). Last but not least, energy transition is also the focus of the Groningen-based Energy Academy Europe that was officially launched in November 2011.

The current research of GCEL, with director Martha Roggenkamp en co-directors Edwin Woerdman and Hans Vedder, fits very well within this research programme. GCEL is currently actively participating in some EU project proposals. Following an already granted European Interreg-subsidy for the Hansa Energy Corridor (HEC), GCEL is involved in a KP7 proposal on ‘smart cities and smart grids’. Within the framework of GESP, GCEL is involved in drafting a project proposal for an ERC Synergy Grant on ‘decentralised energy’. On the national level, GCEL is participating in project proposals within the framework of the so-called “Topsector Energie”. The research programme ‘Energy & Sustainability’ provides a proper basis for a further expansion and strengthening of current research during the next couple of years.

## 2. SETTING OF THE PROGRAMME: PUBLIC INTERESTS, PRIVATE INTERESTS AND ENERGY & SUSTAINABILITY

Energy production and consumption are key necessities for modern societies. Without energy our society comes to a full stop. A regular, affordable and clean energy supply is a public interest. Some governments even consider energy supply as a fundamental right. The German Federal Constitutional Court ruled, for example, that energy supply is comparable to one’s “daily bread”. Until the 1990s the organisation of the energy supply sector was therefore considered as a ‘public utility’ and thus to be organised by national and/or lower governments. The last decades a different trend can be noted all over the world involving radical market reforms. States are still responsible for energy supply and thus for protecting consumer interests, but governments are no longer considered to be the ones’ exclusively positioned to organise such a regular, affordable and clean energy supply. Consequently, where energy production and supply are regarded as activities to be operated in a competitive market, energy networks are considered as natural monopolies and this strongly regulated. Private companies and private interests therefore play a different role than before.

The need for a regular, affordable and clean energy supply is, however, closely connected to the availability of energy resources. Fossil fuels like coal, oil and gas have been dominant fuels for many decades but are gradually diminishing and/or more difficult to

acquire due to their location (very deep subsoil or far-away countries). Moreover, the combustion of fossil fuels is also considered the main source for global climate change, which is at odds with the public interest of ensuring a healthy and sustainable environment. How can this public interest be in accord with the freedom of choice of producers and suppliers in a liberalised and competitive energy market? This balancing act is often referred to as the process of energy transition, i.e. the process of reducing the use of fossil fuels, whilst stimulating energy savings as well as the use of renewable energy sources. Legal instruments play a crucial role in this process.

The recurring theme in this legal-scientific research is therefore how a reliable, affordable and clean energy supply (= a general public interest) can be protected and enhanced by private actors (= private interests). The liberalization of the energy markets has as a consequence that decisions on energy supply are no longer taken in a purely private or public law context, but in a hybrid situation in which some public interests are served by private entities. As a result of this, energy legal science is involved with questions that deal with the traditional separation of public and private interests. The belief that public interests are best served in a public framework is no longer valid and the question is much more how the public interest can be defined and protected in the most effective way.

### 3. RESEARCH QUESTION

The central question of this research programme is: which legal instruments are most effective in facilitating energy transition?

To address this central question, four broad sub-questions need to be answered, from all sub-disciplines of legal science:

- How to regulate a competitive *energy market*?
- How to *define* sustainability?
- How to effectively *incentivise* the energy transition?
- Does the legal framework *enable* energy transition?

Taken together these research questions define the objective of energy transition, the instruments stimulating this transition and the framework that may or may not allow for energy transition. This seemingly simple structure is complicated since sustainability may go beyond the environmental impact and even could include notions of security of energy supply. Moreover, the definition of sustainability no longer takes place exclusively by public bodies in a setting where they can be held democratically accountable. This means that the governance regimes applying to the definition of sustainability are different from those we see in relation to other forms of societal change. However, even in the absence of a commonly accepted definition of sustainability, the instruments used to encourage energy transition can be examined with regard to their effectiveness in reaching legally-defined sustainability targets, such as the reduction of CO<sub>2</sub> emissions and the promotion of renewable energy sources. On a similar note, the current legal framework should be examined to determine whether it enables or rather hampers energy transition. This framework translates into the following more concrete research questions.

### ***Energy market regulation***

Which legal instruments are used to create a liberalised energy market? The concept of liberalisation entails the need to stimulate competition whilst regulating the use of energy networks. In such a competitive market, states and market players are being confronted with an increasing scarcity of oil and gas resulting in higher energy imports and climate change challenges. The required legal instruments thus cover the entire energy chain, from exploration to final consumption. In other words, these instruments involve the legislation and regulations relating to the production, the transport and the supply of energy, the promotion of sustainable energy sources, the need to secure energy supply and the protection of both the climate and the consumer.

In the European Union, energy market regulation is based on EU Law and national law. Directives and Regulations define the framework within which market players and Member States may act. However, EU as well as national legislation is not always clear and may differ from one Member State to another. The resulting differences in interpretation and implementation could lead to (unforeseen) contradictions and conflicts.

In addition to EU law (and national law) there is an increasing impact of international law or the law of non-EU Member States. Energy supply from outside the EU is influenced by, for example, WTO-law, the Energy Charter Treaty, bilateral investments treaties, the UN Climate Convention and the UN Energy Programme, including the activities of the International Energy Agency. Where the economic interests are substantial, legal instruments will be supplemented by several contracts, such as building contracts, joint venture contracts and supply contracts. How do all these legal and contractual instruments interact in order to serve the goal of a reliable, affordable and clean energy supply?

### *Defining sustainability*

How to define sustainable energy sources? The 1987 Brundtland Report describes 'sustainable development' as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This concept concentrates on the concept of 'needs', i.e. the need of the world's poor and the need of future generation. The latter is, amongst others, linked to the development in technology. As regards sustainable energy development, most definitions focus on the use of renewable energy sources. These resources are by nature sustainable as the source itself does not come to an end. However, can other sources and specific techniques be considered as sustainable because they are less polluting or prolong the use of fossil fuels? In other words, can natural gas, demand-side management and carbon capture and storage, for instance, be applied as a clean energy source in the process of energy transition? A energy lifecycle-analysis approach, which quantifies the environmental and social impact of a given production process and product throughout the life cycle of that product, is well-suited to define sustainability, but at the same time it is very difficult to regulate, particularly at an international level, leading to questions on the regulation of the methodology and monitoring of the lifecycle-analysis.

Within its goal to limit greenhouse gas emissions by 20%, increase the use of renewable energy sources by 20% and achieve 20% energy efficiency in 2020 ("20-20-20 goals"), the EU currently sets all kinds of energy and sustainability targets. How are those targets

enforced? This also involves more fundamental research into the effects of having more purpose-oriented regulation. Often, the use of purpose-oriented regulation is connected to deregulation and flexibility in its implementation. In connection with energy and sustainability, this flexibility is much less prominent and deregulation appears to have been superseded by reregulation. Government policy affecting the contractual freedom of private companies again prompts research into the governance regimes that have been put in place. In this regard we may point to the different instruments designed to encourage renewable energy production through a direct public law intervention in the private business practices, such as trading regimes, mandatory feed-in requirements or minimal renewable energy supply targets. Many of these instruments and the interconnection between these instruments have not been adequately researched.

### ***Incentivising energy transition***

Which incentivising instruments can be applied to reach these 20-20-20 goals? In general there is a choice between subsidies, tax incentives and market-based mechanisms.

The introduction of new techniques and renewable energy sources is often promoted by using subsidies, such as feed-in tariffs. Although such a subsidy regime can be quite successful it may also have considerable disadvantages. It is not only a nationally-oriented instrument, for example not enabling cross-border connections to the grid, but it can also be very costly because such a subsidy usually given for a long period of time.

Tax instruments can be used to promote the use of cleaner energy resources. Levying taxes on CO<sub>2</sub> emissions or any other polluting activity may be an incentive to use cleaner technologies or limit the use of fossil fuels. Although tax incentives are applied in the energy sector, a market-based mechanism is applied in relation to limiting greenhouse gas emissions: the European Union Emissions Trading Scheme (EU ETS).

What is the role of the EU ETS in the energy transition? Research can be carried out on effective legal solutions to link the EU ETS to more or less similar schemes in other jurisdictions, including the United States, Australia and China. Other issues are the impact the EU ETS has on the property rights of energy producers and whether the EU ETS can be expanded to other sectors in the economy, possibly even including

households and motorists. National tradable certificate schemes are also envisaged as an instrument to incentivise renewable energy generation and energy efficiency investments. An interesting question is how such instruments reinforce or conflict with the EU ETS. Is the policy space for energy and sustainability targets and instruments overcrowded and thus ineffective?

Incentivising energy transition can be achieved by way of market-based instruments, energy taxes and/or supplementary subsidies. Which instrument is to be preferred in a liberalised energy market? The price of emission rights in the EU ETS is lower than anticipated, due to over-allocation of emission rights and the economic crisis, as a result of which clean technology is not coming off the ground as fast as some would like to see. Should such technologies, including carbon capture and storage, be subsidised or should the EU ETS be altered in its set-up?

### ***Enabling energy transition***

Enabling energy transition involves multi-disciplinary research. What influence do tax law, competition law and state aid policy have on energy transition? To what extent can the policy instruments in these fields deal with regulatory competition and restrictions of competition that may arise in the energy context?

In which way do international organizations, international treaties and other international legal instruments stimulate or impede energy transition? What is the role of the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA) in energy transition? For example, fuel quality legislation may be at odds with WTO-law and international environmental treaties may stand in the way of or impede the construction of the energy infrastructure that is needed to enable energy transition. Energy networks are the backbone of the energy market. What is their role in energy transition? Large scale production of renewable energy sources by household consumers – for example by installing solar panels and wind turbines - has a direct impact on energy grids and may require a new kind of energy grid (and/or a different use of them), i.e. the development of ‘smart grids’. Such development requires, however, smart ICT options.

What is then the impact of ICT law? Who has access to the data collected by the operators of smart grids and smart meters? How can these data be protected? How should the current network regulation be adapted to introduce these smart grids and the large scale introduction of renewable energy sources?

#### 4. APPROACH AND METHODOLOGY

The research within the programme Energy & Sustainability is conducted on the basis of energy legal-scientific research that contains a legal-theoretic and law-and-economics component. In essence, the legal-theoretic methodology compares different laws and regulations, both conceptually and factually, to see whether there are any legal inconsistencies. The law-and-economics methodology compares different laws and regulations in terms of their costs and benefits, to see whether there are any economic inefficiencies. The scientific nature of energy law research follows from the application of those methodologies in a consistent way to enhance the knowledge of energy law in a manner that takes into account the specific characteristics of this field of law.

Those specific characteristics are the result of the interaction between the ‘laws’ of physics and the ‘laws’ of economics that can be applicable to diverse energy systems. Examples of such physical realities are (i) that an electricity grid must be in balance at all times and (ii) that the gas pressure must not surpass certain levels of safe system use, while there needs to be a sufficient flow of gas in the system. An example of the aforementioned economic regularities is that social welfare increases as more people are connected to an energy system and as security of supply increases.

Energy law research operates on the basis of these physical and economic characteristics of energy systems and not only analyses how law is shaped by those characteristics, but also how law can have an impact on these physical and economic properties that apply to energy systems. An example of the interaction between law and economics is the liberalization of the energy sector. Until some time ago it was assumed that optimal use of an energy system requires monopolistic governance and public ownership. By applying rules from European competition law, for instance, the economic model that



underlies the organization of energy systems has changed drastically. That also laws of physics interact with the law itself becomes apparent by taking into account the regulation of a 'smart grid', in particular when balancing such a grid.

## 5. FOCUS AREAS OF THE RESEARCH

As explained above, energy law develops in reaction to technological progress and new economic insights, while it also contributes to such progress and insights. As a result, energy law is a dynamic and innovative field of law in which new insights constantly emerge, but in which also new legal questions arise as technologies and economics progress. One important challenge will be to create a sustainable energy sector by way of a process of energy transition. The focus areas of the research will therefore include the following sub-themes:

### **Sustainable Energy Production**

A sustainable energy sector requires a production moving from fossil fuels to a more renewable and carbon-free production sector. The research will focus on the role of the EU ETS and the available instruments to introduce renewables (for example via tradable certificates). New techniques and developments include carbon capture and storage and offshore wind energy. However, the research will also focus on the laws and regulation governing traditional oil and gas production (including shale gas) in order to guarantee long time energy supply and the way in which this can be done in a more sustainable way. Special attention will be paid to the reuse of subsoil reservoirs for storage purposes. This research involves input from energy law, law-and-economics, environmental law, property law, tax law, international law and EU law.

### **Network Regulation**

Networks and their regulation are the backbone of the energy sector and are the core aspect of energy law. Research involves the construction and use of networks. The use of networks consists of regulating non-discriminatory access, congestion management and balancing of the grid.

The construction of networks involves networks offshore and onshore. Research involves construction rights, property rights and the reliability of the grid. A new development involves the creation of 'smart grids'. Although smart grids are technically possible already now, its regulation is still at its infancy since energy law is acquainted with this form of energy supply for only a couple of years.

Network regulation is not only a matter of energy law but also relates to property and land law, international law (law of the sea), law-and-economics, competition law and ICT-law.

### **Consumers and 'Prosumers'**

Consumers require a high degree of protection. EU law provides for public service obligations to provide the small household consumers with an additional degree of protection. However, these consumers will in the future also act as producers and are then often referred as 'prosumers'. This will require a change in the current legal regime but also a rethinking on how these consumers may cooperate and which operational structure they require. The research will involve knowledge of energy law, consumer law, company law, EU law and privacy legislation.

### **Regulatory Agencies**

The energy liberalisation process has led to the establishment of regulatory agencies on the national and EU level. The regulatory agencies include national energy regulators, competition authorities, emission authorities, safety authorities. On the EU level there is the European network of competition authorities, the European networks of transmission system operators (electricity and gas) and the Agency of Coordination of Energy Regulators ("ACER"). What are the tasks of these agencies? How is their independence organised? How do they cooperate? This research involves input from experts in energy law, EU law and public administration.

## **Trade**

Market liberalisation has led to new types of energy trade and trading platforms. In addition to trade in energy (= the commodity), other products are now being traded such as capacity, derivatives, emission rights, green certificates etc. These products are traded over the counter and via exchanges. The impact of financial markets and financial market law is increasing. In addition, the role of international trade law (including the energy charter treaty) and long term contracts are becoming more and more important. Special attention needs to be paid to EU-Russia relations. This research will involve expertise on energy law, contract law, financial market law, international law and trade law.

## **Governance and Energy Law**

The result of these new technological and economic developments is that energy legal-scientific research poses questions that simply could not have been posed before. Next to that, the liberalization of the energy markets results in methods of law-making that are not applied anywhere, not on such a scale at least. This implies that energy law is a good example of the 'regulatory state', in which regulation takes place in a way in which only the process is founded in public law, while the real decisions are being taken in a dialogue between market parties and a supervisory body (for instance: an incumbent, a new entrant and the competition authority; or a network operator, a party requesting access to the network and the network authority). The scale and intensity in which these law-making mechanisms are being applied in energy law make this an ideal field of law to better understand those governance processes. Furthermore, energy law develops in constant interaction with economics, which leads to more insights in the field of law-and-economics as well. Research on emissions trading, for instance, applies law-and-economics theory to a scale not yet seen before and thus leads to an increase in our knowledge about tradable emission rights and how this can be improved by means of law.

The interesting question is how new governance regimes can be developed to effectively accommodate the technical and regulatory innovations described above. Such regimes

may include several institutional arrangements, varying from traditional legislation to economic regulation and soft law.

## 6. PROFILE OF THE PROGRAMME

As mentioned above, the programme fits very well within the University-defined spearhead regarding energy research. Moreover, it provides the necessary academic backing for the legal track in the Energy Academy Europe that is being established at this moment at the University of Groningen. The study of energy transition also fits within the profile of the Faculty of Law itself, since it focuses on the governance of public interests as energy security and sustainability, including the use of markets and the involvement of private parties.

This programme is focusing on ‘energy and sustainability’. Securing long term energy supply is of paramount importance to a society that is depending on energy. Stimulating sustainability is key in avoiding dangerous, irreversible levels of global warming to protect the climate at large and to protect vulnerable third world countries as well as future generations in particular.

This programme has a clear multidisciplinary nature, both within legal research (public, private) and between legal research and other research fields (including legal theory, law-and-economics, policy science). GCEL comprises a significant and well-established law-and-economics research group as well as representatives from all major fields of legal research. GCEL is also well-connected to researchers in various other disciplines such as economics, social psychology and geology.

Researchers within this programme build upon various networks of scientists and practicing lawyers, including the European Association of Law and Economics (EALE), the North Sea Energy Law Programme, the Section of Environment, Energy, Resources and Infrastructure Law of the International Bar Association and the Dutch Energy Law Association (NeVER).

The researchers within the programme Energy & Sustainability have a solid scientific profile, both nationally and internationally. For example, in 2009 fifteen GCEL members published research they had conducted collectively. The title of the book is *Legal Design of Carbon Capture and Storage: Developments in the Netherlands from an International and EU Perspective* (eds. Martha Roggenkamp and Edwin Woerdman), published by Intersentia as part of the Energy & Law series. This book has received excellent reviews in various law (and economics) journals.

The European profile of the research within the programme Energy & Sustainability is considerable. In 2011, for instance, GCEL celebrated its 5th anniversary with a successful conference where legal scientists from Groningen met practising lawyers and policymakers, including a keynote lecture by Philip Lowe (European Commission Director General for Energy) and a message by Maria van der Hoeven (executive director of the International Energy Agency). GCEL is also linked to the IEA in the context of its research on carbon capture and storage and has presented research in Paris. Conferences were also organized in 2008, 2009 and 2010 on carbon capture and storage at the Energy Delta Convention in Groningen.

The programme Energy & Sustainability is working on its international profile, which is already substantial. For instance, in 2011 a research meeting took place in Groningen of the Academic Advisory Group of the Section of Energy, Environment, Resources and Infrastructure Law of the IBA in preparation of a book on “Energy Networks and the Law – Innovative Solutions in Changing Market” (ed. Martha Roggenkamp *et al*) to be published by Oxford University Press in April 2012.

Many international, peer-reviewed legal articles have been published, for instance on carbon capture and storage, emissions trading, offshore electricity grid development and energy market liberalisation. Journals include: International Journal of Private Law, Competition and Regulation in Network Industries, Carbon & Climate Law Review, Journal of Energy and Natural Resources, European Journal of Law and Economics, and the European Energy Law Report.

GCEL has also been successful in attracting funding for additional energy (legal) research. This involves public funds (NWO, Nucleus), public-private funds (Energy Delta Gas Research EDGaR, CATO2) and private funds (Gasunie, RWE, Nord Stream).