Clingendael International Energy Programme

Harvesting Transition?

Energy Policy Cooperation or Competition around the North Sea

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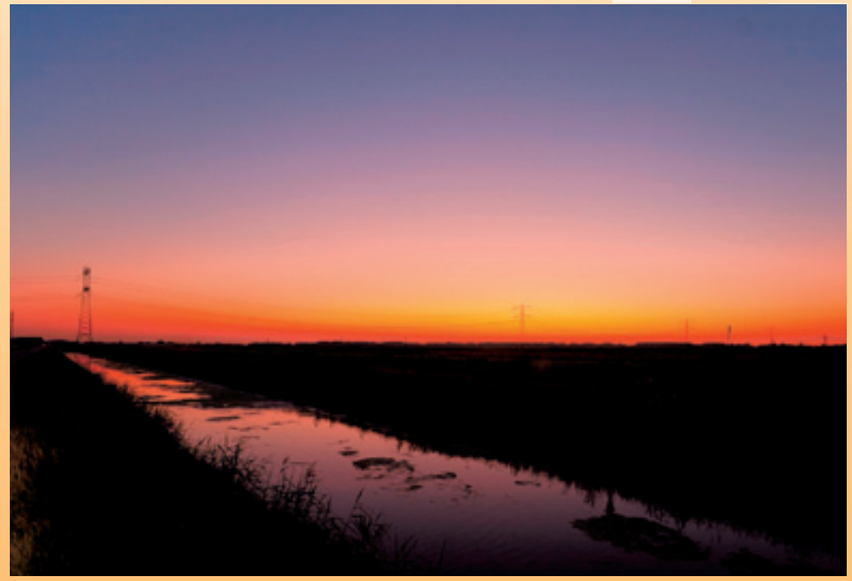

Nederlands Instituut voor Internationale Betrekkingen
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Clingendael Energy Paper

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Acknowledgements

On 17 November 2011 the Clingendael International Energy Programme organised a conference on "The long-term energy strategies of the countries around the North Sea and the internal market". The conference focused on the long-term electricity and climate strategies of several Northwest European countries and the cross-border impact of these policies. We would particularity like to thank the speakers of the conference for their interesting presentations, and the participants for the fruitful discussion. These insights helped the project team (Leonie Meulman, Pieter Boot[1], Coby van der Linde, Jacques de Jong and Luc Werring) to finalise this paper.

[1] Pieter Boot is Head of the Department of Climate, Air and Energy at PBL Netherlands Environmental Assessment Agency and is affiliated with the Clingendael International Energy Programme.

Executive summary

The Northwest European electricity markets are increasingly becoming intertwined with the advance of the internal market. A more integrated market – through investments in cross-border transmission capacity and measures which promote the efficient use of it – implies that national fuel mix policies increasingly have cross-national implications. Not only the electricity price, but also the (physical) security of supply level and potentially the CO_2 price, can be influenced by neighbouring countries' policy decisions. Moreover, large energy companies base their generation investment decisions on their European-wide portfolio, in which comparative and absolute advantages play a role.

The recent German decision to phase out nuclear energy brought home the message that integration in Northwest Europe has become more than just a paper affair but is part of daily life. The long gestation period of a Belgian nuclear exit possibly has cross-border implications, too, particularly because it is highly debatable as to whether domestic replacement capacities will be ready (on time). Lack of clarity about the continuation of French policy, which has produced low-priced nuclear generated electricity exports, has an impact on investment decisions in neighbouring countries. These few examples illustrate that the policy space of countries is increasingly overlapping due to the internal energy market. With policy spaces overlapping, the question arises as to how best to harvest the benefits of coordination among the Northwest European countries and how best to avoid the cost of policy competition.

The transition to a near-zero carbon emitting electricity system forty years hence potentially increases the benefits of policy coordination. Adding more variable renewable (RES) power to the system intensifies the need for back-up capacity and requires new investment in the grid. Coordination between Northwest European countries could lead to significant synergy and cost reductions. It could also help avert situations in which national policy constricts neighbouring countries' options rather than widening them.

Using coordination opportunities within European legislation

Energy policy is a joint competence of the Members States and the EU. Importantly, Article 194 of the Lisbon Treaty – on which most likely all future energy legislation will be based – specifies that European policies should not impact the right of every Member State to choose between different energy sources. While this article does not exclude the incorporation of coordination obligations between countries in this area in future EU law, it could make it more difficult as each Member State is able to contest, ex ante or ex post, EU legislation. Nevertheless, if coordination remains uncodified in EU law, voluntary coordination of the fuel mix between countries on a bilateral or regional basis is still an option.

In current laws related to the internal market (the Third Package) cooperation between Member States is required for the purpose of realising regional markets as an intermediate step to creating a fully integrated EU internal market. In the 2009 Renewables Directive (RES Directive), rather than harmonising the RES incentive schemes, coordination between Member States on the fuel mix is actively encouraged by including the option that the 2020 RES targets per country can (at least partially) be achieved in another country by making use of the flexibility mechanisms. Proponents of the internal market school (i.e., making use of the comparative advantage argument) favoured including this collaboration option. Except for the joint RES support scheme of Sweden and Norway, we do not know of any other final agreement between Northwest European countries using the flexibility mechanisms. While not being very concrete, it seems that most Northwest European countries are considering using them. Of course, using these instruments depends on whether a sufficient level of surplus will exist by 2020.

Post-2020 coordination potential

Several Member States are developing their post-2020 energy policies. The stated aim is to achieve an almost carbon-free electricity generation sector. With more RES in the system, the importance of coordination increases, as already mentioned. As a rule of thumb, it is easier for countries to cooperate if ambitions, drivers and approaches concerning the electricity sector are largely similar. It seems that the Northwest European countries agree on a host of general principles: the energy system is perceived as integrated, actions in the short term are also viewed from a long-term perspective, room should be made for market forces to determine the fuel mix, etcetera. That said, the hierarchy in the driving forces of energy transition differs (for example, climate, the cost of security of supply and ethical considerations). In all countries, encouraging domestic industrial opportunities are short listed in the top three. Like employment opportunities, rural development and local pollution are also important. Particularly these drivers can be seen as potentially conflicting with the internal market approach, because they could require the siting of power plants within national borders. While in Germany this conflict of drivers was even publically acknowledged, it seems that in Norway and Denmark the benefits of regional coordination in the Nordic Council of Ministries are taken to heart. Looking at Northwest European countries' long-term energy strategies, it appears that cross-border implications and coordination are only marginally taken into account when thinking about, for example, capacity markets. Considering coordination would do justice to its possibilities.

Sowing and tending

Instead of immediately resorting to coordination at the European level, and in accordance with earlier CIEP studies suggesting the benefits of regional markets, we recommend smaller steps to bridge the space between unilateral decision-making (national level) and harmonisation at the EU level. This is to manage the risks of national policy producing a non-optimal outcome from a cross-national perspective and to overcome the difficulty of reaching an early agreement with 27 actors, which was also an obstacle in the European wide Florence Forum. It remains to be seen whether the recently proposed EU electricity coordination group will suffer similar decision-making problems. In addition to the Florence Forum, seven regional initiatives were established in the EU; these focused on regulatory issues although they do not address the underlying broader policy issues. To also give political clout to regional cooperation, the Nordic countries started with their Nordic Council of Ministries, which goes beyond internal market issues. For example, they commissioned a study on the usefulness and consequences of utilising the flexible support mechanisms of the RES Directive in the Nordic Countries. The Pentalateral Forum between the Benelux countries, Germany and France followed after the Nordic Cooperation initiative and is focused on market integration matters.

With the Pentalateral Forum in mind, we have distinguished five different options (see Table on the next page) with an increasing level of coordination, which we would like to bring to the attention of Northwest European policy-makers. First comes the sharing of information on all decisions with external implications. In essence no real coordination takes place. This is different from the second option, which could possibly require a strengthening of the Pentalateral Forum. In the third option, named 'coordination plus', neighbouring countries would look for common policy considerations. We believe that with different primary policy drivers these three options are worth exploring. However, the fourth option, 'joint instruments', and the fifth option, 'joint policy', can only be successful if and when drivers are more aligned. Within the first three options we also recommend that joint research be conducted on various subjects, such as the advantages and disadvantages of different RES support schemes and additional ETS instruments. This could be facilitated by a joint research programme among a number of institutions in the region.

Table: Recommended degrees of cooperation.

Degree of cooperation:	**Focus:**	**RES energy**	**CCS**	**Nuclear energy**	**General and networks**	**Process**
Sharing information		•sharing of information •looking at impact on neighbouring countries before new policies are instigated				•MoU
Coordination		•timing of tenders •coordination of level of support	•joint investigation of storage opportunities	•joint investigation of storage opportunities	•joint balancing •joint investigation of which investments are needed	• MoU
Coordination plus		•one philosophy on support	•one philosophy on the need of an Emission Performance Standard and/or a minimum CO_2 price	•reflections on the place of nuclear	•joint cost/benefit analysis on infrastructure	• MoU
Joint instruments		•joint support system	•joint support system •joint storage approach	•joint ultimate support system	•one capacity market •one TSO	• MoU •joint policy instru-ments
Joint policy		•common goals and policies in power (not necessarily in issues of local interest such as heat)				•joint policies

1.

Introduction

In the quest to decarbonise the European economy, the Member States are all, to varying degrees, developing national strategies. These strategies are part of the implementation of the 20-20-20 policy[2] and the development of roadmaps towards 2050. With the introduction of decarbonisation policies, part of the internal market has become subject to national measures with regard to the introduction of RES. These national measures could create policy competition and increase (public) costs of complying with European policy. The question addressed in this paper is if and what kind of coordination among Member States' policies could be a valuable instrument to gain more traction for the national plans and create better results in achieving the energy policy targets of the European Union (EU).

Coordination can take place at various levels. Obviously, the European policy goals include coordination in formulating the contours of the policies, but at the implementation level, coordination is much less evident. With a power industry that is increasingly organised across borders, employing cross-border portfolio strategies, energy policy-making is still rather national in its focus. One would think that the implementation of the internal energy market should have enticed at least more policy coordination to facilitate cross-border energy trade and portfolio management. Yet the introduction of the European 20-20-20 policies in 2020 seemed to have steered energy policy-making even more firmly in the direction of the capitals. From an internal market perspective this is surprising, but from a policy perspective perhaps not. Subsidiarity and a certain design of the competencies point more in the national direction. Also, large Member States will always take their own energy economy as the context for their policies, not what other (and smaller) neighbouring Member States do. For smaller Member States, the context of energy policy is different. For them, the energy policies of larger neighbouring countries are extremely relevant, particularly because their energy markets are in general also organisationally more open.

In this paper we would like to explore the upward potential of coordination of national electricity- and climate-related policies in the fairly deeply integrated and sophisticated Northwest European regional market[3]. This market has seen improvements in interconnectivity and price convergence on exchanges. While the observations and recommendations can potentially be applied to several energy sectors, we will concentrate on the electricity sector and related climate policies, as this constitutes one of the areas in which the cross-border implications of national policies are particularly manifest.

[2] We will not focus on the European Union's 20% energy efficiency target in this paper.

[3] Our geographic definition of the Northwest European market is Ireland, United Kingdom, the Benelux-countries, France, Denmark, Germany and Norway. We will concentrate on the Netherlands, Belgium, Germany, France, the United Kingdom, Denmark and Norway.

1.1 Energy policy

Energy policy as a joint EU competence usually has three objectives, i.e., ensuring present and future security of supply, competiveness and sustainability[4]. These three objectives are the basis for both national and EU energy policies. EU energy legislation constitutes the primary framework for policy coordination among Member States and between the EU and the Member States.

Due to the subsidiarity principle, the EU legislation adopted to date seems to leave considerable wiggle room for national interpretation, choice of policy instruments and their implementation. Here the German decision to close certain nuclear facilities following the Fukushima disaster comes to mind, not so much in terms of the grounds but the execution. The governments of neighbouring Member States were not informed, even though the decision was bound to impact the markets beyond Germany, as will be explained in Section 2.3. While this room to manoeuvre helps to include the various national circumstances and preferences in EU legislation, it can also lead to a situation in which the translation of European policy into 27 different policies, targets and implementation choices fail to add up to the intended optimal situation, both at the European level and in how individual Member States' policy choices support and affect each other. Sometimes the options are broadened, but they can also be constricted by a neighbouring country's choices. Although the jurisdiction of national policy-makers should stop at the border, the internal market easily translates the impact of policies across national borders – so much so, that the national policy space can be influenced.

This is the case, for example, in sectors in which investments require a certain sequential planning. The availability of sufficient infrastructure is important. Yet infrastructure investments are strictly regulated on a national level and thus often miss the impact of decisions made across the border. For instance, the decision to increase wind energy production without looking at the wider need for network adaptation can lead to network instabilities beyond the national borders, while the need to land offshore wind onshore in the Member State that is building them (with subsidies) can prevent efficient network connections from being made. An example of the latter is the provision that German wind energy should be connected to the German onshore grid, while an interconnector between the Netherlands and Denmark crosses the German wind sector. In this case the example is all the more painful because it is the same company which is building these network connections, and it is being forced to build cables that cross but do not connect.

This brings us to the heart of the matter for this paper: in which areas of energy policy-making in the Northwest European markets can important coordination gains be achieved and lack of coordination losses be reduced in order to gain more traction for the national plans?

1.2 How to marry competitiveness and sustainability

A functioning internal electricity market in the EU is one of the cornerstones of the competiveness objective of EU energy policy (i.e., to move towards the objective of relatively

[4] Different terms are used as well. The threesome of reliability, competitiveness and "the environment" is also used in various forms, while earlier definitions spoke of the need for energy to be relatively cheap, secure and clean. Sometimes the three objectives of energy policy are also defined as "the market" (which should bring about reasonable prices) or competitiveness, security of supply, and the environment. The triple A's: affordability, acceptability and access have also been used to describe the policy priorities.

cheap energy)[5]. The European Council has articulated the ambition to achieve a fully functioning, interconnected and integrated internal electricity market by 2014[6]. This is founded on the idea that competition between electricity providers is best served in an as large as possible geographical area. The internal energy market is part of the aim to achieve deep market integration in all sectors of the European economy. It is reflected in the principle of free movement of goods and services as well as anti-state-aid policies also applicable in other sectors. As the theory goes, market integration will lead to one EU price (provided there is sufficient transmission capacity within and between markets), hence resulting in the optimal sum of producer and consumer surplus at a European level by unrestricted trade. It also provides the possibility to benefit from specialisation, i.e., locating specific types of generation capacity where the comparative advantages[7] are the highest. The diversity in national energy market organisation, which has to fit into the EU internal electricity market, poses major challenges for policy-makers. By complying with the spirit of an internal market, they can, in theory, ensure that the total cost of generating electricity in the EU will be minimised. At the same time, the fact that the internal market is evolving due to years of policy adjustments as will be elaborated on in Chapter 2, implies that national policies increasingly have cross-border impacts.

The EU energy market liberalisation programme commenced earlier than the formulation of the decarbonisation objective[8]. Carbonisation is currently considered to be a market failure[9], inferring that without governmental intervention this sustainability objective will not materialise. In a competitive internal market, companies do not have an interest to internalise this long-term goal without governmental involvement, because RES are currently more costly than fossil fuels. Proponents of the (internal) market school of thought argue that the most efficient way to incorporate these market failures would be through: 1) a market-based approach, ensuring (external) cost-, risk- and value-reflective prices, and 2) at a European level, reaping the benefits of specialisation, thereby optimising in terms of costs. The difficulty is to find instruments that capture the external costs sufficiently and have the same impact in all corners of the market. This is difficult because institutional and cultural differences have not been erased by the "acquis communautaire". Dealing with the sustainability objective in an isolated national manner in the nearly completed internal market runs counter to the idea of approaching market failures in a coordinated manner within the EU, where the decarbonisation policies have been politically settled. The danger in such a setup is that this market failure is foremost replaced by government failure.

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[5] According to the Third Package (Recital 1 of Electricity Directive 2009/72/EC) the goal is:
'...The internal market in electricity, which has been progressively implemented throughout the Community since 1999, aims to deliver real choice for all consumers of the European Union, be they citizens or businesses, new business opportunities and more cross-border trade, so as to achieve efficiency gains, competitive prices, and higher standards of service, and to contribute to security of supply and sustainability...'.

[6] European Council (04/02/2011), "European Council Conclusions" <http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/119175.pdf>. However, it should be mentioned that EU Energy Commissioner Günther Oettinger has said, he is pessimistic about the 2014 target, as there are currently (29 September 2011) infringement proceedings against 17 Member States. They have failed to comply with the Third Package Electricity Directive, which had to be transposed into national law before March 2011. Bulletin Quotidien Europe 10464 (01/10/2011).

[7] *'...A resource has comparative advantage if it has the ability to be better suited to the production of one good than another...'* <http://faculty.riohondo.edu/mjavanmard/colandermicro/Chap002trade.pdf>.

[8] Daniel Wilsher (December 2009), "Reducing Carbon Emissions in the Electricity Sector: a Challenge for Competition Policy, Too?", the Competition Law Review, Volume 6 Issue 1.

[9] For example, DG competition has mentioned that *'... full implementation of the PPP [polluter pays principle] would thus lead to correction of the market failure [undertakings can avoid bearing the full cost of the environmental harm from their activities]...'*. European Commission (2008), "Community Guidelines on State Aid for Environmental Protection", OJ 2008, C82/1, Recital 7-8.

In the next chapter, we further explore the idea that there is an increasing need to coordinate future electricity sector policies in Northwest Europe. For instance, the need to integrate large amounts of wind power into the electricity mix poses pertinent questions with regard to system stability and market functioning. Next, we will assess whether this region is moving in the right direction with regard to cooperation. Are they, for example, seizing the opportunities in European legislation to cooperate? Do they assess and approach the drivers for the different post-2020 policies in their national plans in a similar manner? The national policies will be important building blocks for the endeavours of the EU to reduce CO_2 emissions to 80-95% of their 1990 levels by 2050. The paths with which these reductions are realised do not necessarily have to be similar for all Member States, but when more RES electricity becomes part of the mix, the policy space of Member States will increasingly overlap. Cooperation will be easier if ambitions, drivers and approaches are managed across borders.

Lastly, we will address how coordination among countries can be shaped, especially at the level of policy-making, and make some preliminary recommendations to improve them. Instead of immediately looking to the European level, and in accordance with earlier studies suggesting the benefits of regional markets, we will advocate smaller steps to bridge the space between unilateral decision-making (national level) and harmonisation at the EU level. This is to manage the risk of national policy producing a non-optimal outcome from a cross-national perspective and to overcome the difficulty of reaching an early agreement with 27 actors.

2.

An increasing need for coordination of future energy policies

The manoeuvring room of energy policy-makers is constrained by the time factor because of the capital-intensive nature of both generation and infrastructure with long depreciation times. This timing issue implies that in an uncertain environment in terms of costs, potentials and 'black swan-events', wrong policy choices could lead to high costs for both governments and consumers and can potentially harm energy security. It could have wider implications for the competitiveness of the economy and employment when, due to energy policy choices, industries decide to relocate elsewhere or goods cannot compete on international markets. At the same time, it is difficult to predict ahead of time which policy choices will turn out to be erroneous since the future is highly uncertain. To avoid policy competition and dislocation effects on industries within the EU, coordination of policies can be valuable, although it does not reduce the risk of global competitiveness.

As the policy spaces of Northwest European countries increasingly overlap, we believe there is a growing need for cooperation on energy policy in the field of electricity and climate policy, as mentioned in the previous chapter. In this chapter we will explain what this overlapping policy space consists of, starting with the cross-national playing field of companies.

2.1 European companies

The bulk of electricity in Northwest Europe is generated and distributed by large companies that operate (nearly) European-wide. All of them have developed from national power or gas companies. Some are state- or local government-owned, while others are privately owned. The largest companies are E.ON, RWE, GDF-SUEZ, EDF and Vattenfall.

The large companies have pursued a strong European course. They have developed their presence in other Member States' markets both through mergers and acquisitions and sometimes through greenfield investments. Smaller competitors were often taken over. Their ambition was to become, in the words of E.ON's CEO Theyssen: *'…a big and regionally diverse company that (..) has to be in a position to formulate a strategy independently of events in one country…'* [10]. Although the course of the companies is European and sometimes also international, the former home markets are still of huge importance. This is illustrated by the 2010 sales figures of EDF (apart from Energies Nouvelles): €19.5 billion in France, €4.4 in the UK, €3.8 in Belgium, €3.1 in Italy, and much less outside Europe.

The current financial problems which the companies now face could lead to a new geographic market strategy of companies within and outside the EU. There is a need to reduce the large debts. They are mainly pursuing this by divesting assets or searching for shared ownership of specific activities. Examples are the foreseen shared ownership of the GDF-SUEZ oil and gas exploration and potential production activities with the Chinese Investment Corporation.

[10] The Financial Times (27/06/2011).

GDF-SUEZ has merged all European activities into one business unit (Europe) and expects the expansion of activities outside Europe. RWE wants to become 'sustainable, international and robust', but has been hit hardest of all European companies by the change in German nuclear energy policy[11]. RWE's priority is to decrease debt. It was rumoured that selling its UK division Npower was under consideration, but this was denied publicly. E.ON has a relatively large debt, mainly due to its investments in Italy, but still wants to invest more in Russian gas-fired power plants and US RES energy[12]. Vattenfall has already concentrated all European activities in three divisions: generation, distribution and sales, and RES energy; it sold its Belgian division to ENI. EDF wants to divest from nuclear into RES energy and gas-fired production. Some companies like GDF-SUEZ want to remain fully vertically integrated. Others, like E.ON, are less outspoken on this topic. Although E.ON fully owns Ruhrgas, its stated strength is in *'…certain areas of conventional electricity production, trading, renewable energy and devising complex power systems…'*[13], which implicitly excludes further substantial investments in gas.

In line with the aims of the internal market, the main energy companies' playing field has become European. They make their choices regarding the location of generation on the basis of portfolio considerations, including locational advantages and comparative advantages on a European scale. National energy policy should not distort this process by creating artificial comparative advantages or impediments between Member States' markets. With many energy companies that have outgrown national boundaries, policy-makers should follow suit.

2.2 Interconnection and integration

The development of the internal electricity market has stimulated cross-national energy companies. They develop their portfolios in an increasingly interconnected and integrated market. Over the past decade, investments have been made in more interconnections between countries in Northwest Europe. Table 1 shows the current level of interconnection capacity between the Northwest European countries.

Table 1. Net transfer capacity in winter 2010/2011 (in GW) including BritNed. Data provided by the European Network of Transmission System Operators for Electricity (ENTSO-E) and BritNed.

From: / To:	Belgium	Denmark	France	Germany	Netherlands	Norway	UK
Belgium			3.4		2.4		
Denmark				1.6		1.0	
France	2.3			3.2			2.0
Germany		2.1	2.7		3.0		
Netherlands	2.4			3.9		0.7	1.0
Norway		1.0			0.7		
UK			2.0		1.0		

Several plans, which are in different stages of development, are currently being considered to increase this capacity based on the export potential and import needs of the Northwest European countries (see Box 1). In all three scenarios of the early 2011 "ENTSO-E scenario

[11] See for further information: David Duijnmayer (09/08/2011), "RWE ziet Atomausstieg nu al terug in tegenvallende halfjaarcijfers", Energeia. Tijdo van der Zee (28/07/2011), "Atomausstieg drukt Vattenfall in rode cijfers. Nuon boekt nog winst", Energeia.
[12] Het Financieele Dagblad (11/08/2011).
[13] The Financial Times (27/06/2011).

outlook and adequacy forecast 2011-2025" (developed before the change in German nuclear energy policy), both the import and export capacities of Denmark, France and the Netherlands are projected to increase between 2011 and 2025, while Belgium's capacity is decreasing. For Norway and the United Kingdom expansion is foreseen in two out of the three scenarios. There is also widespread agreement that there is a need for more investment in interconnection capacity.

Box 1: Import and export capacity

ENTSO-E's best estimate scenario indicates that if no constraints affect the transmission network, some generating capacity would be available in 2020 for exports from the Northwest European region. This is due to the large projected export potential of the Netherlands (10-12 GW) and France (4-11 GW). Denmark also has export potential. A considerable shortage is expected in Great Britain (4-5 GW) and Belgium. Germany would have an export potential in July (4 GW), but none in January. This scenario assumes that the Belgian nuclear phase-out will take place as planned and that the 2020 RES energy goals will not be fully achieved. The projections are based on estimates of national TSOs with regard to expected capacity. Substantial coal capacity will be shut down in France and the United Kingdom due to the end of the derogation to the Large Combustion Plant Directive at the end of 2015. In the United Kingdom it is expected that existing nuclear reactors will remain connected to the grid until in 2019 when the first new plants come on line. This scenario assumes considerable new gas capacity in the United Kingdom, Germany and the Netherlands, and additional new coal (already under construction in the Netherlands and Germany) and some new 'clean coal' (due to its CCS obligation) capacities in the United Kingdom. Norway's power production is 97% hydro. New wind capacity is expected in this country.

Of course, the German nuclear phase-out will change this picture considerably. In 2010 the capacity of nuclear reactors was only 13% of the German total, but they delivered 22% of its power production. RES energy already constituted 35% of total German power capacity, but it produced only 17% of total power. These facts imply that it will take substantial RES or other additional volumes to guarantee adequate capacity in the Northwest European market (the German market is one-third of Northwest Europe's total).

More interconnection capacity amplifies the possibility that prices for identical electricity products, traded at the same time, converge across borders. Similar prices indicate that total surplus of all participants is maximised within the Northwest European region, as cheaper generation in one country can be used to accommodate more valuable demand in another. Specific policies and initiatives will incentivise this process by making more efficient use of cross-border capacity. Particularly the European network codes for transmission networks across borders, which are currently developed by ENTSO-E based on the Framework Guidelines of the Agency for the Cooperation of Energy Regulators (ACER), could speed up matters[14].

Market coupling is a particularly good example of a mechanism which promotes one electricity price across Northwest Europe. Via this day-ahead and intra-day mechanism[15], price differentials between countries' power exchanges are minimised, with a common price at times when the capacity made available for this process is sufficient. This method of implicit allocation is

[14] The obligation and process for developing these network codes are stipulated within the Third Energy Package. See: Regulation 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation 1228/2003.

[15] Elbas, which comprises the Nordic countries, Germany and Estonia, is a cross-border intra-day market. Hourly contracts can be traded up to an hour before delivery time (for Norway, two hours). At the Norwegian-Dutch border a cross-border implicit intra-day market is expected to be realised in March 2012. At the Belgian-Dutch border such a market is already in place. Similar to day-ahead market coupling, intra-day (which starts after day-ahead) bids and offers are matched across borders to the extent that there is sufficient transmission capacity. Unlike day-ahead implicit auctioning, the intra-day process is a continuously based system without a specific gate closure time.

envisioned as the electricity model to be implemented throughout Europe[16]. In this, the Northwest European region and the Nordic region are frontrunners[17].

More interconnection and the effective use of this, for example through market coupling, effectively indicates that the intra-day and day-ahead bids and offers are matched across borders[18] in the entire Northwest European market. Demand is accommodated by the cheapest supply source in this region, irrespective of the generation location, provided there is sufficient cross-border transmission capacity. This implies that through this matching process, a national fuel-mix policy decision which has an effect on the national bid-and offer-curve has an impact on both the extent of price convergence and the price level within Northwest Europe.

More interconnection also necessitates cross-national evaluation of the level of security of supply because (1) shortage or excess of national capacity has become irrelevant in countries with good interconnections and (2) the strength or weakness of transmission lines does not abide national boundaries. If German power flows from north to south and its internal transmission capacity is insufficient, the electrons must travel via the Netherlands. Northwest European TSOs are developing a common assessment framework of security of supply in an integral model[19]. These flows should also induce more coordination at the government level.

2.3 Examples of recent energy policies with cross-border implications: nuclear policy

In addition to the discussion in the previous two sections, more integration could also imply that (uncertainty surrounding) national measures to ensure that there is sufficient national generation capacity can have an impact on the price and investment decisions in neighbouring countries (for example a crowding-out effect). We would like to illustrate this point by giving a short overview of the national nuclear policy in Germany, Belgium and France. In Chapter 4, (new) nuclear policy in the other Northwest European countries will be addressed.

The German "Atomausstieg"

For more than two decades already, Germany has opposed new nuclear power plants. Its position towards existing ones has changed frequently. Already in 2001, the German government agreed to exit nuclear power, starting by limiting the amount of electricity the nuclear power plants could produce. In this law an exit from nuclear was targeted for around 2022[20]. In September 2010, this law was reversed and the lifetime of existing nuclear reactors was extended with an average of 12 years. After the March 2011 Fukushima nuclear disaster, nuclear policy changed again. Since May 2011, the government's view is that all nuclear plants have to

[16] In 2010 Heinz Hilbrecht (at that time he was the director for "Security of Supply, Energy Markets and Networks" in the European Commission) called for full day-ahead and intra-day market coupling between all seven of the EU's regional power markets.
See for more information: Platts EU ENERGY (27/08/2010), "EU sees single power market by 2015". <http://www.platts.com/IM.Platts.Content/ProductsServices/Products/euenergy.pdf>.

[17] See for more information on market-coupling plans:
<http://www.tennet.org/english/projects/Marketcoupling/Tijdslijn.aspx>.

[18] The intra-day and day-ahead bids and offers are matched across one or more power exchanges.

[19] This cooperation was initiated via the Pentalateral Energy Forum (see Chapter 5 for more information on this forum).

[20] Lilith Volkert (30/05/2011),"Atomausstieg: Schwarz-Gelb vs. Rot-Grün
Alles bleibt anders", sueddeutsche.de <http://www.sueddeutsche.de/politik/atomausstieg-schwarz-gelb-vs-rot-gruen-alles-bleibt-anders-1.1103260>.

close before 1 January 2023. The seven oldest have already been placed under a moratorium[21]. This most recent "Atomausstieg" was written into law on 1 August 2011[22].

The Ethical Commission, a committee summoned by the government to look into the ethical aspects of the country's energy supply, had considered four conditions to be fulfilled before proposing the "Atomausstieg": energy prices should not increase significantly, greenhouse gas emissions should not rise, imports should not be necessary, and security of supply should not deteriorate. While these requirements are formulated with a mostly national focus, not meeting them has and will have implications for neighbouring states[23]. Regarding the recent German phase-out decision, Nobuo Tanaka, the former director of the IEA, remarked that Germany should have sought a shared decision with its European partners: *'…Because Germany is interconnected to other European countries, so its decision has an implication for other players around…'*[24].

It is unclear how some of the conditions mentioned by the Ethical Commission will be met. Much will depend on supply and demand conditions in Northwest Europe and the CO_2 price as to what extent the electricity price will increase in Germany and, via the available transmission capacity and market coupling process, in the neighbouring countries[25]. Based on various studies, the Belgian regulator (de Commissie voor de Regulering van de Electriciteit en het Gas [CREG]) expects the electricity price on the spot market to increase by between 5 and 10 Euros/MWh in 2022 in Germany, and – via market coupling – also in Belgium due to the German decision[26,27]. In the short term, the price difference between Belgium and Germany on both the day-ahead and year-ahead markets have gone from generally negative (higher prices in Belgium compared to Germany) to positive in the researched period (through the end of July 2011)[28]. The policy aspect of stabilisation of greenhouse gas emissions could be relatively easy due to the agreed European emission cap. However, scarcity of CO_2 allowances would in itself induce a higher CO_2 price by the increased use of existing coal and gas-fired plants[29]. Due to the length of the planning procedures and investment decisions, it is not difficult to imagine that a national electricity

[21] The eight oldest were closed this year (8.4 GW); the other ones are to be closed between late 2015 and the end of 2021 (12 GW). Between 31 December 2021 and 1 January 2023 8 GW will disappear. See: Bundesamt für Strahlenschutz (February 2011), "Auflistung kerntechnischer Anlagen in der Bundesrepublik Deutschland".

[22] The Atomgesetz is available online: <http://www.gesetze-im-internet.de/bundesrecht/atg/gesamt.pdf>.

[23] Guido Westerwelle, the German Minister of Foreign Affairs, has mentioned that the policy will not have negative effects on neighbouring countries. Subsequently, he has said that he invites his partners to constructive and close cooperation. Het Financieele Dagblad (27/07/2011), "Duitse energiekeuze daagt uit".

[24] Dow Jones Newswire (06/06/ 2011), "IEA Chief: Germany Should Discuss Nuclear Exit With EU" <http://www.firstenercastfinancial.com/news/story/43371-iea-chief-germany-should-discuss-nuclear-exit-eu>.

[25] The energy-intensive industry expects an increase of wholesale prices by 30% before the end of this decade. The Financial Times (31/05/2011). The German research institute DIW computed a wholesale price increase of 22% if all nuclear plants were to end (a rise of 13.6 E/MWh), and 6% if the moratorium would be kept. C. Kemfert and T. Traber (2011), "Atom-Moratorium: keine Stromausfaelle zu befuerchten", DIW Wochenbericht Nr. 20.

[26] Commissie voor de Regulering van de Electriciteit en het Gas (08/09/2011), "Studie over de impact van de sluiting van de kerncentrales in Duitsland tegen 2022 op de elektriciteitsprijzen die in België worden toegepast".

[27] Please note that there is no direct transmission line between Germany and Belgium.

[28] CREG (08/09/2011), "Studie over de impact van de sluiting van de kerncentrales in Duitsland".

[29] See for an example of a more detailed analysis: "Germany's Plan to Phase Out Nuclear Jeopardizes Emissions Goals" <http://thebreakthrough.org/blog/2011/06/analysis_germanys_plan_to_phas.shtml>. On 16 March 2011, the day after the closure of seven nuclear plants, the CO_2 spot price rose by approximately 1.5 Euro per tonne of CO_2 to almost 17 Euros. Until mid-May the price hovered at around 16.5-17 Euros. Subsequently, a decline set in. Currently, the price is far below the level of the first quarter of 2011 (14-15.5 Euros), namely around 7-8 Euros.

shortage within the German borders will emerge without new investments in infrastructure and generation capacity in Germany. At least in the very short term, electricity exports from neighbouring countries have increased. Two weeks after the nuclear plants' closure, Belgium turned from a net importer of gas from Germany to a net exporter of gas to Germany. Under supervision of the German national regulator (Bundesnetzagentur) and in cooperation with the TSOs, a study has been carried out to assess the necessary measures to guarantee grid stability in the coming winters. Although the foreseen measures do not completely rule out the possibility of grid failure, the regulator assesses the challenge as 'manageable'[30]. ENTSO-E points out in both its preliminary and final Winter Outlook Report 2011/2012 that it is concerned about generation adequacy margins for the coming winter, among others, due to the closure of eight German nuclear plants. The organisation of transmission system operators notes that if the winter turns out to be relatively cold, there is a significant risk to security of supply of key areas in Europe.[31]. Summarising, our impression is that the Ethical Commission's conditions are difficult to meet and will have cross-border implications.

Investment uncertainty around lifespan extension in Belgium

Similar to that of Germany, Belgian nuclear phase-out policy of nuclear power plants (6 GW) has been swaying. The outcome has cross-border implications. Due to the combination of a large share of nuclear plants (30% of total capacity) with low base load costs and the uncertain investment climate, almost no investments have taken place and the import of electricity is expected to increase considerably.

In 2003 Belgium passed legislation requiring the phase-out of nuclear power between 2015 and 2025. The policy was based on concerns about safety and waste issues, as well as to support the development of RES energy sources. However, this legislation also enables the Belgian federal government to extend the operational time limits imposed as part of the phase-out, if security of supply were to be endangered. This law is still in force. Two studies commissioned by the government and completed in 2007 and 2009, concluded that the cap on the lifespan of the nuclear plants should be removed. A nuclear extension fee was introduced by the government, which the three nuclear plant owners appealed in the Constitutional Court. In March 2010, the Court endorsed this fee (called repartition contribution). Meanwhile in 2009, the government concluded a 'nuclear protocol agreement' with the owner (GDF-SUEZ) of the three oldest plants. They agreed to extend their lifespan by ten years in return for several kinds of compensation. However, the European Commission asked questions about the protocol[32]. The federal government has considered formalising the nuclear protocol in legislation, but no formal decision was made during the coalition-forming period which lasted almost one-and-a-half years, until December 2011.

The swaying continues. In November 2011 the coalition reached an agreement to adhere to the nuclear exit law of 2003, which states that the three oldest plants must close by 2015, again conditionally upon having enough energy from alternative sources. However, according to CREG this will probably not be the case. Furthermore, they have concurred that the nuclear fee will more than double. Already earlier, GDF-SUEZ announced that a decision has to be taken before the end of 2011, as investments in improvement of the reactors will be necessary to make the

[30] Different scenarios have been tested, and the conclusion is that there is no need to keep one of the old nuclear plants in 'cold reserve' as was the plan at first. Around one GW of coal-fired capacity is available for back-up in Germany, and another GW could be contracted from Austria. Furthermore, it is advised to greatly accelerate the necessary grid improvements.

[31] ENTSO-E (10/10/2011), "European TSOs concerned about system adequacy for this winter". ENTSO-E (24-11-2011), "Power margins this winter: ENTSO-E's winter outlook report shows increased risks; Transmission System Operators increase cooperation".

[32] W. Geldhof and H. Delahaije (2010), "Nuclear energy in Belgium: To phase out or not to phase out", Stibbe.

lifetime extension possible. Recently, the company stated that with these two proposals *'…the Belgian federal government would fail to meet its commitments previously made to GDF SUEZ, as set out in the protocol signed on 22 October 2009...'* and would have to *'...reassess the entire nuclear strategy of Electrabel in Belgium...*[33]*'.*

France as an exporter of cheap electricity

The difference between the marginal production costs of the (largely amortised) nuclear park in France and the current market prices ignited a debate about the correct distribution of the 'nuclear rent' in the context of a liberalised electricity market. This has led to a government policy in which by means of government intervention the tariffs of nuclear electricity are still lower than the wholesale price[34]. The IEA in-depth review of French energy policy remarks: *'…Developing adequate nuclear capacity is (...) dependent on electricity prices reflecting the full costs of nuclear power production, including its development costs…'*[35]. Currently, questions on the service life extension of the existing nuclear fleet are arising in the face of the next multi-annual programme for investing in electricity generation (see also Section 4.3)[36]. This produces uncertainty about the long-term position of nuclear energy in France[37].

The uncertainty is of immediate interest to the neighbouring countries, because France's historic overcapacity has made it a natural exporter of base load capacity. It makes it difficult for producers in neighbouring countries to take investment decisions which optimise their future electricity supply and demand balance. In its Energy Law of 2005, the French government took the decision to install a new nuclear reactor (EPR) by 2012. In July 2008 the President announced a second reactor to be installed by 2017, of which the permitting process is underway. These decisions are clearly driven by the government through the multi-annual investment programme. Meanwhile, the first EPR will not operate before 2014 and the expected investment costs have increased from 3.3 to 6 bln. Euros.

Conclusion

Regarding nuclear policy, it seems that over the past couple of years national approaches have reigned, while cross-border implications have become more visible. In addition to the EU Member States' obligation to notify the Euratom authorities in advance of building a new reactor, as laid down in the Euratom Treaty, similar and other types of coordination could be valuable in case, for example, the shutdown of a plant is considered. Also, coordinating policies to support the transition to a low-carbon electricity system could be worthwhile; this will be addressed in the next section.

[33] Press release Board of Directors Electrabel (25/11/2011) <http://media.bloomberg.com/bb/avfile/r6cpzwoenGcEn>.

[34] The law No. 2010-1488 of 7 December 2010 on the New Organisation of the Electricity Market (NOME Act) requires EDF to make up to a quarter of the nuclear power it produces purchasable by other suppliers. This is to create more competition.

[35] International Energy Agency, "Policies of IEA Countries, France 2009 Review".

[36] See for an elebaration of this issue: RTE, "Generation Adequacy Report on the Electricity Supply – Demand Balance in France, 2011 Edition" <http://www.rtefrance.com/uploads/Mediatheque_docs/vie_systeme/annuelles/bilan_previsionnel/an/generation_adequacy_report_2011.pdf>.

[37] Service life extension is very uncertain. For example, the French Greens (EEVL) and Socialists (PS) have agreed that if they win the elections in 2012, 24 of the 58 reactors will gradually be taken off the grid between 2012 and 2025.

2.4 Future energy policy with cross-border implications: the transition to a more low-carbon energy mix

The EU aims to reduce CO_2 emissions by 20% relative to 1990 levels, increase the share of RES energy in gross final consumption of energy to 20%[38] and increase energy efficiency to 20% compared to projected levels, all by 2020. It is estimated that green electricity will have to account for 34% of the total electricity consumption in order for the overall RES energy target to be met. Several roadmaps towards 2050 serve as an indication of how to reduce the EU CO_2 emission level by as much as 80-95%[39]. For the electricity sector this target would translate in a reduction of CO_2 emissions of close to 100%. To meet this goal, more investments in RES energy sources are deemed necessary. The introduction of these sources is going to be gradual, and systems will have to adapt accordingly. The difference with earlier adaptations in the electricity mix is the management of the variability of the new sources, and the cross-border consequences for transportation, storage and balancing that come with their introduction. It is for this reason that we suppose coordination of policies to be helpful in certain areas. We will illustrate this by focusing on offshore wind energy in particular, because Northwest Europe has a comparative advantage here due to strong and fairly persistent winds. Subsequently, we will look briefly into policy instruments deemed to facilitate a low-carbon electricity system and the possible impact of more variable electricity generation on the natural gas system. In Chapter 5 more coordination areas are introduced.

Policy space overlaps with more wind energy

In theory, the ETS complies with the internal market requirement of being market-based and cross-national (see Chapter 1) to internalise market failures by putting an EU-wide price on carbon. In an interconnected and integrated market, this would result in investments in the cheapest RES plants where they would be most efficiently located based on the price of CO_2[40], making further incentive schemes for RES superfluous. Only if the ETS were to function properly and companies could expect a steady increase of the CO_2 price would this be the outcome.

The 2020 20% RES objective has been transformed into binding national RES targets (see Chapter 3). To achieve these targets and to move towards the 20% CO_2 reduction goal, ambitious plans have been developed in the Northwest European region to increase the share of wind energy in power generation by 2020. Instead of imposing a European incentive scheme, this issue was (explicitly) left to the Member States (see also Chapter 3). As a result, every country in Northwest Europe has implemented a different set of policies to achieve their national targets. Most of these countries are trying to achieve their targets by stimulating also offshore wind. This is partly due to the higher efficiency of offshore wind turbines, and partly because of less complicated permitting procedures. It goes without saying that the targets for 2050 can be expected to be even more ambitious.

The focus by the Northwest European countries on the North Sea for wind energy is understandable, as the availability of wind in this area is around 3500-4500 full load hours per year, as compared to 2000-3000 hours onshore. There are, however, two disadvantages of this strategy: 1) the location of power demand is relatively far from wind power production locations, requiring transport over long distances. These cables run over the sea bed, which raises total

[38] This covers heating and cooling, transportation and electricity generation.

[39] It is argued that this can only be achieved if, among other things, the surface transport sector largely switches from fossil fuels to electricity and the electricity production grows accordingly (See for example: European Climate Foundation and McKinsey & Company).

[40] Also portfolio considerations determine where RES plants will be situated. For example, a company could choose to build wind parks on two locations, which experience on average a year-on-year negative correlation in wind energy production.

investment costs significantly, and 2) wind energy is strongly (positively) correlated across the North Sea area, including onshore, because meteorological fronts usually affect the entire region[41]. This leads to higher balancing costs and increases the necessity for long-term back-up capacity.

Adding significant amounts of wind energy to the power system should be done in a way that minimises the total costs to European society. Arguing along the benefits of specialisation, making such an assessment on a national scale would (arguably) be less optimal than on a larger Northwest European scale. The selection of sites in Northwest Europe should, then, ideally be driven by the best combination in terms of lowest cost of investment, balancing reserves and transmission, and the highest capacity factor of the wind turbine (that is, the site where the most MWh can be produced). A lack of coordination between countries around these issues could lead to the risk that wind farms (and transmission capacity) are installed in a way (and in a country), which is less optimal in terms of total socialised costs. For example, competition between national incentive schemes should be prevented as much as possible[42]. In Box 2 below the cross-border implications of wind energy are discussed in more detail.

Box 2: Policy space overlaps with more wind energy

With more interconnection and more integration, the coordination of adding variable and less predictable RES electricity to the system could be valuable. Due to the fact that electricity itself is oblivious to national borders and that grids will be become even more interconnected, a highly concentrated wind deployment in a specific country can lead to congestion within the domestic transmission system, but also, through interconnections, in the system of neighbouring countries. The implication could be that some of the integration cost of wind are exported.

Furthermore, these new flows and the resulting higher security margins, which are required, could lead to reduced availability of transmission capacity for the market-coupling process. This leads to diverging wholesale prices, which is less optimal from a total society's welfare perspective.

At times when there is a lot of wind in one country, the electricity wholesale spot price of the neighbouring country could lower through the market-coupling process, assuming that there is sufficient interconnection capacity. Similarly, in times when there is less or no wind this price could increase. Wind has very low marginal production costs and, all else equal, replaces higher marginal cost plants on the system when the wind blows, and this in turn is likely to lower wholesale electricity prices. As a result of market coupling, price volatility in the market with a large amount of variable supply will be reduced and price spikes will be softened.

With more integration and the addition of large non-constant sources, the level of price-elasticity of RES electricity supply, which differs per country depending on the support scheme and the balancing regime, becomes more significant. It may be important that RES electricity producers respond to prices (for example by executing wind curtailment) to reduce the total cost of integrating RES.

Coordination in the field of connecting offshore wind to the grid and balancing wind energy could lead to important synergies. In this way, combined grid connection of offshore wind parks, for instance, instead of separate national connections, could be facilitated. The same goes for situations in which transmission investments in a particular country are necessary to accommodate offshore wind in an adjacent country. Whereas the cross-border pooling of balancing reserves can capture synergies, a situation in which countries rely on the same foreign back-up source in their (national) projections should be prevented.

[41] See for an elaboration: Nora Méray (December 2011), "Wind and Gas. Back-up or Back-out, "That is the Question"", Energy Paper, Clingendael International Energy Programme.

[42] During the Clingendael International Energy Conference "Long-Term Energy Strategies of the Countries around the North Sea and the Internal Market" held on 17 November 2011, it was remarked that there are signs of competition between incentive schemes. The bids during a recent offshore wind tendering process seem to be influenced by the support level in other countries.

Capacity mechanisms

With more variable wind in the mix, the availability of which is highly correlated across the North Sea region, prices could become more volatile in Northwest Europe; they could potentially spike more often, but could also turn negative[43]. While price spikes could in theory stimulate investments in back-up capacity, the capital-intensive nature of these investments in more conventional units makes a substantial amount of running hours crucial. Together with the natural tendency of regulators to cap price spikes[44], investments could be considered too risky. To overcome this risk, remuneration based on the electricity produced (kWh) can be augmented by or changed (see next chapter) to payment on the basis of the electricity available (kW) for a certain part of the power fleet, thus providing conventional back-up capacities with a more stable flow of revenues. Again, because policy spaces overlap in the internal market and because synergies can be achieved in terms of lowering the total cost for society, cooperation with regard to price-capping and capacity market initiatives should be contemplated. The extent of coordination is potentially also dependent on the motives for considering it. Capacity mechanisms are not only appraised in order to be able to cope with intermittent RES, but also to be able to deal with base load shortages and increased winter peak (heating)-demand (see Chapter 4).

Measures to complement the ETS

There is one CO_2 credit market in the EU, hence only one CO_2 (spot) price. Unilateral decisions relating to a minimal carbon price, a CO_2 tax or an Emission Performance Standard could have cross-national implications for the European supply and demand of credits. Moreover, they could skew competiveness of industrial sectors within the EU. On this subject, too, coordination could be valuable.

A minimum CO_2 price could theoretically make a country less attractive to carbon-intensive industry, when emitters expect the CO_2 price to remain below this threshold. A CO_2 tax will certainly be considered to be a constant additional cost if it is not adapted to the development of the traded CO_2 price in the rest of the EU. An Emission Performance Standard in one Member State is only disadvantageous for competiveness when the CO_2 price remains below the cost of complying with the standard.

Gas and electricity

The North Sea countries share their interest in natural gas: they use it as a fuel for generating electricity, some of them are producers, and/or they are involved in gas trading in national and regional markets. Adding increasing amounts of variable energy sources to the fuel mix in the Northwest European region will no doubt lead to additional needs for balancing fuels and/or electricity storage devices. Gas-based power generation plants, especially CCGTs, are expected to play an important role in this[45]. The variability of wind power could imply significant short-term fluctuations in gas demand. This may have a major impact on the gas supply system for power generation in the Member States. The predictability of gas flows could decline, while the need for flexibility might increase. Combined with the projection that gas will enter from more routes than previously, this could cause the system capacity demand, including for cross-border interconnections, to increase. The role of spot markets, both day-ahead and intra-day, will gain importance. It might also impact regulatory arrangements with respect to infrastructures (pipelines, storages, nomination issues, balancing periods, etc.). Also, more flexibility could be

[43] In the future the demand for electricity could become even more price-inelastic, as increased electrification is expected in all sectors, notably the heating sector. However, demand-side management could counter this to a certain extend.

[44] Particularly if they feed in through retail prices.

[45] Nora Méray, "Wind and Gas".

required in the contractual relations between suppliers and power generators. In a separate paper CIEP has further analysed the role of gas as a flexibility provider in the power generation system[46].

Governments and National Regulatory Authorities (NRAs) need to be aware of these intensifying power/gas interrelations and the related cross-border effects and challenges. Regional coordination seems an obvious answer. Coordination at the national policy and regulatory level with this focus does not yet exist. Regulators, policy-makers and other stakeholders do work together the context of the Gas Regulatory Initiatives (see also Chapter 5). But all these activities have a 'gas-only' agenda and lack an integrated power sector approach.

2.5 Concluding remarks

From the nuclear policies of the various Member States, it is clear that national approaches prevail despite the cross border-implications of decision-making. Nuclear policy was one of the main reasons why Member States preferred to maintain their competency in the national fuel mix. They agreed on this principle during the negotiations on the Lisbon Treaty, which will be addressed in the next chapter. The EU Council conclusions on the 20-20-20 targets did, however, accept a role for the European Commission in nuclear policy related to safety and nuclear waste issues. With fuel mix decisions now firmly in the national energy policy competency sphere, certain transition paths could encounter the same fate. Certain sustainable RES options could either be blocked or promoted at the Member States level, while the market might want to consider these options. Yet these national preferences come with cross-border implications.

[46] Idem.

3.

Coordination opportunities within European legislation

In the previous chapter we argued that electricity policy coordination among Northwest European countries could be valuable, particularly with the introduction of more variable RES sources into the system. In this chapter, we will explore what opportunities for coordination among (a group of) Member States lie within European legislation. In the next chapters the drivers and approaches of the different national pathways to 2050 will be analysed and current coordination-initiatives will be addressed.

With regard to the EU legal framework on coordination of fuel mix policy between Member States, there are theoretically three possibilities: coordination is compulsory, allowed or forbidden. After exploring these possibilities, we will then focus on cooperation with regard to RES including the extent to which coordination opportunities within the European Directive 2009/28/EC on the promotion of the use of energy from RES sources (RES Directive) is taken to heart in Northwest Europe.

3.1 Coordination opportunities – the general legal situation

Article 194(2) of the Lisbon Treaty

The primary legislation laid down in the Treaties establishing the European Union is effectively the constitutional law of the EU. The treaties allow for the adoption of secondary legislation (directives, regulations, decisions and other instruments) to pursue the objectives set out in the treaties. Therefore, in order to analyse the legal situation with regard to coordination of energy policies between Member States, the relevant articles in the relevant treaties[47] are a good starting point.

Until late 2009, EU secondary legislation related to fuel mix issues, as adopted over the past two decades, was based on two articles: Article 95 on the internal market and Article 175 on the environment[48] (see for an elaboration Box 3). Internal market legislation includes various provisions obliging Member States to cooperate. The RES Directive is based on Article 175(1). The extent to which the coordination opportunities within this directive are employed in Northwest Europe will be assessed in the next section.

[47] These are: the Treaty on the Functioning of the European Union (known as the Treaty of Rome), the Treaty on the European Union (known as the Treaty of Maastricht) and the Treaty of Lisbon, which has amended the two former treaties.

[48] In the Lisbon Treaty, Articles 95 and 175 are renumbered in consolidated fashion to, respectively, Article 114 and Article 192.

Box 3: Article 175 on the environment and Article 95 on the internal market

Article 175 (1) on the environment

Directives on RES energy (see also Section 3.2 below), energy efficiency in buildings and combined heat and power are founded on Article 175(1). It should be noted that this article also has a second paragraph (175[2]), which explicitly reserves the right of Member States (i.e., *'...the Council acting unanimously...'*) to deal with *'...measures significantly* [emphasis auth.] *affecting a Member State's choice between different energy sources and the general structure of its energy supply...'.* If a directive would have been based on that paragraph, then no majority votes could have been possible. Although some attempts were made by certain Member States to revoke Article 175(2) during the negotiations process of the relevant energy directives, in the end they were all grounded on the first section and thus approved by majority vote. This means that these legal acts were implicitly supposed not to interfere significantly with national fuel mix policy.

Article 95 on the internal market

Examples of secondary legislation based on Article 95 are directives and regulations on access to the market and unbundling, such as the Third Package or directives on efficiency standards for products.In this article no similar exemption grounds for majority voting on fuel mix choice such as stipulated in Article 175(2) exists. The legislation that is grounded on the internal market article often contains provisions that make it compulsory for Member States to work together in the approximation of conditions for market access and market surveillance and to notify intentions that may interfere with the internal market. For example, in the Third Package, for both electricity and gas *'...Member States as well as the regulatory authorities shall cooperate with each other for the purpose of integrating their national markets at one and more regional levels, as a first step towards the creation of a fully liberalised internal market...'.*

Since the Lisbon Treaty came into force, all secondary legislation to achieve the three energy policy goals has been based on a new specific article for energy: Article 194[49]. The first paragraph (194(1)) states the energy policy goals, which need to be achieved 'in the spirit of solidarity':

> *'...In the context of the establishment and functioning of the internal market and with regard for the need to preserve and improve the environment, Union policy on energy shall aim, in a spirit of solidarity* [emphasis auth.] *between Member States, to:*
> *(a) ensure the functioning of the energy market;*
> *(b) ensure security of energy supply in the Union;*
> *(c) promote energy efficiency and energy saving and the development of new and renewable forms of energy; and*
> *(d) promote the interconnection of energy networks...'.*

The first section of Article 194(2) specifies that all measures to achieve these energy policy objectives – hence including those that may interfere with the energy mix of a Member State – can be adopted by a qualified majority. However, the second section of Article 194 (2) explicitly gives the right to Member States to decide on their own fuel choices: *'...Such measures[50] shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply...'*.

In the likely event that all future secondary energy legislation will be based on Article 194(2)[51], it can be concluded that codification of certain forms of coordination obligations affecting the freedom of fuel mix choice at the European level is still possible as long as it is not contested by a

[49] For example Regulation 994/2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC is based on this article, as is the new product labelling. Particular reference is made to the second part of this article.

[50] These are measures necessary to achieve the objectives set in Article 194(1).

[51] Hypothetically, compulsory coordination based on Article 114 (old Article 95) could also be used, as it is the only energy-related article in which no fuel mix exemption ground is specified.

Member State. The second section of Article 194(2) could imply that any Member State could challenge secondary legislation attempting to implement such initiatives during the European decision-making process[52]. It could also mean that after ratification of secondary legislation a Member State could try to abstain from implementation or roll back implementation in case it believes affects its room to choose. Furthermore, it could discourage the Commission from proposing coordination measures which potentially interfere too heavily with the freedom of fuel mix choice. In other words, compared to the situation before the Lisbon Treaty it will probably be more difficult to incorporate coordination obligations in the field of the fuel mix in EU law because any of the 27 Member States could restrain the process[53].

Other forms of legally binding coordination

The Treaty on the European Union, together with the Treaty on the Functioning of the European, include the possibility of 'enhanced cooperation' by a minimum of nine nations which prefer to integrate more quickly than others on subjects covered by the treaties, using EU institutions and procedures[54]. Other Member States have the right to join at any time. In theory, this option circumvents the difficulty of reaching agreement among all 27 Member States. However, in practice this option has never been exercised in the energy field and only to a limited extent in other areas. It is argued that because of its procedural rigidity, other forms of reinforced *legally binding* cooperation in the field of energy, outside the EU institutional framework, should be considered[55]: that is, treaties between Member States under international law, for example inspired by the Schengen-regime. However, whether this is possible must be assessed on a case-by-case basis and is dependent on at least five principles derived from jurisprudence[56].

Voluntary cross-border coordination

If coordination is not recorded in EU law and 'enhanced cooperation' or Schengen-like harmonisation is not possible, voluntary coordination among like-minded Member States is also an option. In general it is not possible for EU legislation to forbid coordination between Member States, unless it would infringe on fair competition or interfere with international agreements for which the EU as a whole is contracting partner. In the energy field, competition law plays an important role in the freedom of large companies to act. This can have an indirect influence on Member State policy in cases when such a company holds a dominant position or in other words is the 'national champion'. However, the right of Member States to work together is not directly affected by competition law.

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[52] The exemption grounds are without prejudice to Article 192(2)(c), which entails that measures that were adopted by unanimity on the basis of Article 192(2) (c) indeed can interfere with the choice of fuel (see Box 3).

[53] As mentioned in Box 3, no exemption ground to majority voting on fuel mix issues exists in the internal market article of the treaty (Article 95). It seems that the threshold for "contesting" or trying to circumvent majority voting is lower in this (new) energy Article 194(2) than in Article 175(2) on the environment. As stipulated in Box 3, the threshold in Article 175(2) refers to *'measures **significantly** [emphasis auth.] affecting a Member State's choice between different energy sources and the general structure of its energy supply'*, while in the new article any effect seems to be sufficient: *'Such measures shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply'*.

[54] See Article 326 through Article 334 of the consolidated version of the Treaty of the Functioning of the European Union and Article 20 of the consolidated version of the Treaty on the European Union.

[55] Nicole Ahner and Adrien de Hauteclocque (2010), "Legal Feasibility of Schengen-Like Agreements in European Energy Policy: The Cases of Nuclear Cooperation and Gas Security of Supply" EUI RSCAS, 2010/43, Loyola De Palacio Program on Energy Policy .

[56] Idem.

3.2 Usage of coordination opportunities in the RES Directive

RES Directive 2009/28/EC

In some adopted secondary legislation coordination between Member States on fuel-mix issues is explicitly encouraged. The most prominent example is the RES Directive[57]. Interesting here is that the legal basis is still the old Article 175(1), rather than Article 175(2). As explained in Box 3 this implies that the provisions of the directive are not supposed to interfere significantly with national fuel mix policy. This is rather surprising, as the RES targets are binding and represent a considerable share of the energy mix (see Table A below). The choice of the legal basis has probably been highly influenced by the desire to avoid the requirement of a unanimous vote.

At first sight, the explicit provision that every country can decide in isolation about its own national support scheme and the seemingly arbitrary 2020 RES targets (see Box 4 below for an explanation) suggests that the comparative advantage principle, one of the cornerstones of the internal market, is not acted on in this directive.

Box 4: 2020 RES targets in the RES Directive

Recital 15 of the RES Directive considers it:

> *'...necessary to translate the Community 20% target into individual targets for each Member State, with due regard to a fair and adequate allocation taking account of Member States' different starting points and [*RES energy*] potentials, including the existing level of energy from renewable sources and the energy mix...'.*

The 'potentials' mentioned seem to reflect the internal market spirit by including the comparative advantage principle. Unfortunately, this part is not mirrored in the implementation section of this recital, making the national targets rather arbitrary:

> *'...It is appropriate to do this by sharing the required total increase in the use of energy from renewable sources between Member States on the basis of an equal increase in each Member State's share weighted by their GDP, modulated to reflect their starting points, and by accounting in terms of gross final consumption of energy, with account being taken of Member States' past efforts with regard to the use of energy from renewable sources...'*

The obligatory national RES targets are based on approximately the same growth rate for each Member State (around 11.5%). The table below illustrates this for the Northwest European countries.

Table A. National binding 2020 RES targets. Source: Ecofys (October 2011), "RE-Shaping: Shaping an effective and efficient European renewable energy market".

EU Member State	RES in 2005	2020 RES Target	% increase required
United Kingdom	1.3%	15%	13.7%
Netherlands	2.4%	14%	11.6%
Luxembourg	0.9%	11%	10.1%
Ireland	3.1%	16%	12.9%
Germany	5.8%	18%	12.2%
France	10.3%	23%	12.7%
Denmark	17.0%	30%	13.0%
Belgium	2.2%	13%	10.8%

[57] Directive 2009/28/EC on the promotion of the use of energy from renewable sources.

However, coordination of Member States' policies is actively encouraged in the directive for reasons which are best reflected in Recital 25 of the directive. One of the motives airs the internal market spirit: the production of RES is currently more expensive than conventional energy and should preferably take place at the most appropriate place to minimise extra costs. This is similar to the argument made in the first chapter.

Since the late 1990s several attempts have been made to harmonise these RES support schemes at the EU level in order to integrate green electricity in the total market. In the 2001 Directive on The Promotion of Electricity Produced from RES Energy Sources in the Internal Electricity Market it was pointed out that a 'Community framework' of these schemes is the long-term goal[58]. However, these attempts all failed[59]. The reason was that national production-based subsidy schemes (feed-in tariffs) appeared to be much more effective than demand-side market-based systems (green certificates) because of higher investor certainty. Countries which applied these feed-in tariffs from the beginning, like Germany and Denmark, had a much better take-off in the development of RES energy than countries that applied market-based systems, such as the Netherlands and the UK. Therefore, any effort to harmonise towards a system that would be more in line with a liberalised internal energy market met with fierce opposition of the sector, the majority of the European Parliament and most of those successful countries.

During the drafting and adoption of the RES Directive a similar struggle emerged. The compromise finally adopted is that every Member State can still have its own support scheme. However, coordination among Member States (and third countries) is also provided for, as a way to achieve the national RES targets. It even states that '...Member States should be encouraged [emphasis auth.] to pursue all appropriate forms of cooperation...' and '...such cooperation can take place at all levels, bilaterally or multilaterally...'[60]. The following '...optional [emphasis auth.]...' actions are mentioned[61]:

- statistical transfer of production between Member States;
- joint RES projects with Member States or third countries;

[58] This is best reflected in Recital 16 of Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.
'...It is, however necessary to adapt, after a sufficient transitional period, support schemes to the developing internal electricity market. It is therefore appropriate that the Commission monitor the situation and present a report on experience gained with the application of national schemes. If necessary, the Commission should, in the light of the conclusions of this report, make a proposal for a Community framework with regard to support schemes for electricity produced from renewable energy sources. That proposal should contribute to the achievement of the national indicative targets, be compatible with the principles of the internal electricity market and take into account the characteristics of the different sources of renewable energy, together with the different technologies and geographical differences. It should also promote the use of renewable energy sources in an effective way, and be simple and at the same time as efficient as possible, particularly in terms of cost, and include sufficient transitional periods of at least seven years, maintain investors' confidence and avoid stranded costs. This framework would enable electricity from renewable energy sources to compete with electricity produced from non-renewable energy sources and limit the cost to the consumer, while, in the medium term, reduce the need for public support...'.
[59] National incentive schemes are in principle subject to the state aid rules of Article 87 of the treaty. On RES the EC has accepted that state aid is permitted. *'...But only to the extent that it covers the additional costs and that it is not discriminatory*...', Alexander Italianer, Director General of Competition, recently said. Most feed-in-tariffs applied in Member States were notified as state aid and allowed by decision of the European Commission on the basis of the environmental state aid framework. Only in the particular case of the German feed-in tariff did the European Court of Justice rule, in the 2001 PreussenElektra case, that the German feed-in-tariff was not state aid, as the funds did not come from the state treasury but was a circulation of money by law between *private* companies.
[60] Preamble 35 of the RES Directive.
[61] See: RES Directive Articles 6-11.

- joint support mechanisms; and
- other voluntary coordination between Member States, such as exchange of information and best practices.

Furthermore, an online public transparency platform has been established to promote cooperation between Member States, particularity regarding the flexibility options[62].

Usage of RES Directive coordination mechanisms by the Northwest European countries

Coordination is thus voluntary, and hence left to the discretion of individual Member States. The National Renewable Energy Action Plans (NREAPs) developed in 2010[63] show that all Northwest European countries initially counted on achieving their 2020 targets within their own borders. In these plans, countries indicated interest in using the flexibility mechanisms, without referring to concrete plans (see Box 5 below for an elaboration).

Box 5: Coordination in RES development towards 2020 target – according to NREAPs

In the NREAPs, which were developed in 2010, most Northwest European countries supposed that they would realise their 2020 targets domestically. At the same time, most Member States also indicated the possible benefits of coordination and the use of flexible mechanisms. For instance, Germany and Denmark expected to exceed their targets. The Netherlands and France expected to meet their targets and mentioned that they would investigate the possibilities of statistical transfer with deficit countries.

The United Kingdom saw potential for joint projects concerning offshore wind parks in the North Sea. Denmark began a '...clarification of procedural aspects and agreements within the framework of the Nordic energy partnership, including how the various types of national support schemes can be included in joint projects...'. The Netherlands stated that '...in terms of joint projects, no national policy currently exists, although the Netherlands is open to proposals and ideas from other Member States...' Belgium '...wants to implement internally the largest portion of its 13% target and does not exclude the possibility to call upon the flexibility mechanisms for at most 0.5%...'.

France '...may use the joint projects mechanism with several countries around the Mediterranean, due to its commitments in the Mediterranean Solar Plan (MSP)...'. If necessary, the mechanism would then enable France to exceed its target and the excess capacity would be statistically transferred to a deficit Member State.

Currently, we do not know of any joint support mechanisms or joint RES projects, apart from the joint support scheme of Sweden[64] and Norway[65]. The statistical transfer option will probably be used closer to 2020, if and when it becomes clear that certain countries will not succeed in

[62] See: <http://ec.europa.eu/energy/renewables/transparency_platform/transparency_platform_en.htm>.

[63] In order to attain this target and guide the Member States' efforts, Article 4 of the RES Directive requests each Member State to provide a National Renewable Energy Action Plan (NREAP) by 30 June 2010. This plan comprises an overview of the development of RES energy in the Member States, including an indicative trajectory and detailed outlook on how it expects to meet its 2020 target. According to the RES Directive EU Member States have to hand in a progress report on 31 December 2011 and every two years thereafter.
NREAPs can be found here:
<http://ec.europa.eu/energy/renewables/transparency_platform/action_plan_en.htm>.

[64] In the spring of 2011 Sweden has also indicated that it could have surplus production which could be sold to other countries. It also became clear that Italy is interested in having joint projects with one or more Nordic countries. "Reflections on a workshop in Copenhagen in April 2011 with attendees from across Scandinavia and Europe held by the Working Group for Renewable Energy of the Nordic Energy Cooperation", (09/05/2011).

[65] The system is technology-neutral regarding RES sources. The two countries share the same level of ambition regarding production increases from the date when the common market was put into effect.

meeting their target domestically and if a sufficient level of surplus exists in other countries[66]. The UK has indicated in its recent Reform Package that trade could take place two ways using the RES Directive mechanisms: importing if costs of domestic deployment do not decline and cheaper opportunities arise elsewhere, or exporting if offshore wind energy physically connected to Europe's mainland will materialise[67]. Whereas in the NRAP (see Box 5 above) the Dutch expected to meet the target and possibly end up with a surplus, the Dutch Energy Report of 2011 explicitly refers to the possibility of achieving its RES target via imports of RES energy, either via the EU flexibility mechanisms or otherwise. At the end of 2011, the Dutch Parliament has been be informed of the outcome of a study on this matter[68].

3.3 Concluding remarks

The new energy article in the Lisbon Treaty does not exclude the incorporation of coordination obligations on the fuel mix between the Northwest European countries in future EU law. However, it certainly does not make things easier, because based on the article's exemption grounds potentially any Member State can contest EU legislation in this field. Voluntary coordination between limited numbers of countries is still possible. In future coordination between a limited number of Member States could perhaps be made legally binding under auspices of the 'enhanced cooperation' mechanisms requiring nine Member States or a Schengen-like agreement.

In line with the internal market school of thought, voluntary coordination is actively promoted in the 2009 RES Directive, thereby shifting the responsibility of harmonising RES incentive schemes from the EU level to the Member States. Apart from the joint incentive scheme between Sweden and Norway, however, no Northwest European country seems to have formulated any concrete plans in this direction.

In the next chapter, we will look into the post-2020 coordination potential between the Northwest European countries by addressing – also beyond RES incentive schemes – their long-term policies.

[66] It should be noted that any plans on coordination, also regarding statistical transfer, could be in the pipeline but are not known publicly. Part of the online transparency platform is organised as a strictly confidential discussion platform for national authorities responsible for the implementation of the RES Directive or their nominated representatives.

[67] UK Department of Energy & Climate Change (July 2011), "UK Renewable Energy Roadmap",<http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/renewable-energy/2167-uk-renewable-energy-roadmap.pdf>.

[68] Dutch Ministry of Economic Affairs, Agriculture and Innovation (June 2011), "Energy Report 2011". According to PBL with the current policy an RES share of between 9% and 12% can be achieved domestically, while the goal is 14%. PBL, ECN (2011), "Effecten van het kabinetsbeleid voor milieu en klimaat. Verkenning voor de Motie-Halsema", <http://www.pbl.nl/sites/default/files/cms/publicaties/PBL-notitie%20Doorrekening%20motie%20Halsema.pdf>.

4.

Post-2020 approaches

Several EU Member States are currently working on their long-term (post-2020) energy policies in relation to the European target to realise 80-95% CO_2 emission reductions by 2050 in comparison to the 1990 level. This will probably imply a 100% reduction in the electricity sector. As argued in the previous chapter, intensified coordination between the Northwest European countries could bring benefits because of the cross-national implications of national policies. These benefits are compounded by the introduction of growing vo lumes of variable RES energy into the mix. As a rule of thumb, it is simpler for countries to cooperate if ambitions, drivers and approaches regarding the electricity sector are largely shared. It is therefore important to investigate these. The 2020 policy context serves as a guide towards the longer-term policy direction.

4.1 Need for a long-term approach

The UK, Germany, Denmark, France and Norway have construed a long-term view. The Netherlands formally accepted a European target in 2030 of 40% greenhouse gas emissions reduction relative to 1990, conditional upon sufficient global action and a secure competitive position of the European industry[69]. Belgium has not developed any long-term policy approach[70], except for its position on the phase-out of nuclear energy, as mentioned earlier. A complex division of responsibilities between the federal and regional administrations and the absence of a federal government for more than a year have made it impossible to include Belgium in this analysis.

Integrated long-term strategies are important. They give direction to consumers and producers alike, and it is crucial that they create the political support needed to follow through with the policies[71]:

- Without a strategy, governments don't have a 'story' to tell. And without a story, the general public tends to oppose most fuels. Coal is dirty, nuclear is dangerous, CCS is unknown, wind pollutes the horizon and takes space, transmission lines are ugly and dangerous, solar-PV is too expensive, and gas 'has to be imported from Russia'. Public resistance cannot be tackled without a clear story about the future, how it can be achieved, and what the consequences are of how to preserve a high level of energy service.
- Investments in power generation and infrastructure are being unbundled due to European legislation. Without a clear guidance of investments in generation, investments in infrastructure are only accidentally cost-effective – nobody would consider investing in new trains without knowing whether tracks were available or not. Governmental assessment of climate and security of supply considerations in policy-

[69] Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, Agriculture and Innovation (18 November 2011), "Climate Letter 2050".

[70] International Energy Agency (2010), "*Energy Policies of IEA Countries, Belgium 2010 Review".* The four Ministers of Energy commissioned a back-casting study to achieve 100% RES in 2050. It is expected that the results of this study will be available by summer 2012.

[71] Note that particularly the last two reasons are also arguments for the need to increase cross-national coordination as explained in Chapter 2.

making influence investments in generation. The increasing share of intermittent RES electricity requires a strengthening of the interaction between generation, infrastructure, demand-side responses and/or storage options.
- Without some kind of government direction, lock-ins in power generation are likely to occur. This is not only true for the fuel mix, but also for spatial planning (for instance, will it be obliged to use heat from fossil fuel burning or will CO_2 storage be required – both possible obligations might lead to changes in (dis-) advantages of specific locations).

At a macro level, the five countries with a long-term view all underline the importance of approaching the energy system as an integrated system. They acknowledge that short-term actions should be seen in the long-term perspective and that market forces should determine the fuel mix. At the same time they endeavour to create stability with a fixed and long-term framework for energy policy.

4.2 Main aims and drivers

While principles on a macro level may coincide, the comparison in Table 2 below shows that the hierarchy among driving forces of energy transition approaches differs. The drivers can be divided in the following categories: costs, climate, industrial opportunities, security of supply and ethical considerations.

The ambition to achieve a substantial decrease of greenhouse gas emissions is the main driver of the ***UK*** approach, followed by a clear aim to control costs and stimulate 'clean technology'. Cost control and clean technology development are the main focus in ***the Netherlands***, while the European ambition of an 80% greenhouse gas emissions reduction is acknowledged[72] without further specification. It is remarkable that the government of the country that more or less invented the concept of energy transition in energy policy-making[73] abandoned the framework of an actual long-term approach in the year 2010. The need to control short-term costs, as part of the policy response to the financial crisis of 2008/2009, is so strong that the government commitments to finance long-term investments are being postponed. The Netherlands currently restricts itself to trying to achieve the European 2020 targets. ***Denmark*** has placed security of supply at the heart of its ambition: it wants to be fossil-free by 2050, mainly by stimulating domestic sources. Both climate ambitions and opportunities to develop a clean technology sector go hand in hand with the attempt to realise this aim. The ***Norwegian*** main driver is climate.

To be sure, ***Germany*** underwent fundamental changes in its energy policy ambitions by changing the role of nuclear energy within the space of one year. However, its long-term ambition to achieve a very large share (80%) of RES energy in its power fuel mix by 2050 as part of a greenhouse gas emissions reduction plan with 80-95% has not changed. We have defined the main driver of German long-term energy policy as "ethical", named after the advisory group that argued in favour of intensifying the long-term approach and ending nuclear energy within a decade[74]. The arguments of this advisory group were explicitly ethical by nature. Like in Denmark, climate and clean technology arguments come next. ***France*** had already formulated its ambition to decrease CO_2 emissions, and this remains the main driver of its long-term policy. Industrial opportunities also weigh heavily in actual French decision-making.

The rank order of energy transition motives diverges, as Table 2 shows. In all Northwest European countries the encouragement of domestic industrial opportunities is in the top three.

[72] Ministry of Economic Affairs, Agriculture and Innovation (10/06/ 2011), "Energy Report 2011".
[73] The Ministry of Housing, Spatial Planning and the Environment (2007), "Nieuwe Energie voor het Klimaat, Werkprogramma Schoon en Zuinig".
[74] Ethik Kommission (2011),"Sichere Energieversorgung, Deutschlands Energiewende".

While all drivers are inherently national, this aim can particularly be understood as conflicting with a comparative-advantage approach. Similar to motives such as the reduction of local pollution, employment growth and rural development, industrial opportunities are often synonymous with requiring the location of generation plants within national borders, instead of considering them in the context of comparative advantages. It should be noted that the positions of Denmark and Norway seem to deviate from this practice. Together with other Nordic countries, they have announced their desire for joint efforts to support the development of new technologies with the Top-Level Research Initiative[75]. Furthermore, the Action Programme (see Box 8) states that *'… there is a good basis for joint marketing of Nordic solutions, which can contribute to the region's international competitiveness…'*.

[75] See also Box 8.

Table 2. Ambitions and organising principles in energy policy.

	United Kingdom	Germany	Denmark	The Netherlands	Belgium	France	Norway
Main drivers	1. Climate 2. Costs 3. Industrial opportunities	1. Ethical 2. Climate 3. Industrial opportunities	1. Security of supply 2. Climate 3. Industry	1. Costs 2. Industrial opportunities		1. Climate 2. Industrial opportunities 3. Security of supply	1. Climate 2. Trade opportunities
Main target 2030	• -60% GHG •30% RES energy •electricity fully decarbonised	• -55% GHG •30% RES energy		• -40% GHG (conditional)			
Other ambitions 2030		•50% RES electricity	•100% RES electricity and heat				
Ambition 2050	•- 80% GHG (legally binding)	•Minimal -80% GHG, •60% RES in fuel mix (80% of electricity, 10% CCS, rest peak)	•- 75% GHG in energy system • 100% RES(60-80% wind)	•-80% GHG		•-75% CO_2	•-90% GHG
Illustrative fuel shares 2030 (power)	•40% RES •40% nuclear • 15% CCS •10% other gas (depending on relative costs)	•no nuclear (after 2022), •50% RES •CCS, gas/CHP	•electricity (40-70% of total energy demand): *45% wind *20% heat pumps and solar *35% biomass	•shares of RES, gas, nuclear and coal •some CCS	•no nuclear?	•gas and RES will increase •exact role nuclear unclear	•ban on gas-fired power without CCS
Policy approach	•legally binding carbon budgets •strong incentives for offshore wind •spatial planning promotes onshore wind • green deal to promote efficiency	•decentralisation •monitoring •national dialogue •more R&D •national grid policy •spatial planning onshore wind	•fuel tax •obligations for fuel in district heating	•spatial planning onshore wind •gas roundabout •green deal with communities and companies	•not much coordination between regions and federation	•emphasis on buildings and transport, not on power •pluri-annual investment scheme	•more R&D; •joint green certificate system with Sweden

	United Kingdom	Germany	Denmark	The Netherlands	Belgium	France	Norway
New instruments to influence market structure considered	• CO_2 minimum prices •contracts for differences •capacity market or long-term auction • Green Investment Bank	•no firm intentions •capacity market and carbon law under investigation	•fossil fuel tax			•has already pluri-annual investment scheme •capacity mechanism (capacity obligation already recorded in law, implementation under consideration)	
2020 target	•15%	•17.5%	•30%	•14%	•13%	•23%	•67.5% (not official yet)
2020 share of RES in electricity	•35%	•35%	•60%	•35%	•21%	•27%	•is already almost 100%
2020 target expected to be attained?	•according to CCC: yes	•according to Prognos et. al.: yes	•government expects 33%	•only 8-12%, according to PBL	?	?	?

4.3 Drivers and fundamental approaches explained

It is understandable that if the aims differ, the approaches differ as well. The most archetypal of them will be described. As mentioned in Section 4.1, all North Sea countries approach the energy system as an integrated system and emphasise market forces. A cross-national approach would suit such a view. In this section the extent to which coordination has been taken into account in the different approaches will be addressed.

United Kingdom

The United Kingdom organised its long-term energy policy around the Climate Law. Basic elements of the 2008 Climate Law are[76]:

- A binding greenhouse gas emission reduction target of -80% by 2050;
- The calling into existence of a Commission on Climate Change (CCC), which advises the government on specific five-year 'carbon budgets' and how to achieve them;
- A framework of how and when the government has to respond to this advice, in particular, the foreseen need to always have three five-year carbon budgets in place.

The Commission on Climate Change did already advise on four carbon budgets for the period up to 2023-27. The government of the United Kingdom accepted all of them, albeit the last one with minor changes compared to the advice[77]. The Commission on Climate Change is strongly convinced that a realistic timing of greenhouse gas reduction needs a more or less carbon-free power system by 2030. Carbon intensity of power production should decrease from 500g CO_2/kWh to 50 by 2030, an ambition which has been accepted by most UK stakeholders. The arguments are that:

1. greenhouse gas reduction in power is cheaper and easier to realise than in other sectors;
2. large investments in electricity are needed anyway, so it is better to make them in a carbon-free way; and
3. one cannot wait too long to achieve reductions, as a yearly reduction of 4-5% after 2030 is the maximum that can be expected[78]. The UK government is convinced that early action is more cost-effective than pathways which delay action to closer to the 2050 target date. It is argued that delayed action could lead to higher overall costs due to lock-ins to carbon-intensive technologies and increased pressure on supply chains[79].

[76] Client Earth (2009), "The UK Climate Change Act 2008 – Lessons for national climate laws".

[77] The Commission on Climate Changed advised to adjust the 2013-17 and 2018-22 budgets to reflect a strengthened level of ambition, which did not take place. It further advised to define a 2023-27 budget by domestic action only without relying on the use of international carbon credits. The UK Government confirmed the CCC proposal for the non-traded sector, but decided to meet the 2023-27 budget though domestic action 'as far as is practical and affordable' and to review the budget in 2014 whether consistency with the European Emission trading System is still ensured. If not, it will be possible to align it with the then actual European ETS trajectory. HM Government (2011), "Implementing the Climate Change Act 2008. The Government's proposal for setting the fourth carbon budget. Policy statement". This decision offers more flexibility, but less certainty for investors.

[78] Even this approach assumes a yearly increase in reductions from 0.8% in 1990-2008, 1.5% in 2009- 20 to 4.7% after 2030, which mainly has to be achieved by the fruits of today's innovation.

[79] HM Government (2011), "Implementing the Climate Change Act 2008".

As the main UK government target is to realise greenhouse gas reductions, the exact fuel mix by which this has to be achieved is of secondary interest. Expected costs are the main driver of a sketch of different possibilities (see Box 6[80] for an elaboration).

Box 6: Possible fuel mix within the UK

Both the Commission on Climate Change and the UK government are convinced of the relative cost advantages of nuclear energy: it is expected to be by far the least expensive way of power production by 2020. In other words, nuclear is expected to be the cheapest baseload and mid-merit option, while gas with CCS (carbon capture and storage) and unabated gas plants are cheapest with lower load factors (in a central fuel and carbon price scenario), whereas onshore wind is an attractive investment option in general. They underline the uncertainties of especially offshore wind costs and CCS. A possible fuel mix mentioned by the Commission on Climate Change is 40% nuclear, 30-45% RES, 15% CCS (both gas- and coal-based) by 2030 and the remaining part unabated gas-fired peak production. To achieve its 2020 RES energy target, the United Kingdom is backing especially offshore wind. The Commission on Climate Change is less certain as to whether this is cost-effective and has advised careful monitoring to determine whether offshore wind costs will decrease sufficiently.

In its Renewable Energy Roadmap of July 2011, published alongside the reform package (see below) which also takes other energy consuming sectors into account, the UK focuses on eight technologies which *'...have either the greatest potential to help the UK meet the 2020 target in a cost effective and sustainable way..',* or are of *'...importance to the UK's 2050 energy mix...'*. These are onshore and offshore wind, marine energy, biomass electricity and heat, ground source and air source heat pumps and renewable transport. It is expected that with these eight technologies the UK will produce 15% of its projected energy consumption in 2020, equal to its RES target.

The UK government has also expressed concern that the existing electricity market arrangements will not be sufficient to realise the ambitious level of clean investments. In July 2011 the UK government set out proposals for a ground-breaking Electricity Market Reform in "Planning our electric future: a White Paper for secure, affordable, low-carbon electricity"[81]. This White paper consists of four key elements (see Box 7 for an elaboration[82]):

- A carbon price floor will be introduced in April 2013;
- Feed-in Tariffs with Contracts for Differences (FiT CfD) starting in 2014 for low-carbon generation;
- A Capacity Mechanism;
- An Emissions Performance Standard (EPS).

[80] Box 6 is based on: CCC (2011), "The Renewable Energy Review". CCC (2011), "The Fourth Carbon Budget" and UK Department of Energy & Climate Change (July 2011), "UK Renewable Energy Roadmap". CCC mentions that in 2007-10 onshore wind costs rose by 20%, costs for gas-fired plants (CCGT) by 25%, nuclear plants 40% and offshore wind by a stunning 70%. Coal CCS would not comply with the required full sector decarbonisation by 2050, and therefore demonstration of co-firing with biomass is recommended.

[81] UK Department of Energy & Climate Change (July 2011), "Planning our Electric Future: a White Paper for Secure, Affordable, Low-carbon Electricity" <http://www.decc.gov.uk/en/content/cms/legislation/white_papers/emr_wp_2011/emr_wp_2011.aspx>.

[82] Allen&Overy (2011), "UK Electricity Market Reform".

Box 7: Key elements of the UK reform package

This White paper consists of four key elements:

- A carbon price floor will be introduced in April 2013. In the 2011 budget it was announced to be around £15.70 (€18)/tonne of CO_2, rising to £30/tonne of CO_2 in 2020 and £70 in 2030 (in real 2009 prices).
- Feed-in Tariffs with Contracts for Differences (FiT CfD) starting in 2014 for low-carbon generation. A FiT CfD is a long-term financial contract providing stable and predictable revenue streams for investors in low-carbon electricity generation. The FiT CfD will consist of three parts and leaves space for technology-specific detailing to be determined. For intermittent (mainly wind power) and baseload (especially nuclear) power it will be a two-way mechanism, with support payments to the generator if the market reference price is below a defined strike and an obligation to repay the surplus if it is the other way around. The strike price for intermittent load will be determined administratively but potentially by tenders from 2017 onwards. The reference price will be linked to the day-ahead market. For baseload the strike price will be determined administratively or through bilateral negotiations. The reference price will be linked to the year-ahead market. For flexible generation, (CCS) generators will receive a fixed payment, coupled with a requirement to make difference payments when the market reference price exceeds a defined strike price. This strike price will be linked to the marginal costs of the generation technology. Much detailed design work remains to be done, like the methodology to calculate market reference prices, the level of various strike prices and the length of the contracts.
- A Capacity Mechanism. Two options are under consideration: one is a strategic reserve, in which contracted capacity will be called upon when economically efficient; another option is a market mechanism to conclude reliability contracts which would provide contract holders with fixed payments, while requiring them to make difference payments when the market price exceeds a defined strike price. The reason to introduce this option is two-fold: to accommodate the fact that a quarter of the aging plants are closing during this decade and to deal with the increasing portion of intermittent less flexible low-carbon power inflow. The government expects to take a decision around the turn of 2011/2012. Of course, a relation exists between the capacity mechanism and the FiT CfD, which is what has to be investigated and decided on.
- An Emissions Performance Standard (EPS) to be set initially at 450g CO_2/kWh for new plants and significant refurbishments and life extensions, except CCS demonstration plants. It will not be retrospective and will be subject to regular reviews. The initial EPS implies that unabated coal-fired power plants cannot be built from the second half of 2013 onwards. In the longer term, the EPC could be used to give a clear regulatory signal to reinforce the economic signals as described above.

The UK government expects that the EMR package will be less expensive than the existing financial incentive for RES energy. Instead of raising average consumer bills by around £200 from 2010 to 2030 without reform, this will be limited to around £160.

The publication of the White Paper is the first step in the reform process. Many more detailed decisions have to be taken and translated into legislation[83]. But the Electricity Market reform is an important and even fundamental new approach with a huge potential to provide the clarity and certainty that investors need.

At first glance it seems somewhat strange that the United Kingdom interferes (see Box 7) in the European market. However, it looks as if the UK does not have the luxury for a wait and see approach, since the expected British adequacy problems are large. Previously the UK could use the argument that it was relatively isolated to justify intervention due to limited transmission

[83] Particularly about the potentially complex interactions between the FiT CfD and the capacity mechanism and about the institutional arrangements of the FiT CfD.

capacity. With BritNed and (not very concrete) plans to enhance the interconnection capacity with Northwest Europe to 7.8 GW by 2020[84], policy coordination becomes more appropriate.

While we are not aware of any ongoing coordination concerning the reform package with neighbouring countries, it is clear that the UK is conscious of the cross-national dimension. The Committee on Climate Change acknowledges that interconnection 'with Europe' offers potential for balancing intermittent energy in a cost-effective way and could contribute to security of supply in the face of its capacity market plan (see Box 7). With regard to the latter, it is envisaged that non-UK-based generation could in principle be allowed to participate in a Capacity Mechanism. Furthermore, it will be considered '...*whether there may be circumstances in which it is appropriate to allow other forms of low-carbon generation [offshore wind], developed outside the UK, to be supported by our package of reforms...*'. However, potential (detrimental) impacts on other countries in terms of, for example, investment signals and the electricity price (including through the market coupling process[85]) are not substantially considered. With regard to the ETS it is indicated that the carbon price floor 'complements' the EU ETS. Furthermore, the EPS is considered not to undermine the EU ETS. It plans to engage with the Commission to guarantee that it will be implemented such, that it fully in compliance with EU law.

Germany

The German long-term approach started with an 80-95% greenhouse gas reduction target by 2050 as well, with an emphasis on RES energy. Germany created visible milestones of RES energy ambitions: 30% in 2030 (50% in the power system), 45% in 2040 (65% of power) and 60% by 2050 (80% of power) according to the Energy Concept, published in September 2010. The power system has thus to be close to fully RES by 2050, in addition to some coal-fired power plants with carbon capture and storage[86].

It is somewhat unclear how Germany wants to achieve these targets. Its most visible and well-known policy instrument is the feed-in tariff policy for RES power laid down in the 'Erneuerbare Energien Gesetz' (EEG). By means of this policy instrument, Germany has achieved an increase in RES power from 6.4% in 2000 to 17% by 2010[87]. The end of nuclear energy complicates matters, however. On the one hand, many players in the German arena welcome the decision because of the implied creation of a laboratory for an accelerated switch to RES energy. On the other hand, it is difficult to see how the necessary accelerated increase of RES energy production can be implemented. Between 2000 and 2010 the annual increase of RES energy in the fuel mix has been consistently one percent. Nuclear energy takes 23%. Therefore, the annual increase should double if the nuclear void is filled with RES, regardless of emerging problems of intermittency, spatial planning, system adaptation, and the large increase of capacity. Comparing the scenarios which the German Federal Ministry of Economics and Technology uses before and after the "Atomausstieg", shows that instead of counting on more ambitious RES targets, particularly gas is depicted as accommodating the gap[88].

Another implication of the RES growth is the cost burden of the feed-in tariff. Not only did the costs increase with the larger production of RES energy, also the *average* support for RES energy increased considerably (see Table 3 below). Although the German Ministry of Environment

[84] UK Department of Energy & Climate Change (July 2011), "Electricity Market Reform Impact Assessment" <http://www.decc.gov.uk/assets/decc/11/policy-legislation/EMR/2180-emr-impact-assessment.pdf>.
[85] It is only mentioned that it will be ensured that the reform package will support market coupling, without any further analysis. Idem.
[86] Ministry for the Environment, Nature Conservation and Nuclear Safety and the Ministry of Economics and Technology (2010), "Energiekonzept".
[87] Federal Ministry of Economics and Technology (2011), "Gesamtausgabe der Energiedaten - Datensammlung des BMWi".
[88] Prognos, EWI, GWS (August 2011), "Energieszenarien 2011".

expected several times to be able to announce a maximum level of support for RES energy in the near future, the scenario study published in 2010 sketches a different picture. The average additional cost (the EEG Umlage) has already increased from 1 c/kWh in 2008 to 3.5 ct presently. This is expected to stay approximately constant until 2020, decrease to 2-3 ct in the decades thereafter, and increase again to 4-5 ct/kWh, depending on assumptions of the development of conventional energy prices and the costs of CO_2-allowances[89]. As the additional yearly costs will have to be paid for in 15-20 years, the financial burden is impressive according to this scenario.

Table 3. Nominal additional costs of RES electricity in Germany. Ministry for the Environment, Nature Conservation and Nuclear Safety (2011), "Entwurf EEG Erfahrungsbericht". One has to detract the wholesale price from the average remuneration to calculate the additional remuneration.

	Average remuneration (c/kWh)	**Wholesale price** (c/kWh)	**Total remuneration** (bln €)	**Additional remuneration** (bln €)
2000	8.5	1.9	1.2	0.9
2004	9.3	2.8	3.6	2.5
2008	13.9	6.9	9.0	4.7
2010	15.4	4.4	12.3	8.3

The main cause for the large increase of additional remuneration for RES energy, in addition to increased production, is the popularity of solar-PV in Germany. Solar-PV delivers 9% of German RES electricity but represents 40% of the additional costs. Due to the relatively generous support level as compared with the considerably decreased costs of solar-PV panels – costs fell over 50% between 2006 and 2011 – it became very interesting for German households and firms to install solar-PV. In 2010 alone, 7.4 GW of solar-PV has been installed in Germany. By tying the support level to the volume installed (when more is installed than expected, the support level will decrease more strongly), the German government hopes to control the cost development. For now, this approach seems to be working: between March and May of 2011 'only' about 700 MW of solar-PV was installed, compared to around 1,700 MW in the same period in 2010.

Despite the financial burden which the feed-in tariffs policy puts on consumers (around €10 per household[90] per month), the instrument seems to have German public backing[91]. After lengthy debates about the instrument since the centre-right government took office at the end of 2009, and especially following the decision to exit from nuclear power in May 2011, the feed-in tariff policy is now embraced across the political spectrum as *the* instrument to attain Germany's ambitious RES targets.

It is understandable that the German government is investigating streamlining its national system in the long run with a more coordinated European approach by 2020. One of the main arguments for the ambitious RES energy targets and policy is the conviction that this policy will stimulate German clean energy technology, such as national production of wind turbines and solar-PV equipment. As mentioned before, cost reduction elsewhere could conflict with the development of rural areas and national industrial policy. In theory, it could be less expensive to achieve

[89] Idem, p.130.
[90] Under the assumption that the electricity use for an average German household is 3,500 kWh/year.
[91] Agentur für Erneuerbare Energien (29/08/2011), "Umfrage: Bürger befürworten Energiewende und sind bereit, die Kosten dafür zu tragen"
<http://www.unendlich-viel-energie.de/de/detailansicht/article/4/umfrage-buerger-befuerworten-energiewende-und-sind-bereit-die-kosten-dafuer-zu-tragen.html>.

European RES energy targets in a manner more in line with comparative advantages of the individual countries: it is cheaper to produce solar power in Italy or Spain than in Germany. However, Germany sees the development of decentralised RES energy as a way of providing a new impulse to rural areas. Furthermore, German solar-PV companies have less close links to Spanish or Italian construction and installation companies than to German ones. Germany is anxious that this would negatively influence their competitive position. The visibility of the transition is fundamental to winning and keeping public support: *'…If it were to happen that German money will develop markets in southern Italy and Spain and we end up importing our energy, then the whole transformation wouldn't make sense and it would lose its backing in Germany…'*, as Environment minister Röttgen remarked in January 2011[92]. Germany is also afraid that a more common European approach would mean the end of feed-in tariff policy. To be able to hold on to this system, the Bundesgovernment is against harmonisation[93], at least for now. Possibly a joint approach could become more likely if and when (even) more European countries adopt some form of feed-in policy. Currently, a majority of EU countries has adopted some form of feed-in policy[94]. It should, however, be noted that it is argued that a shared quota system is politically easier to implement than a shared feed-in-system[95].

The Ethical Commission which argued in favour of the "Atomausstieg" also advised the German government to investigate whether additional market incentives such as a capacity market would be necessary to accommodate intermittent wind and solar power influx. According to the energy information provider Energate, the German Economics Minister Philipp Rösler (Liberal Democratic Party – FDP) is rather sceptical, just like the energy regulator Bundesnetzagentur[96], although the 2010 Energiekonzept indicates such a mechanism would be investigated. Also the Monopolies Commission (Monopolkommission) has mentioned in its recent report "Competition in the Gas and Electricity Markets", that capacity market might be contemplated, but overall it was cautious in its remarks, calling for further research[97]. Representatives from the electricity industry are, to put it mildly, critical[98].

With regard to coordination in the Northwest European realm it is important to note that the scenarios of the Energy Concept expect 20-30% of the German power demand in 2050 to be imported (RES energy due to lower costs in southern Europe, but also nuclear energy)[99]. To accommodate this, interconnection capacity could increase 2.5-fold. Because of the necessity to store energy to accommodate the increasing share of variable RES sources, Germany is looking to Switzerland, Austria and Norway to make use of their favourable conditions to store energy in

[92] Stefan Nicola (31 January 2011), "Germany's Coming Civil Energy War" European Energy Review.

[93] Handelsblatt (31/01/2011), "Europäische Energiepolitik braucht noch Zeit" <http://www.handelsblatt.com/politik/international/europaeische-energiepolitik-braucht-noch-zeit/3820146.html?p3820146=all>.

[94] Mario Ragwitz, et.al. (2010), "Recent Experiences with Feed-in Tariff Systems in the EU – A research paper for the International Feed-In Cooperation", (A report commissioned by the German Ministry for the Environment, Nature Conservation and Nuclear Safety) Fraunhofer ISI, Ecofys and EEG <http://www.feed-in-cooperation.org/wDefault_7/download-files/8th-workshop/IFIC_feed-in_evaluation_Nov_2010.pdf>.

[95] EWI (April 2010), "European RES-E Policy Analysis. A model-based analysis of RES-E deployment and its impact on the conventional power market".

[96] Stadtwerke Bochum (21/09/2011), "Rösler sieht Kapazitätsmärkte kritisch" <http://www.stadtwerke-bochum.de/index/energiewelt/energie/energienews/116615.html>.

[97] German Energy Blog (29/09/2011), "EFET Demands Strengthening of Market-Related Mechanisms Instead of Capacity Markets" <http://www.germanenergyblog.de/?p=7383>.

[98] For example, the Norwegian electricity producer and wholesale trader Statkraft has rejected the idea. See: <http://www.statkraft.de/images/Statkraft_Capacity%20Markets_tcm21-17867.pdf>. RWE has commissioned a study by Frontier, in which it is concluded that for now the cost are too high. See: <http://www.frontier-economics.com/europe/en/news/1146/>. EFET has also spoken out against capacity markets. EFET Germany (28/09/2011), "Kapazitätsmärkte – Keine überstürzten Eingriffe in den Markt!".

[99] Prognos, EWI and GWS (2010), "Energieszenarien fuer ein Energiekonzept der Bundesregierung".

pumped storage hydro plants. Furthermore, Germany refers to the Pentalateral Forum to resolve grid issues with its neighbouring countries to the West.

Denmark

Denmark has a strong tradition of prioritising security of supply policy. Already in the 1980s it stimulated district heating networks and wind electricity for this reason. Advised by a Climate Commission in September 2010[100], the government decided to move 'from coal, oil and gas to green energy' in February 2011, stating that all energy has to be renewable by 2050[101]. The new government, installed in autumn 2011, endorsed this aim. Part of this ambition is that 60 to 80% of electricity has to be powered by wind; the remaining part to be biomass in CHP. One of the 'hidden secrets' of Denmark is the realised stabilisation of overall energy demand for several decades[102]. It endeavours to reduce energy demand by 6% by 2020. The main instrument of this transition is, in addition to strong regulation, a new and gradually increasing tax on fossil fuels, to partly fund subsidies for RES energy. This tax is expected to result in both an increase in RES energy and a decrease in fossil fuel demand, plus a further electrification of the energy system[103]. R&D also plays a central role in Danish climate policy.

One of the principles on which the transition is based is that it will 'exploit all the advantages of being part of an international energy market', acknowledging that the goal is not to become self-sufficient. Denmark pursues further integration of the Northern European electricity market, especially with Norwegian and Swedish hydropower for the integration of wind[104]. The Climate Commission has stressed that coordination should be central regarding the connection of offshore wind parks to arrive at the most cost-effective expansion of international electricity transmission grids. In the energy strategy, the Danish government has indicated that the Krieger Flak, an area in the Baltic Sea, can be realised as a joint project between Denmark and Germany (and possibly also Sweden). While it is becoming clear that nuclear is not an option on Danish soil, it explicitly accepts that it will import electricity from countries with nuclear energy in the mix. On biomass Denmark mentions that the availability can come under pressure. Furthermore, it emphasises that it is committed to working against green protectionism. However, no concrete measures are proposed in this field. While Denmark is part of the Nordic Energy Cooperation, it makes no reference to it in the 2050 energy strategy[105].

Norway

Norway has the ambition to become fully carbon-neutral by 2050 (taking into account its contribution to emissions reductions abroad) and, if a sufficient number of other countries take on adequate obligations, to bring this target forward to 2030. Currently a draft resolution on the RES Directive under the auspices of the European Economic Area (EEA) is on the table. In the

[100] Klimakommissionen (2010), "Green Energy – the road to a Danish energy system without fossil fuels".
[101] Danish government (February 2011), "Energy Strategy 2050 – from coal, oil and gas to green energy". It should be noted that the roadmap makes clear that this does not exclude the CCS-option.
[102] The European Odyssee-Mure project has looked at energy efficiency in the four countries. In 1997-2007 the Netherlands was the only country with an increasing primary energy demand. Energy intensity declined most in the United Kingdom. However, energy efficiency improved most in the Netherlands (1.4% yearly) and Germany (1.3%), against 0.8% in the United Kingdom and Denmark. A large part of the Danish achievement can be explained by a somewhat lower economic growth and to behavioural changes. See: Ademe (2009), "Overall Energy Efficiency Trends and Policies in the EU-27".
[103] The Danish Climate Commission suggested introducing a temporary compensation scheme for existing power plants to prevent an increase in electricity imports. The government introduced a more general tax reduction for energy-intensive industry.
[104] Danish government (February 2011), "Energy Strategy 2050".
[105] Idem.

draft, Norway's RES energy share should be 67.5 percent by 2020[106]. The Norwegian electricity sector is already almost carbon-neutral with 97% hydro in 2009[107]. Depending on rainfall and reservoir inflow, hydropower availability can fluctuate. In general, there has been a close correlation between water inflow and net electricity trade. Electricity trade has a diurnal pattern: Norway generally exports during the weekdays and imports during the nights and in the weekends.

The importance of Norwegian hydro capacity as one of the backup sources will potentially increase over time as more variable generation is added to the Northwest European system. In this respect interconnection plans are imperative. Stattnet, however, announced in August 2011 that the enhancement of interconnections to Germany (1000 MW), the Netherlands (700-1400 MW) and the UK (1600 MW) will be postponed and that instead of two lines, only one line to Germany will be realised[108]. The main reason for this decision is internal congestion in the south of Norway[109].

Another issue is the investment and usage of hydro capacity. Regarding the latter, the IEA recommends Norway to think of using its capacity primarily for regional balancing purposes instead of all day (base load capacity). Furthermore, it suggests that the Norwegian government rethink its decision to not permit new gas-fired plants without carbon capture and storage (CCS), as this effectively excludes the gas option in the near future[110]. While both approaches are understandable from a national climate-neutral point, at moments of low hydropower availability, power is often imported from countries with a lot of coal in the mix[111].

France

France set its target to cut its CO_2 emissions by 75% between 1990 and 2050 in the Energy Law of July 2005. In that same legislation, specific targets for energy efficiency and RES energy were defined. In addition, the French government developed a programme in 2007, the "Grenelle de l'Environment", which created a framework of policies and measures. This has led to two legal commitments: Grenelle 1 and 2. Grenelle 1 sets general policy, while Grenelle 2 specifies targets and actions, particularly in the transport and the buildings sector because these sectors account for the largest share of greenhouse gas emissions[112].

French policy already has certain features which fall under the category 'capacity market'. First of all, Article 2 of "The Law on the New Organization of Markets in Electricity"(NOME) adopted in November 2010 introduces a capacity obligation for all electricity suppliers: every supplier *'…must provide direct or indirect guarantees of demand-response or electricity generation capacity that can be activated to create a balance between generation and demand in continental France…'.* RTE, the French TSO, considers the capacity obligation very important for the projected continuing rise in electricity peak demand due to electric heating[113]. Regarding the

[106] Ministry of Petroleum and Energy (21/07/2011), "Target of 67.5 Percent for Norway's Renewable Energy Share by 2020" <http://www.regjeringen.no/en/dep/oed/press-center/press-releases/2011/target-of-675-percent-for-norways-renewa.html?id=651715>.
[107] In 2008 hydropower accounted for 99% of total generation.
[108] A 700 MW link to Denmark is planned to be operation in 2014. With Sweden the plans have met a lot of delay and according to the latest plan are scheduled to be online in 2016/2017 (1200 MW).
[109] Energeia (18/08/2011), "Statnett herziet strategie interconnectoren: NorNed 2 op de lange baan".
[110] International Energy Agency (2011), "Energy Policies of IEA Countries, Norway 2011 Review" .
[111] It should be noted that on a regional scale, the carbon credit price combined with the fuel price of gas and coal is very important. Coal will only be pushed out of the merit order instead of gas if the carbon price is high enough, as fuel price of coal is today generally cheaper than gas and fuel cost particularly determine the sequence in the merit order. See for an elaboration: Nora Méray, "Wind and Gas".
[112] International Energy Agency (2009), "Energy Policies of IEA Countries, France 2011 Review" .
[113] RTE, "Generation Adequacy Report".

European context, it has been mentioned that interconnection will be taken into account and that France is *'… very interested in having some exchange on the capacity mechanism...'* It is expected that in 2012 an implementation decree will be issued with more details on the mechanism[114]. The extent to which coordination with other countries has been taken into account will then become much clearer.

Secondly, the "Programmation Pluriannuelle des Investissements" (PPI), which identifies investment needs in electricity generating capacity from the point of view of energy security is important. If actual installed capacity of a certain technology exceeds the politically desired amounts, the government has the possibility to temporarily suspend authorisations or, in the case of RES energy, suspend authorisations of new guaranteed purchase contracts. If the government considers installed capacity to be too low, it has the option to issue bids for tenders for plants of a desired type. The winning bidder would receive a long-term contract that guarantees a fair return on investments[115].

In its 2011 edition of the France adequacy report – which also functions as input for the PPI – RTE included for the first time an assessment of future supply-demand based on a larger scale than France alone. RTE has, for example, taken the German nuclear decision into account[116]. It would be useful if the next PPI will have a broader focus. This would also be consistent with the fact that France seems to be the front-runner in setting up an EU power coordination group (see Section 5.1).

The Netherlands

The Netherlands currently does not have an actual long-term approach in its energy policy, other than the one on gas markets. This is partly due to its emphasis on cost reductions, but also to a recent uncoupling of energy and climate policies. The current Dutch government is of the opinion that energy and climate ambitions and policies are distinct issues. Therefore its recent energy White Paper[117] did not deal with the period after 2020. While an orientation on a long-term approach was laid down in the recent Climate letter 2050[118], the fact that the current government has a restricted brief and needs to 'shop in parliament' for majorities for its policy proposals has led to caution. In the meantime, the Dutch tradition of energy transition has shifted to energy innovation. Transition teams of electric vehicles and 'green gas' – both supposed to have comparative advantages in the Netherlands – are still on track.

The Netherlands perceives itself, perhaps more than its neighbours do, as a part of the Northwest European energy system. It allowed investments in coal-fired plants to take place, based on its comparative or locational advantage of being situated at sea and on the expectation that older plants would be closed and investments in CCS would be feasible, offering opportunities for the Netherlands. The government also endeavours to generate investment in nuclear capacity, because it expects nuclear to be an important part of the Northwest European fuel mix. Currently, the country is struggling with expanding RES energy because the Dutch government has installed a strict financial cap on the level of subsidies in the next few years. Hopes are that a system of obligations (on biomass in coal-fired plants, possibly to be extended to low-cost options in general) could be a useful addition to the other schemes. The government has mentioned that it sees RES development in a European perspective, without subsidy

[114] Idem.
[115] IEA (2009), "France 2011 Review". Republique Francaise (2009), "Rapport au Parlement, Programmation pluriannualle des investissements de production de l'electricité, Periode 2009-2020".
[116] RTE, "Generation Adequacy Report".
[117] Ministry of Economic Affairs, Agriculture and Innovation (10/06/ 2011), "Energy Report 2011".
[118] Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, Agriculture and Innovation (18 November 2011), "Climate letter 2050".

competition and with an eye for comparative advantages. It favours European harmonisation for incentivising RES energy.

4.4 Concluding remarks

Six Northwest European countries have ambitions to transform the energy system within a few decades. Main drivers differ, however. The United Kingdom aims for efficiency in the approach, Germany has strong ethical considerations and promotes RES energy, Denmark wants to become independent from fossil fuels, France and Norway have strong ambitions to decrease greenhouse gas emissions, and the Netherlands does not want to outlay too much public money. The ambitions do not reflect current realities, as Denmark is currently heavily dependent on coal and Germany still has a large share of nuclear in the mix. The Netherlands does not have a true long-term approach yet, which infers that its ambitions relatively match current circumstances with a high share of gas in the fuel mix. Industrial opportunities play an important additional role in the ambitions of the countries. All of them are aware of the potential and therefore necessity of international coordination, but for now this is only marginally reflected in their actions. Moreover, the motives to develop certain new instruments differ, which could influence the possible scope of coordination. For example, while capacity mechanisms are examined in France to accommodate increasing winter-peak demand, the UK is mainly focused on coping with the expected base load plant closures and Germany's primary driver is managing the backup for variable wind and solar supply.

5.

Recommendations on coordination and concluding remarks

5.1 Current coordination initiatives

Coordination models to date have been applied with varying degrees of success, both from a bottom-up as well as a more top-down approach. Some of these initiatives, relevant to the current discussion on regional coordination, will be perused and then placed in the perspective of the countries around the North Sea in the recommendations.

Florence (gas) /Madrid (electricity) Fora

Under EC leadership, bi-annual meetings with all stakeholders are held to monitor and discuss the implementation of relevant directives, regulations and other initiatives in the field of liberalisation. The meetings deliver important contributions to furthering formalised decision-making.

Regional Initiatives

On the initiative of ERGEG, various regional platforms[119] have been created as bottom-up initiatives to identify regulatory gaps and practical solutions. They were set up as intermediate steps in the process to a single internal market. Participation is voluntary. Participants primarily come from the regulatory, TSO and market-party communities. The European Commission and national governments are only active on the sidelines. A light-handed monitoring process by ACER tries to ensure that the single market paradigm is maintained. Reports on progress are made in the Florence and Madrid Fora.

In electricity, the focus is largely on congestion management (including long-term, day-ahead and intra-day allocation and capacity calculation), balancing and transparency. Only in the Northern region[120] has the integration of wind-power been considered. However, according to consultancy firms everis and Mercados[121], limited progress has been made on this subject. With gas, subjects such as congestion management, investment in new infrastructure, interoperability and transparency have been generally addressed[122].

The Pentalateral Forum

This energy forum is an intergovernmental initiative (Benelux, France and Germany) with the goal to enhance the cooperation between all relevant parties in order to create a regional Northwest European electricity market as an intermediate step towards one common European electricity market. It is supported by an independent secretariat[123] and works pragmatically towards the

[119] For electricity there are seven platforms: Baltic, Central-East, Central-South, Central-West, Northern, Southwest and France-UK-Ireland. For gas there are three platforms: Northwest, South and South-Southeast.
[120] The Northern region consists of Denmark, Finland, Norway, Sweden, Germany and Poland.
[121] Mercados and everis (28/04/2010), "From Regional Markets to a Single European Market", p. 50.
[122] Idem.
[123] This function was laid down at the Benelux Secretariat. See:
<http://www.benelux.int/nl/dos/dos14.asp>.

accomplishment of its objectives. These are mainly the removal of barriers for market integration and improved security of supply. The resulting process of market coupling and explicit auctioning for long-term capacity allocation along Northwest European borders became a success story and a precedent for the rest of the internal market.

The forum meets regularly at a ministerial level and is supported by several task groups, in which regulators, TSOs, market parties and power exchanges also participate. The forum provides the relevant political umbrella for the various arrangements, agreements and practical understandings made by the actors in the market. The forum has no mandate to initiate legal arrangements, such as ones that might be appropriate for regulatory harmonisation. It does not have a mandate to discuss energy policy issues such as the fuel mix. Initiatives have been taken to create a similar forum for gas, which would include the United Kingdom. However, no feasible results have come from this initiative as of yet.

The North Sea Countries' Offshore Grid Initiative

In late 2010, energy ministers from countries around the North Sea[124] signed a Memorandum of Understanding (MoU) in order (among other things) to *'…facilitate a strategic and coordinated development of the offshore and onshore grids to ensure more cost-effective and sustainable investment…'* and *'…to tackle barriers to grid development at both national, regional and EU-level, in particular regulatory, legal, market, planning, authorization and technical issues…'*. In separate statements, the TSOs (ENTSO-E), ACER and the NRAs have supported the objectives of the MoU and have offered their cooperation. A secretarial support function of this initiative has also been laid down at the Benelux Secretariat.

Bilateral approaches

There is no doubt that at the bilateral level, frequent contacts occur between national governments and their policy-makers. It is questionable, however, as to what extent these contacts happen on a structured basis and, in particular, are dealing with the relevant cross-border issues in the context of the Northwest European market.

(Ir)regular contacts in a wider sense, where academics, think tanks, industry and policy-makers meet and discuss, may also be relevant. One example of this is the French-Dutch Cooperation Council that sometimes meets specifically on energy issues. The Netherlands has voiced its desire to organise a similar platform with Germany.

It should be noted, however, that these bilateral initiatives are sometimes hindered due to different national mandates of the ministries involved. In the UK, for instance, one ministry covers almost all climate and energy policies (Department of Energy and Climate Change). In the Netherlands climate and energy policies are separated. In Germany the competences for RES energy lie with the Ministry for the Environment, Nature Conservation and Nuclear Safety, whereas the other energy policy issues are dealt within the Ministry of Economics and Technology.

Future EU coordination – EU Electricity Coordination Group

At an informal meeting of the EU Council of Ministers for Energy in Poland on 20 September 2011, France and Germany called for the formation of a European group which should monitor electricity projects with a potentially large impact on European markets: *'from price competitiveness and grid balancing to carbon cutting targets'*, according to the energy news service Platts. This group is expected to consists of grid operators, government representatives

[124] These countries are Belgium, Denmark, France, Germany, Ireland, Luxemburg, the Netherlands, Norway, Sweden, and the UK. The European Commission is also involved.

and regulators. Furthermore, the French energy minister, Eric Besson, prompted his colleagues to set up a European organisation to monitor winter supply-demand balance and proposed that EU Member States become more transparent by publicising their long-term investment plans[125]. Three days later, Director General of DG Energy of the European Commission Phillip Lowe said that in creating an electricity coordination group the Commission wishes to ensure interactivity between national and EU policies[126]. It remains to be seen as to whether this coordination group will deliver much result, due to the variety of issues that inevitably crop up in such a large EU-wide forum. The dilemmas presented in trying to combine regional coordination, in which pragmatic solutions for – often localised – problems are sought and found, and EU-wide coordination, where more entrenched positions can be expected, is clear. The different levels of cross-border integration, the types of market players and the expected benefits from coordinated policies with regard to sustainable energy play a larger role in an EU-wide grouping, while at a regional level certain disparities can more easily be overcome.

In conclusion

It may be clear from this list that a number of policy discussion platforms are functional; yet although they all have 'electricity' in their terms of reference, the underlying policies are not addressed in these platforms, neither in the forums with a broader agenda nor in the more geographically-specific initiatives. Hence, these platforms are not designed (or allowed) to discuss the broader objectives and interactions of energy policy concerns and the fuel-mix developments in the Northwest European region. It might therefore be appropriate to explore possibilities for enhancing regional cooperation beyond what is already in place.

5.2 Recommendations for the way forward

It would be useful to explore possibilities for broader cooperation, both in the context of governments and of think tanks which could help to develop fresh ideas and new inputs into ongoing debates. It is important to assess the different possible levels of cooperation between governments, regulators and TSOs and subsequently look at more joint approaches in the European debate. Finally, we stress the importance of the simpler level of cooperation, between think tanks and academics, to further the shared perspectives where possible.

5.2.1 Cooperation between governments, regulators and TSOs

Discussing the options for enhancing policy cooperation between members of the EU should not neglect the existing EU mechanisms. These exchanges take place in formal and informal gatherings within the context of the EU Council or the EU Commission. However, with 27 members, their government representatives and administrations, it is not always practical or useful to pursue EU-wide exchanges on all issues, due to the large differences which exists within the national structures, arrangements and practices, let alone the vast differences in interests between all these actors.

Instead of immediately resorting to harmonisation at the European level, the interactions between countries could easily lead to the slowest country determining the pace of coordination. Instead, we support a more pragmatic approach and propagate 'differentiated coordination': that is, coordination among Member States at different speeds. This is a less advanced form of the concept of 'differentiated integration' such as Schengen. Examples of such instruments are voluntary agreements, different forms of self-regulation, soft law, and open methods of

[125] Robin Sayles (21/09/2011), "France, Germany call for European group to monitor power decisions", Platts.
[126] See: <http://www.epc.eu/events_rep_details.php?cat_id=6&pub_id=1340>.

coordination. The latter revolves around voluntarily adopting best practices of other Member States via peer review, benchmarking and guidelines[127].

The difficulty of reaching agreement among a large group of stakeholders from the Member States also became apparent in the general proceedings of the Florence Forum. Seven Regional Initiatives for Electricity were created, as elaborated on in the previous section, in an attempt to create a more practical mechanism or process to solve cross-border issues en route to market integration. However, these regional initiatives mainly focused on regulatory issues and not so much on the underlying policy issues.

Therefore, certain issues concerning market integration at the regional level could not be left to the discussions between regulators, TSOs and market parties alone; some political direction was deemed necessary as well. The Nordic countries were front-runners in this politically oriented process, using the already existing wider political cooperation of the Nordic Council of Ministers. In the context of the Nordic Council, in addition to cooperation of the TSOs and the regulators, the Council also provides a political umbrella. This includes the coordination of wider energy policies, including coordination on integrating RES into the system (see Box 8 below). A similar political umbrella was provided by Spain and Portugal when a single Iberian electricity market was created, but the implementation was nevertheless somewhat uneven.

Box 8: Possible example for future cooperation – Nordic Energy Cooperation

'…The Nordic Energy Co-operation will be a strong and active player in the development of energy policy in the Nordic region and the EU…' In 2004, the Nordic energy ministers adopted this vision, which was to constitute the basis for cooperation between them. There has been no legal basis for the coordination. The cooperation stands on consensus and common understanding.

Of the Northwest European countries considered in this paper, Norway and Denmark are involved in the Nordic Energy Cooperation. Most achievements in the harmonisation process concern the internal market. It can be argued that the Nordic market is the most advanced market in terms of integration. Particularly interesting here is that cooperation is not limited to market liberalisation but also includes RES and other issues. The other Northwest European countries should also consider such wider cooperation beyond internal market issues.

The wider focus is illustrated by the latest Action Programme (2010-2013), which guides coordination between the Nordic countries. This programme identifies six fields of cooperation:

- A borderless Nordic electricity market with a focus on integrating wind energy. They also pursue closer cooperation with neighbouring countries on internal market issues.
- Promoting RES energy through joint efforts. Coordination of initiatives and tools should be endeavored as far as they bring benefits. Cooperative research on RES Directive implementation (including the flexible mechanisms mentioned in Section 3.2) will serve as a basis for joint initiatives. Harmonisation of planning and approvals processes and cooperation on the conditions for offshore wind power is also pursued. Other areas of cooperation are geo-thermal energy and RES energy in transport systems.
- International cooperation. This particularly consists of having one voice in the EU/EEA, internationally marketing the region's energy solutions and cooperation with its adjacent countries, particularly the Baltic States and Northwest Russia.
- Energy efficiency.
- Sparsely populated areas.
- Research and technology development, such as the Nordic Energy Research institution.

[127] Andrew Jordan and Adriaan Schout (2006), "The Coordination of the European Union: Exploring the Capacities of Networked Governance".

When the Dutch and Belgian TSOs started to explore the mutual benefits of the creation of a Benelux Electricity Market, the regulators of the two countries were not able to join that process, and hence the two governments had to step in. A Benelux-market, however, was soon considered unfeasible without the involvement of the French and German markets as well. Therefore a set of MoUs was concluded between the various capitals and the Pentalateral Forum was created, which included actual deliverables in the field of market integration.

Keeping in mind the model of the Pentalateral Forum, we will explore options for enhancing energy policy cooperation in the Northwest European region. Such policy cooperation particularly includes the transition to a low carbon future. We will distinguish five different options, ranging from merely information sharing to developing joint policies. Table 4 contains a summary of these five options.

Table 4: Recommended degrees of cooperation.

Degree of cooperation:	**Focus:**	**RES energy**	**CCS**	**Nuclear energy**	**General and networks**	**Process**
Sharing information		•sharing of information •looking at impact on neighbouring countries before new policies are instigated				•MoU
Coordination		•timing of tenders •coordination of level of support	•joint investigation of storage opportunities	•joint investigation of storage opportunities	•joint balancing •joint investigation of which investments are needed	• MoU
Coordination plus		•one philosophy on support	•one philosophy on the need of an Emission Performance Standard and/or a minimum CO_2 price	•reflections on the place of nuclear	•joint cost/benefit analysis on infrastructure	• MoU
Joint instruments		•joint support system	•joint support system •joint storage approach	•joint ultimate support system	•one capacity market •one TSO	• MoU •joint policy instru-ments
Joint policy		•common goals and policies in power (not necessarily in issues of local interest such as heat)				•joint policies

In addition to the current situation in which no formal cooperation is taking place among the Northwest European countries (other than on internal market issues), five levels of possible cooperation can be distinguished. As long as the main drivers of energy policy differ, we conclude that options 4 and 5 cannot be expected to have much success, but options 1-3 are worth exploring.

Sharing information

A first level of cooperation is to share information – this is potentially relevant for all fuels and infrastructure in the power sector. If this had been the case, Germany would have informed neighbouring countries of its intentions before deciding on a phase-out of nuclear power, and the United Kingdom would have communicated its intentions before proposing a new electricity market design, as both decisions have a clear impact on power production and the investment climate in other countries. Information would be shared on all issues for which such external effects exist. A limited amount of information sharing has taken place in the Pentalateral Forum by the Netherlands, Belgium, Luxemburg, France and Germany. Information on expected capacity decreases and increases has been exchanged and interconnections have been used more efficiently. Eventually, the completion of the market coupling process of electricity markets will be realised. If the United Kingdom, Norway and Denmark were to join this activity, the information issues would become broader. No coordination would take place automatically, however. It simply is sharing of policy information. The way in which this process is organised could be described in a Memorandum of Understanding.

Coordination

One step further would be towards some kind of coordination. This would probably require a strengthening of the Pentalateral Forum, if it were to take place in that setting, maybe in combination with more specific cooperation in the North Sea Countries' Offshore Grid Initiative (NSCOGI). Because both are facilitated by the same (Benelux) secretariat, creating more synergies could be straightforward if the political will is there. Knowledge and information could be developed jointly, for instance about what kinds of investments are needed (complementary to the process organised by ENTSO-E), and what storage facilities (for CO_2, nuclear waste and possibly electricity) are available. Tendering processes for offshore wind could be coordinated to ensure that one country does not tender at the same time as another. The way in which the necessary levels of support for RES energy are computed could be investigated, including whether these differ between countries, and if so, why this is the case. It could be agreed that major changes in the incentive systems will be made only after consulting the partner countries. In this way a gradual alignment could take place and could eventually lead to voicing joint opinions in European discussions. With more variable energy, system operation and the continuous balancing needs would increasingly lead to cross-border impacts. This would require strengthening of cross-border TSO-cooperation at regional levels, potentially going much further than what is currently developed. Moreover, it could have a major regulatory impact, and hence potentially influence regulatory mandates. This last issue is a role for governments, demanding coordination of their legal instruments. Yet countries would still take all decisions individually and no joint institutions would be developed; they could draw their own conclusions from joint or shared analyses. Again, a Memorandum of Understanding could be the framework to organise this manner of alignment. It might also be useful to explore the lessons learned from the Nordic Council.

Coordination plus

A third option would be what we coin 'coordination plus'. In this type of coordination, neighbouring countries would search for common policy considerations. Support schemes for RES energy are a good example. The United Kingdom, for instance, considers introducing a feed-in premium (as the Netherlands has), while Germany is investigating a combination of the existing feed-in tariff with a premium. However, the Netherlands intends to end the feed-in premium and to introduce some kind of obligation for suppliers, which the United Kingdom intends to abolish. This example shows that Member States are still seeking for a scheme which incentivises RES production but is not too costly and does not creates windfall profits. Sharing and comparing information about the pros and cons of the schemes in use could be a great help. An investigation into the potential of sharing models and information on additional costs of RES

energy with the goal of narrowing the additional sums to be paid would be useful, as would be a joint effort to investigate advantages and disadvantages of the different incentive mechanisms. Also, much broader issues could be covered. Interactions between power and gas grids may be one component. With the continued role of fossil fuels, a joint CCS approach could be another fruitful route to coordination. If the UK prefers the introduction of an Emission Performance Standard (EPS) and/or a minimum CO_2 price, the potential impact of these instrument on other national markets and investments could be discussed and could lead to joint conclusions. If such joint approaches were to be developed, it would be strange to exclude the nuclear dimension. Discussions on short- and longer-term worries about system reliability and fuel supply security could become part of the discussions. On back-up capacities, whether they are flexible gas or hydro-storage or various forms of demand-side management, cross-border solutions would be needed, allowing the sector options to explore the most cost-efficient possibilities. This would require joint policy frameworks, to be discussed at regional levels. Still, only broad policy discussions would take place and actual policy instruments could differ from country to country according to legal and parliamentary traditions; Germany could still conclude it does not want nuclear, whereas the UK could thinks it needs this option. The UK could introduce an EPS, while the Netherlands could reject such a measure.

Joint instruments

In the fourth coordination option, in which joint instrumentation is the goal, the sort of differentiated approach discussed in the previous section is no longer possible. The joint instruments approach would aim towards a joint incentive mechanism for RES and could be expanded to the formulation of a single RES objective for the whole area. The Dutch government seems charmed by the prospect of abolishing national RES targets. A possibility would be to explore the option of the emerging joint RES market between Norway and Sweden, possibly leading to an expansion of the geographic area to beyond these two countries. Support for CCS would be organised jointly if this were to be deemed necessary, and a capacity market would be introduced jointly. The legal instruments of system operation and balancing needs would be harmonised. Germany could still decide not to want nuclear energy, but it would accept different decisions in other countries and adopt one joint policy instrument (it would accept the existence of an incentive for nuclear but decide that this could not be implemented on German territory).

Joint policy

A 'maximum approach' would be to have one joint electricity policy across the different countries. This would not necessarily be relevant for local options such as heating systems or building codes but would include all aspects of the power market.

5.2.2 Joint approach between governments in the European debate

Another option is that the Northwest European governments could develop a common approach towards discussions in the EU. This kind of cooperation could be focused on the formulation of long-term European ambitions. All countries have accepted the European 2050 -80% greenhouse gas emissions reduction ambition, and most of them have agreed on the necessity to strengthen the 2020 -20% GHG reduction target. It seems beneficial for the countries around the North Sea to agree upon a new approach for the year 2030 or 2035. It is clear that they all already agree that the European ETS has to be the main instrument to drive the transition forward. It could be easier to agree on a 2030-35 target than to change the 2020 one.

Such an approach could consist of a combination of three elements:

- A national target, somewhat in the range of -50% around 2030 compared with 1990;
- An agreement on the cap that would be necessary to underline the effectiveness of the European Emission Trading System, again in the range of -50%. A discussion on whether

'leakages' like CDM are acceptable or not could be part of the agreement and could be proposed jointly in the European discussion.
- An investigation of whether additional instruments such as a minimum CO_2 price, capacity markets, auctions or contracts for differences should be pursued.

5.2.3 Cooperation between think tanks and academics in the Northwest European region

One group of issues to be further explored, analysed and developed is found in the more technical and economic issues mentioned in the bulleted list above. Each of these issues would need to be further explored, and it could be very useful and interesting if a joint programme of concrete themes and actions would be defined between a number of institutions in the region. The Clingendael International Energy Programme would be willing to explore such a programme in the coming years.

A further possibility might come from the organisation of periodical (bilateral) discussions between policy-makers, industry and academia from two or more countries. Bilateral meetings with the intention to further regional cooperation could also be helpful.

Another group of issues might be found in the area of the broader sets of societal drivers that are increasingly influencing energy policy-making. This was recently shown in Germany when the Ethical Commission gave a thought-provoking and determining advice to the German government (see Section 2.3). Cross-border discussions at academic levels that go beyond the more technocratic policy-making circles could be useful to enhance mutual understanding. A better understanding of cross-border impacts from national decisions could also be facilitated.

5.3 Concluding remarks

Coordination can take place at various levels and with varying degrees of intensity. Very often the ambition to coordinate at the European level is not matched with a similar drive at the level of implementation. It is exactly there that national policy-making is most dominant and where cross-border costs and benefits are missed. Local, mostly bilateral or regional practical issues cannot be addressed in the larger entities at the EU level because they are too specific. However, the larger entities, such as the European electricity group recently proposed by Germany and France, runs the risk of failing to deal with pragmatic issues arising from increasingly interconnected and integrated markets. More and more, we are discovering that these national policy aims do not add up to the intended complete whole. In reality, subsidy and policy competition emerge, and new barriers to market efficiency are raised by the various approaches to stimulate the low carbon economy. The Fukushima disaster has ended the discussion to delay or suspend nuclear phase-outs in some Member States. These phase-outs are not coordinated and could lead to additional security of supply stress in the Northwest European network and wholesale price movement in neighbouring countries. At the same time, uncoordinated capacity build-up of variable RES energy, such as wind power, could also lead to undue cross-border effects. Coordination could be valuable, because wind is planned to account for a large share of the RES ambitions in Northwest Europe.

Despite a power industry that is more and more organised across Member State borders, and although companies are increasingly employing cross-border portfolio strategies, energy policy-making is still quite national in focus. This is due in part to the way the competency of the EU in these matters is organised, and partly to national preferences for certain policies and fuel options. This is not new. Throughout the history of the EU, Member States have cherished their own domestic energy industries, and these preferences also resound in the new fuel policies arising from the introduction of the European 20-20-20 policies. From an internal market

perspective this is remarkable, but from a national policy perspective perhaps not. Subsidiarity and a certain design of the competencies point more in the national direction.

Another notable feature of the EU internal energy market is the uneven influence of neighbouring countries' policy-making on the policy space of large and small(er) Member States. Large Member States will always take their own energy economy as the proper context for their policies, not what other (and smaller) neighbouring Member States do. For smaller Member States, the context of energy policy is different. For them, the energy policies of larger neighbouring countries are extremely relevant, particularly because their energy markets are sometimes more open. The asymmetric impact of the introduction of decarbonisation policies – such as when part of the internal market became subject to national measures with regard to the introduction of RES – requires more consideration because these national policies can exacerbate policy competition and increase (public) costs of complying with European policy.

The national preferences for certain policies and incentive schemes require coordination so as to prevent policy imperfections. A 'bottom-up' approach of the electricity market could be a useful addition to the more top-down European approaches. Energy policy drivers differ, but it is not necessary to agree on all main drivers for this to be a worthwhile attempt. Indeed, not only could climate ambitions be pursued, but also security of supply and economic resilience. A pragmatic approach could constitute a much-needed step forward in the energy transition. Regional coordination must search for an optimum between international and national tendencies: international, as the main energy companies have outgrown the national boundaries; but also local, as the 'hearts and minds' of the people have to experience the necessity and benefits of energy transition. Without public support energy transition will not succeed. This requires that the coordinated story lines evolve in such a way that local people experience them as their own story.

The coordination options we have recommended vary from information sharing, allowing policy-makers to include neighbouring countries' preferences in their deliberations, to harmonising policies across borders. In a period when public finances are under pressure and energy policy space increasingly overlaps, coordination which could prevent more costly options from playing out should be applauded. Larger Member States carry some responsibility here, because they are instrumental in making the lighter forms of coordination work for the smaller Member States. At the same time, the smaller Member States can provide the type of balancing important for the larger Member States. Supply of RES energy, also in larger Member States, is sometimes geographically separated from demand and national networks insufficient to match these without balancing across borders. The German "Atomausstieg" has shown that anticipated large changes in production capacity are relevant for neighbouring countries. Moreover, from the country descriptions it is clear that policy claims on storage, network capacity and production capacity can compete. Without resorting to intense and heavy-handed policy cooperation, lighter forms of cooperation at a pragmatic level can already help national policies be more effective. Enhanced regional cooperation, such as within the Pentalateral Forum, can be crucial in avoiding national policy competition and other capacity mismatches.

One of the many lessons from the Eurocrisis is that the void between the European and the national level should not be ignored and that effectiveness of policy-making can be improved substantially when information is shared and policies can include anticipating each other's decisions. The many discussions on existing market failures should be complemented by a discussion on how best to minimise government failures to make a success of the internal energy market and the transition to a more sustainable energy system.