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## **ASEAN ENERGY MARKET INTEGRATION (AEMI)**

### **Energy Security and Connectivity: The Nordic and European Union Approaches**

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#### **FORUM PAPER**

### **Nordic Energy Policy Cooperation**

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## Executive Summary

A common interest in developing a reliable, sustainable and affordable energy system was the main driver for the Nordic energy policy cooperation since the creation of the Nordic Council of Ministers. The diversity of the energy systems in the Nordic countries facilitated this cooperation, not least in the power sector. Over the years, five focus areas have been addressed. Energy security of supply triggered the Nordic cooperation with the need to develop a long-term energy policy. This required decision-making support and energy systems analyses based on reliable and valid data, modelling and policy scenarios.

Energy markets developed from a political wish to make the important oil and gas sector an area of cooperation that led finally to the recognition that there was no common ground for closer cooperation in this field. However, power utilities and grid companies cooperated across the borders long before the politicians supported and pushed for further cooperation. Energy efficiency was addressed by a portfolio of activities ranging from knowledge-sharing, public campaigns, labelling and standardisation of products. The need to address environmental degradation was inspired by the UN Brundtland Commission Report, and climate change became a common concern. Energy technology cooperation was an integral part of Nordic energy policy cooperation from the very beginning. The Nordic Energy Research Programme was established with funding from each of the Nordic countries, and was earmarked for Nordic projects of common interests. This created the necessary critical knowledge base in new energy technologies, energy systems and energy markets.

Nordic energy policy cooperation followed the ordinary Nordic governance structures, rules and mode of operation with Council of Ministers, supported by a committee of senior officials and a secretariat. This was characterised by an incremental development of the cooperation based on consensus, mutual understanding and trust facilitated through exchange of experiences, work groups, seminars, educational activities and mobility schemes for energy policy officials. With the consolidation of Nordic Energy Research in 1999, the cooperation benefitted from having an institution that exclusively could focus on Nordic energy policy issues and deliver research-based decision support to decision makers in the Nordic energy sector.

## Introduction

Nordic energy policy cooperation dates back to the creation of the Nordic Council of Ministers in 1972. Over the years, it has become an important area of cooperation in its own right, with high political ambitions to develop a well-functioning, sustainable, environmentally friendly and secure energy system within and across the borders. The cooperation has led to some remarkable successes, such as the liberalised Nordic electricity market and Nordic Energy Research. It has also resulted in numerous reports, discussions and visions, but without further actions. This paper aims to analyse how the Nordic energy policy cooperation has developed from its beginnings till the present day. What have been the areas of cooperation

and why have they changed over time? How has the cooperation been organised and what has been decisive for successful outcomes?

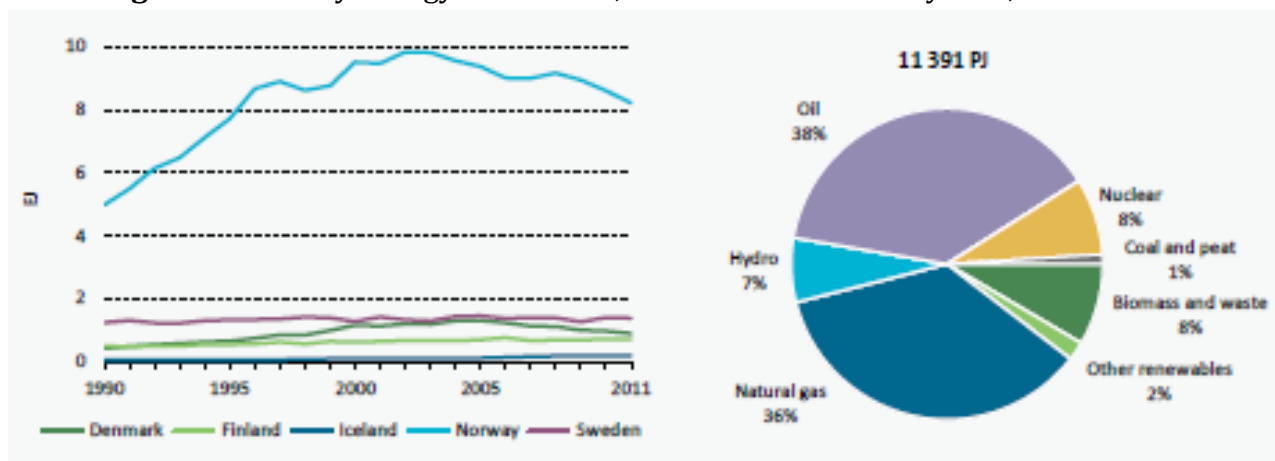
The analysis is primarily based on documents, policy action plans and reports from the archives at the Nordic Council and Nordic Council of Ministers. The academic literature on Nordic energy policy cooperation is presented to the author's best knowledge, except for the development of the Nordic electricity markets.

First, a short description of the energy systems in the Nordic countries is made. Then three stages of the Nordic energy policy cooperation are described, each of which setting the context for the cooperation. The first period from 1972 to 1988 is influenced by the first oil crisis and describes the building of the Nordic energy policy cooperation. The second period from 1989 to 2005 describes the cooperation being stuck between the European internal market discourse and the radical changes in Europe around the fall of the Wall and the dissolution of the Soviet Union. The third and last period from 2006 up to the present focuses on the political ambitions in developing energy and climate policies beyond the national boundaries. Finally, the three stages are summarised across cooperation areas and achievements are described.

## The Energy System in the Nordic Countries

The Nordic region has a wide diversity of primary energy sources, comprising petroleum, nuclear power, and renewable energy sources such as hydropower, biomass, wind power and geothermal energy.<sup>1</sup> Norwegian oil and natural gas dominate the region's primary energy supply representing 68 per cent in 2010. Norway's oil and gas exports were the third largest in the world in 2010, after Russia and Saudi Arabia. Mainly due to a decrease in Norwegian petroleum production, overall Nordic energy production declined by about 16 per cent since its peak in 2002, but it has increased by 58 per cent since 1990.

**Figure 1.** Primary Energy Production; Share of Production by Fuel, 2011

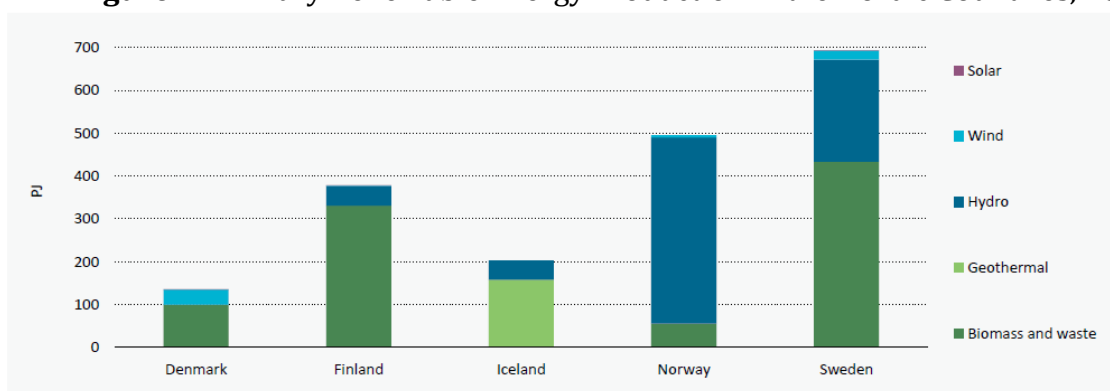


Source: International Energy Agency (IEA), 2013.

<sup>1</sup> This section is based on International Energy Agency, *Nordic Energy Technology Perspectives* (Paris: OECD/IEA, 2013).

Renewable energy production in the Nordic countries is dominated by biomass and hydropower. Sweden is the leading producer of renewables, dominated by biomass and hydropower. Second is Norway with its abundant hydropower. Third is Finland, mainly dominated by biomass. Iceland has geothermal and hydropower, and last comes Denmark with wind power and biomass.

**Figure 2.** Primary Renewable Energy Production in the Nordic Countries, 2011

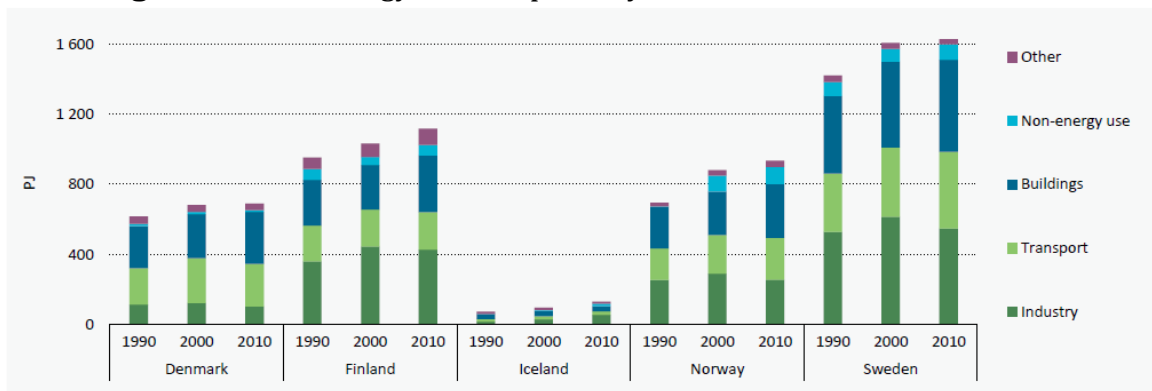


Source: IEA, 2013

Electricity generation in the Nordic region exceeded 400 TWh in 2010. 83 per cent of its electricity production is carbon neutral, with 63 per cent coming from renewables. Hydropower represents about half of the generation, with more than 50 per cent coming from Norway (118 TWh) followed by Sweden (66 TWh). The share of non-hydro generation is increasing. In Denmark, there is a steady replacement of coal-fired power plants with biomass, gas and wind. The share of wind power rose from 12 per cent in 2000 to 21 per cent in 2011 (in 2014, it was 39.1 per cent). Electricity generation in Finland is dominated by coal-fired power plants and nuclear, each providing 20 TWh out of 80 TWh. Iceland has 100 per cent renewable electricity generation, with 74 per cent hydro and 26 per cent geothermal. Norway has 95 per cent hydropower, one natural gas combined cycle power plant and a relatively modest share of wind power. Sweden has the largest power generation with mainly nuclear power, hydro power and biomass fired power plants.

Energy consumption in the Nordic region has increased by 17 per cent since 1990. The end-use sectors of industry, households and transport each represents one-third of total energy consumption. The largest increase in consumption is seen in the transport sector and commercial buildings, each with 30 per cent increase over the last 20 years. Industry accounts for 40 per cent of electricity in the region. Due to high electricity consumption by the aluminium industry, Iceland and Norway have the world's highest electricity consumption per capita. The cold climate has resulted in high rates of electricity consumption for heating, particular in Norway, Sweden and Finland.

**Figure 3. Final Energy Consumption by Sector in the Nordic Countries**



Source: IEA, 2013.

The energy intensity (energy consumption per unit of GDP) has remained above the OECD average since the mid-1980s, mainly due to increases in industry activity and to the high concentration of energy-intensive industries (e.g. metal and pulp and paper), as well as the petroleum industry. With the exception of Denmark, energy consumption per capita is above the OECD average. The energy sector accounted for 62 per cent of GHG emissions in 2010 in the Nordic region, has varied between 200 Mt and 250 Mt over the past decades. The transport sector has shown the largest increase in emissions. In Iceland, emissions from industrial processes have increased due to a new aluminium plant and increased capacity in others.

The Nordic region is a net exporter of energy, led by Norway's oil and gas exports. In 2011, the primary energy production was close to the double that of final energy consumption. Norway's exports account for 82 per cent of Nordic exports, while oil and gas also account for the largest share of imports, primarily to meet the demand in the transport sector. In addition to electricity trade among its participating countries, Nord Pool spot trades with Russia, Germany, Estonia, Poland and the Netherlands. Finland has been a net importer, purchasing power from Russia and to a lesser extent from Estonia. Norway, Sweden and Denmark fluctuate, being net exporter for one year and net importer for another, depending on the climate.

## Stages of Nordic Energy Policy Cooperation

The stages of the Nordic energy policy cooperation are divided into three periods (Table 1).

**First period (1972–88):** With the establishment of Nordic Council of Ministers in 1972, these years were characterised by the overlapping regional cooperation between the Nordic countries and the European Economic Community (EEC), which Denmark together with the UK joined in 1972 while Iceland, Norway and Sweden remained in the European Free Trade Association (EFTA). The oil crisis in the 1970s brought energy policy high on the political agenda, also at Nordic level where each of the countries was forced to develop a robust national energy policy. In this period, two parallel features emerged: the environmental and natural resource concern as described in the UN Brundtland commission report; and the

common European market relaunched by the Delors Commission. At the end of this period, nuclear power was deeply challenged following the US Three Mile Island accident in 1979 and the Russian Chernobyl accident in 1986. Nordic energy policy cooperation took off with the first meeting of the Nordic energy ministers in 1980, which outlined a range of common activities relevant to the planning and development of the Nordic energy sector.

Second period (1989–2005): This was a dramatic time for the Nordic countries and the adjacent areas due to the fall of the Wall in 1989, the dissolution of the Soviet Union in 1991, the unification of Germany, and the process towards the establishment of the European Union (Maastricht Treaty, 1992). In 1992, the internal European market came into force, and the EEC and EFTA agreed to cooperate within the European Economic Agreement (EEA). Finland and Sweden became members of the EU in 1995, leaving Norway and Iceland as the remaining EEA countries. The outreach towards the adjacent areas around the Baltic Sea changed the Nordic outlook and opened up for closer cooperation. This was further strengthened with the three Baltic countries being members of the EU in 2004. Environmental issues and climate change were coming up on the international agenda, and in 1997, the Kyoto Protocol was adopted and came into force in 2005 by the ratification of Russia. These events had strong implications for Nordic energy policy cooperation in terms of energy markets.

Third period (2006–present): Security of supply and climate change are the two major issues dominating the political agenda of this period. The energy security of supply became evident in Europe in January 2007 when, due to the Russia–Ukraine conflict over gas supply and payments, the gas supply from Russia to Europe was effectively blocked. Parallel to these events, the international negotiation on a post-Kyoto regime addressed the urgent need to address climate challenge at a global level. The EU responded to these challenges by launching the ambitious 20-20-20 targets by 2020. Member states were obliged to increase the share of renewables in the energy system, and to reduce GHG emissions and energy consumption. At the same time, the third EU energy package<sup>2</sup> paved the way for even more integration of European energy markets. In 2008, the financial crisis hit the Nordic countries and the rest of the world, and the energy security of supply and climate change concerns were transformed into economic considerations for job creation, growth and competitiveness. Despite the drop in oil prices in the autumn of 2014, energy security of supply, climate issues and competition remained high on the European agenda. In February 2015, the EU Commission launched the European Energy Union package with five mutually enforcing and closely interrelated dimensions relating to: energy security; a fully integrated European energy market; energy efficiency; a decarbonised economy; and research and innovation (European Commission, 2015).

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<sup>2</sup> The first energy package in the late 1990s allowed the opening of the electricity and gas markets and a gradual introduction of competition. The second energy package in 2003/4 focused on the concepts of unbundling and third-party access, and defined the need for independent regulatory authorities. The third energy package in 2007 established an unbundling regime and defined the duties of national regulatory authorities. It also improved consumer rights, and promoted regional solidarity and national emergency measures in times of severe disruption to the gas supply; see also: <http://fsr-encyclopedia.eui.eu/eu-energy-legislation-packages/>.

**Table 1.** Overview of Nordic Energy Policy Cooperation

	<b>First period 1972–88</b>	<b>Second period 1989–2005</b>	<b>Third period 2006–present</b>
<b>Governance</b>	<ul style="list-style-type: none"> <li>• Nordic Council of Ministers of Energy</li> <li>• Committee of Senior Officials</li> <li>• Permanent or ad hoc work groups</li> <li>• Nordic Energy Research</li> </ul>		
<b>Security</b>	Long-term planning	Outreach to the adjacent areas	Alignment of policies in the wider EU context
<b>Energy markets</b>	Knowledge-sharing on oil and gas	<ul style="list-style-type: none"> <li>• Action on liberalised electricity market</li> <li>• Knowledge-sharing on oil and gas</li> </ul>	Nordic action plan for electricity market
<b>Efficiency</b>	Knowledge-sharing	Knowledge-sharing	Knowledge-sharing, especially around implementation of EU directives
<b>Technologies</b>	<ul style="list-style-type: none"> <li>• Research (fossil, renewables and nuclear)</li> <li>• Nordic Energy Research Programme</li> </ul>	Consolidation of research cooperation	<ul style="list-style-type: none"> <li>• Knowledge-sharing on support mechanisms</li> <li>• Market pull and tech push initiatives</li> </ul>
<b>Environment</b>	Increasing awareness	<ul style="list-style-type: none"> <li>• Baltic Sea Region as testing ground for climate mechanisms</li> <li>• Post-Kyoto negotiations</li> </ul>	Embedded in other activities

### Stage One: Building the Nordic Energy Policy Cooperation, 1972–88

Economic development relies on a well-functioning energy sector. This was the rationale for the OECD as well as a core element of the European Steel and Coal Union from the very beginning. When the Nordic Council of Ministers was established in 1972, a separate Nordic Council of Ministers and a Nordic committee of senior officials for industry and energy were set up, also supported by similar resort ministries in several member states. The Nordic Industrialisation Foundation issued grants and loans to technical and industrial research, Nordtest provided cooperation on materials research, and the Nordic Investment Bank (NIB) supplied important financial instruments to facilitate the cooperation, also in the energy sector. The latter, NIB, financed a number of transmission projects in the first years and two nuclear power projects in Finland with Finnish and Swedish interests.

Following the first oil crisis, the Swedish government in 1974 approached the Norwegian government to discuss Nordic cooperation on oil and gas. Norway had little interest in Nordic cooperation and continued to give concessions to multinational companies in the exploration phase and to favour its own industry during the production phase. Further

attempts to give preferred exploration access to Swedish Volvo Petroleum also failed. Although a bilateral agreement on energy cooperation between Norway and Sweden was concluded, but it never played a substantial role.

However, at regional level, the Nordic energy ministers were ready to work more closely so as to address a common challenge: how to plan and develop a secure and robust energy sector. The Nordic Council of energy ministers met for the first time in 1980 to agree on a common four-year action plan for energy cooperation, which focused on:

- Energy efficiency
- Energy research and new technologies
- Energy planning
- Oil, gas and coal
- Electricity trade and infrastructure

For each topic, working groups were appointed, work programmes agreed upon and modest budgets provided. Central to the work was the exchange of experiences on the happenings within each country—during seminars and conferences, in reports and analysis, as well as through the organising of educational activities and mobility schemes for national energy planners and experts. The aim was to make the cooperation efficient and non-bureaucratic, relying primarily on the Nordic governance system and institutions to strengthen Nordic energy policy cooperation. This mode of operation was made from the very beginning, and has not changed much over the years.

The energy efficiency cooperation focused on the end-use sectors of households and industry. Typical activities included education of energy economists, exchanges of experiences and assessment of energy conservation campaigns, local energy planning and industrial sector guidelines for energy efficiency, and identification of “best practices” companies.

Nordic cooperation in energy research complemented the well-established Nordic cooperation in nuclear energy.<sup>3</sup> A contact group for energy research was set up, and its aim was to coordinate research and development in the Nordic countries. It saw to the registration of energy research projects, a catalogue of special courses in the oil and gas sectors, common review of concrete projects, and financial support for researchers to meet with one another. A special committee was tasked to make a proposal for the setting up of a Nordic Energy Research Programme to strengthen overall energy research through coordination and cooperation in areas of common interest (Nordisk Energiforsknings Utvalget, 1985). In 1985, the ministers decided to support the establishment of the Nordic

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<sup>3</sup> The Nordic contact organ for nuclear issues (Nordisk Kontaktorgan for Atomkraftfrågar, NKA) was established in 1957 by the Nordic governments to promote Nordic cooperation related to the peaceful utilisation of nuclear energy. NKA was also the discussion forum for topics of common interest within international organisations, such as IAEA and OECD’s NEA.



Energy Research Programme with approximately 30 million Norwegian kroner, paid annually and directly from the Nordic governments, and distributed according to each country's GDP.

Nordic cooperation in energy planning took its departure in the need of each country for better planning tools for the long-term planning of the energy system. Emphasis was on the exchange of experiences among national officials, the development of comparable energy statistics, and methodological development of energy modelling and systems analysis for each of the Nordic countries. These included price sensitivity studies and engineering studies of energy sources, energy transfer, and also changing energy markets and the energy policy opportunities to influence these markets. Closer cooperation between the Nordic energy planning committee of officials and the power sector's advisory body, Nordel,<sup>4</sup> was also established for purposes of long-term electricity planning.

Following the oil crisis, the Nordic energy ministers wanted to explore cooperation activities in the oil, coal and gas sectors to complement existing international contingency plans. But through a number of explorative studies on the oil refinery sector and the trade of coal, it soon became clear that there was little common ground for cooperation except within areas related to safety and environmental issues.

The gas sector was different. An information group with participants from state companies and ministries exchanged information and experiences, and commissioned over the years a number of studies to explore cooperation: economic aspects of liquid natural gas (LNG), prospects for coupling the Ekofisk in the North Sea with the Danish and Swedish gas systems, as well as the extension of the Swedish gas system to Norway. Conferences were also organised on topics such as contractual affairs in the offshore industry, offshore insurance issues, and oil and gas exploration in the Arctic.

By end of the 1980s, Norway had become one of the main gas exporters to the European market, but had no domestic market for gas. Finland had built up a gas market entirely based on imports of gas from the Soviet Union. Denmark developed a gas market based on its own resources and exported about 25 per cent of its gas production to Sweden. Sweden had a gas market only in the south, based on Danish supplies. In 1988, a Nordic gas conference was held to discuss a common infrastructure, research and development, planning and storage. Concrete cooperation should be based on commercial conditions, including the Nordic Gas Technology Centre (NGC). The initiative was supported by the Nordic energy ministers, who once more expressed their expectations concerning the role of natural gas in the Nordic energy system (Nordisk Råd, 1989). However, by 1990, Swedish energy policy remained complicated with its moratorium on nuclear power, the status of the hydropower and biofuel preference. This forced Swedegas to drop its project of introducing gas to central Sweden. Three major gas companies (Statoil, Neste and Stoseb Gas) continued in 1991–92 to analyse the possibilities of importing gas from Norway, but they finally concluded that the market was not large enough, neither in Stockholm nor in Finland (Agfors, 1995).

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<sup>4</sup> In 1962, Nordel was established by the power companies in Denmark, Sweden, Norway and Finland. Over the years, Nordel proved to be a very powerful advisory body to the Nordic governments as well as to its member organisations.

Stronger Nordic energy policy cooperation was not just a question of political engagement but also implied closer contact between the authorities and power producers on the longer-term planning across the borders and assessment of concrete transmission lines. The power sector had cooperated across the borders since the first transmission cable was established across the Oresund Belt between Denmark and Sweden back in 1915. After the Second World War, several cables were built across the border to assure sufficient and reliable power in the region; in addition to delivering power to its constituents, utilities were also alert to the opportunity to utilise their capacity regardless of national borders. These cross-border power supply contracts between national utilities became the seed of a Nordic power stock market (Bäckman, 2011).

By 1986, 17 connections facilitated comprehensive cooperation on the optimised use of the production system and better security of supply. In the action plan of 1986–88, the energy ministers continued the work initiated in the first years and started to consider the Nordic region as a home market for energy. They commissioned studies on how to overcome technical barriers for the flow of energy equipment products and how to promote Nordic industry on export markets. The cross-border nature of environmental problems in the energy system was also a concern; these included local pollution and CO<sub>2</sub> emissions.

In summary, the first period of Nordic energy policy cooperation started out as an integrated part of the economic cooperation between the Nordic countries. But following the oil crisis, the countries were ready for closer cooperation on how to tackle energy efficiency, research, planning and the very important oil, gas and coal sectors. To a lesser extent, the political attention was focused on facilitating the cross-border power exchange, which was mostly addressed by the power companies themselves and their advisory body, Nordel. The cooperation was organised around committees and working groups which, by means of studies, analyses and conferences, provided informational support for politicians and other decision-makers on issues such as what to cooperate on and what to let go of. In the oil and gas sector, it gradually became clear that it was difficult to find common ground, though all could agree on the need to explore the prospects of cooperation through further analysis and exchange of information. In the research area, there was solid ground for strengthening the cooperation, which led to the establishment of the Nordic Energy Research Programme in 1985 with direct national contributions.

## Stage Two: Stuck between Internal Markets and the New European Landscape, 1989–2005

In the period of 1989–92, Nordic energy policy cooperation had ambitions to develop a home market for energy. It also took note of the Brundtland Commission Report, *Our Common Future*, and the need for a sustainable use of energy sources. Nordic cooperation could no longer take place isolated from the developments of other countries. The objectives of the cooperation were to ensure a reliable energy supply, increase energy savings, and address safety and environmental aspects through energy technologies. In the Nordic Council session of 1992, the urgent need to reconsider Nordic energy policy cooperation—in light of the

dramatic developments in the adjacent areas, such as the Baltic countries, East European countries and Russia—was apparent.

During these years, energy and economy were again merged into one Council of Ministers. Work groups were closed (energy efficiency, markets and environment), but the work groups on energy research and information carried on, as did ad hoc groups on power and gas markets, energy-related environmental issues and international cooperation. It was during these years that only areas of strict Nordic added value were prioritised. As a result, it seemed as if the strategic action plans were replaced by annual work plans until 2002.

The prioritised areas started out with four and were later narrowed down to three core areas (electricity market, climate issues and regional cooperation):

- Nordic energy market (oil and gas markets, electricity market)
- Research and development
- Energy and environment
- Energy efficiency

Regarding energy markets, the energy ministers did not put emphasis on the Nordic electricity market in the 1989–92 action plan, but continued to focus their attention on developing and improving energy planning, while taking into consideration environmental aspects. The oil and gas markets remained an area for further exploration of cooperation. Working groups with representatives from authorities and industry analysed prospects for Nordic cooperation, ranging from prospects for increased procurement in the North Sea, development of oil and energy markets in the Nordic region, integration of the Nordic gas net and consequences for infrastructure and security of supply. A working group explicitly focused on oil and gas in the West Nordic area covering Greenland, the Faroe Islands and Iceland. No substantial political decisions followed these explorative attempts.

Since mid-1995, the political focus has shifted substantially towards the Nordic electricity markets. The Nordic energy ministers met at the Louisiana Museum in 1995 and agreed on liberalising the Nordic electricity markets. An ad hoc group of senior officials was established and assigned with the tasks to analyse the future of Nordel, to assess the need for Nordic actions to develop the Nordic electricity market, and to examine the development in the European Community and the Baltic Sea region as well as its implications for the Nordic electricity markets. The Nordic activities took notice of the ongoing EU activities, which resulted in the EU directives of 1996 and 1998 outlining the common rules for the internal market in electricity and natural gas, and pushing for generation and transmission unbundling. The further development was highly influenced by the bilateral electricity market between Norway and Sweden, which created a common electricity market, Nord Pool in 1996. Shortly after, Finland (1996) and Denmark (West Denmark in 1999 and East Denmark in 2000) joined Nord Pool (Bredesen and Nielsen, 2013). This wholesale market for electricity became a role model for the development of cross boundary electricity markets, which implied supply reliability, competition and efficiency.

The 2002–05 action plan intensified the cooperation on the electricity market: it called for heightened cooperation between the transmission system operators (TSOs), the regional need for developing and strengthening the trans-border transmission grid, and the assessment of net tariffs and analyses of market-based mechanisms to stimulate sustainable power production.

Research and development (R&D) was regarded as a key to the overall development of the energy system, the energy markets and the efficient use of energy resources. With the establishment of the Nordic Energy Research Programme in 1985, continued focus was placed on strengthening the basic competences in the university and research institute sector, supporting national energy research programmes and contributing to the efficient use of scarce public financial resources. The programme was funded directly by the national energy and technology agencies, and complemented by a modest support for administration from the Nordic Council of Ministers' budget. A number of Nordic research colleges were established with delegated responsibility for seminars, PhD mobility scheme and research projects within their area. Over the years, the programme developed according to four year research strategies, reflecting also the Nordic energy ministers' priorities for energy cooperation. Accordingly, priorities have changed over the years, e.g. from oil technology, oil geology and coal technology to electricity markets and the impact of climate change on the energy system. Efficiency (district heating) and renewable technologies were prioritised throughout the years. From 1998, an additional 10 per cent funding was earmarked to strengthen research cooperation between the three Baltic countries and Northwest Russia. The governance structure of academic colleges, supported by a small secretariat under the guidance of a committee of senior officials, was challenged in an external evaluation that criticised the programme for being closed and non-transparent. In order to professionalise the cooperation, the programme was transformed into a Nordic institution in 1999 with similar governance structures as other Nordic funding institutions comprising a board, director and secretariat.

Energy and the environment took its departure in the Brundtland Commission's recommendations to facilitate a transition from fossil fuels to renewable energy, and to improve energy efficiency in order to minimise negative environmental impacts and costly investment in new capacity. In 1995, the Nordic Council of Ministers announced that Nordic strategies to address energy-related environmental problems were needed, and an ad hoc taskforce was appointed to address energy-related climate issues. In the action plan 2002–05, climate was one of three core policy areas closely linked to the other core area: international cooperation in the Baltic Sea Region and the adjacent areas. Further issues included the importance of the Kyoto Protocol that was yet to be ratified, the need to reduce industrial CO<sub>2</sub> emissions, the prospects for CO<sub>2</sub> capture as a means to minimise the impacts of CO<sub>2</sub> emissions and Nordic research cooperation regarding climate issues.

In energy efficiency, work continued on the economical use of energy in industrial sectors, transportation and the service sector. Activities included education, information and consultancy, labelling of energy efficient equipment and cooperation in savings.

During this period, the Nordic energy policy cooperation started to put increasing focus on international issues. Activities included information-sharing and exchange on the Energy Charter Treaty<sup>5</sup> and the additional protocol on energy efficiency. A number of studies were commissioned to analyse the prospects for Nordic activities in the Baltic Sea region related to the mechanisms of the Kyoto Protocol.<sup>6</sup> Especially in the action plan 2002–05, emphasis was put on making a framework agreement for a Testing Ground in the Baltic Sea region. This was anchored in the Bergen declaration made by the Nordic prime ministers and commitments by their colleagues from the Baltic Sea region and the EU Commission in Stavanger in 1998. Further, efforts were made to create a special Nordic investment facility to conduct climate-related projects through the Nordic Environment Finance Cooperation (NEFCO). Much emphasis was on the general energy policy situation in Eastern Europe and the Baltic countries. The aim was to develop the electricity markets in the region and to promote energy saving, energy efficiency and renewable energy. Likewise, Nordic cooperation should strive to extend the gas grid to the whole Nordic region, and to link the gas consumers with both Russian and Norwegian suppliers.

In summary, this period of Nordic energy policy cooperation was characterised by developments in the energy markets, environmental concern and geopolitical changes. Cooperation on gas infrastructure and markets remained at the explorative stage. Nevertheless, the Nordic states sought common ground in their international activities around the Energy Charter Treaty. Cooperation on the electricity markets took a huge step forward when the Nordic energy ministers in 1995 agreed to liberalise the Nordic electricity markets. In terms of Nordic energy research, the cooperation developed steadily, and was guided by strategic action plans reflecting political energy priorities. A decisive step was taken when the programme was transformed into a Nordic institution in 1999. During this period, Nordic energy policy cooperation became increasingly attune to environmental challenges related to the energy system, not least those concerning sustainable energy sources and climate change.

### Stage Three: Political Focus on Energy and Climate Policy, 2006–Present Day

Nordic energy policy cooperation as described in the action plan 2006–09 was founded upon the Nordic energy ministers' vision of 2004: "The Nordic Energy Cooperation will play a strong and active role in the development of Nordic and European energy policies". Broadly defined priority areas were outlined in the work as well as in the action plans that followed, though the member state responsible for drafting the plan also left some room for other preferences. The key priority areas included:

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<sup>5</sup> Energy Charter Treaty dates back to the early 1990s and is an international agreement which establishes a multilateral framework for cross-border cooperation in the energy sector (<http://www.energycharter.org/>).

<sup>6</sup> The Kyoto Protocol was adopted in Japan in 1997. It is based on the principle of common but differentiated responsibilities: it puts the obligation to reduce current emissions on developed countries on the basis that they are historically responsible for the current levels of greenhouse gases in the atmosphere. The first commitment period was 2008–12 and it came into force with the ratification by Russia in 2005.

- Energy markets
- Development of sustainable energy systems (renewable energy, energy efficiency, climate and sustainable energy in sparsely populated areas)
- Energy research and technology development
- International cooperation (impact on the EU agenda and regional cooperation)

The overall objective of cooperation on energy markets was to secure the best possible frameworks for the development of the Nordic markets.

As for the electricity market, the ambition was to create a borderless Nordic market with effective external trade. As laid out in the Nordic energy ministers' resolutions in 2004 and 2005, the Nordic electricity market was to become a well-functioning regional market, characterised by multiple players, and a high degree of security of supply, competition, sustainability, transparency and flexible consumption. The focus was to improve the framework conditions for the markets through harmonisation, development of the transmission grid, mechanisms to assure necessary investments in production capacity and infrastructure. Congestion management and transfer capacity of the transmission network and cooperation with EU and non-EU neighbours in developing frameworks for external trade were also high on the agenda.

Nordic cooperation was further intensified by the adoption of a Nordic action plan for cooperation in the electricity market in 2008. The focus was on congestion management and grid investment, as well as the common end-user market and development of the European electricity sector (Nordic Council of Ministers, 2009). Attention was paid to maintaining the momentum of the action plan 2010–14, and the document included national grid plans, feasibility of cost-sharing initiatives and assessment of potential areas for bids and prices by 2010. Likewise, the integration of a large share of wind power and other renewables in the system was mentioned, placing demand on additional grid investments as well as on developing new ways of integrating renewables.

The 2014–17 action plan took electricity market cooperation a step further. In addition to the Nordic wholesale market, Nordic energy ministers decided to create a common Nordic end-user electricity market. Although a detailed roadmap for harmonising the end-user market was made by the cooperating body of the Nordic supervisory authorities (NordReg), it was recognised that development in the Nordic countries did not always occur at the same rate and was not always identical. Since the Nordic electricity market was well advanced compared to the rest of the EU, the ambition was to jointly monitor the new regulatory framework of the third EU energy package and see that it did not counteract the well-functioning Nordic market. Following the EU 20-20-20 targets by 2020, rapid expansion of renewable electricity changed the conditions for electricity production in EU. Several countries decided to introduce capacity markets to balance the system in times of high consumption, which carries the risk of reducing the electricity trade across the borders and distorting the competition. The need for grid reinforcement in each country also depended on the reinforcement of other countries. The Nordic energy ministers' response to this was to

make grid investments that were socio-economical profitable from a Nordic perspective. This meant that if costs and benefits were unevenly distributed between countries, the system managers were to negotiate on sharing. The first step of this rather ambitious action was to agree on methods for assessing the socio-economic benefits of transborder transmission capacity. Cooperation on grid planning and the preparation of a Nordic development plan seemed to be more straightforward. Due to a higher share of renewables in the system, storage was mentioned as an important means, particularly in isolated or sparsely populated areas far from the central transmission grids.

Regarding the gas market, the energy ministers were at the beginning of this period still exploring possible Nordic synergies and cooperation, while also keeping an eye on the development of the natural gas markets in the EU and in the Baltic Sea region. In these years, the Russian Northstream gas pipeline<sup>7</sup> from Viborg to Europe was planned, and environmental impact assessments of the waters where the pipeline would be located were conducted.

Within sustainable energy systems, renewable energy was considered an area in which the Nordic countries were ahead of the EU, albeit with significant differences in resources, technologies, policies and mechanisms. A number of studies were commissioned in the action plan 2006–09, including a comparative study on Nordic framework conditions for renewable energy, and a study on the expansion of the Swedish–Norwegian green certificate market to a Nordic green electricity market. The emphasis was also on technological developments, faster market introduction and deployment, and the Nordic region as a testing ground for promising renewable energy technologies. In the 2010–13 action plan, specific technologies were mentioned, including wind power and geothermal energy, as well as the prospects of developing more efficient transport solutions. Action points included: the exploration of possible cooperation on matters related to EU directives on renewables; promotion of the integration of renewable energy in the system, very much related to the Nordic competences; and cooperation in wind power and planning issues. A special initiative to increase the use of renewable energy in the transport sector was foreseen. In the following action plan, key priority issues comprised the exchange of experiences and views on the implementation of the EU directive on renewable energy, and new initiatives from the EU Commission. Framework conditions for renewable energy were again addressed, but further to the explorative work conducted so far, it was recognised that each country should choose its support system in accordance with its own conditions and policies—something which might influence new investments in the Nordic electricity sector. The extent of Nordic cooperation was thus contingent upon finding common ground.

Energy efficiency continued to be one of the cornerstones of a sustainable energy system in the Nordic countries. As previously, knowledge-sharing was central, including reports on market-oriented incentives and price signals to increase energy efficiency. The 2010–13 action plan was more specific in terms of the three end-use sectors: housing,

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<sup>7</sup> The construction started in 2005 and was officially inaugurated in 2011 by the presidents of Russia, Germany and France.

transport and industry. Special focus was on the prospects of influencing international negotiations relating to product labelling and standardisation. The following action plan was concerned about the implementation of the EU directive on energy efficiency adopted in 2012, including also the Ecodesign directive. Nordic actions in this area seemed to be limited to pre-studies of possible areas of cooperation, similar to, for example, the three-year Nordic programme for market supervision, Nordsyn, for energy design and energy labelling.

Nordic cooperation on climate issues featured in the 2006–09 action plan: it primarily focused on analysing the prospects of taking initiatives to open up the EU quota trading system to other non-EU players, and examined the need to further develop the Testing Ground agreement with the other Baltic Sea countries. In the following action plans, climate was considered an integral part of a sustainable energy policy and hence embedded in actions on renewable energy and energy efficiency. Nordic cooperation related to the development of the post-Kyoto regime was included in international cooperation, though mainly in terms of preparing meetings and ad hoc activities related to specific events.

Nordic cooperation on sustainable energy in sparsely populated areas addressed two issues. On the one hand, analysis of mechanisms to improve energy efficiency in the often fossil-energy-dominated systems, and on the other hand the set-up of pilot projects and demonstration of new technologies. Outreach to northern Canada and northern Russia was given attention. These priorities prevailed in the subsequent action plans, though within the framework of the North Atlantic Area and with more emphasis on small-scale plants, stand-alone systems and storage.

Cooperation on energy research further developed in this period through Nordic Energy Research, which was regarded a European role model for aligning national research programmes and operating a true common pot for Nordic projects (Jørgensen, 2006). It operated with a mission to add Nordic value to national energy research programmes by funding Nordic energy research projects of common interest. It coordinated and participated in several EU ERA-net projects together with other EU partners, commissioned policy studies on energy technology aspects, and provided secretariat support to several of the work groups of the committee of senior energy officials, e.g. the Nordic Electricity Market group. As a pendant to the European research area, the ambition was to develop a Nordic knowledge area in energy technologies and systems, and at the same time position Nordic initiatives in the wider European and international context. This included cooperation with the International Energy Agency (IEA) on a regional study, *The Nordic Energy Technology Perspective*, which involved IEA officials, Nordic research groups and Nordic Energy Research. Together with other Nordic institutions, Nordic Energy Research was involved in the implementation of the Nordic Top Level Research initiative: a five-year and 400 million Danish Kroner Nordic research and innovation programme aimed at solving the global climate crisis and strengthening the leading knowledge role of the Nordic region.

International cooperation played an important role in this period, with a clear message that Nordic energy policy cooperation strived to be at the forefront of the energy policy in general, and in EU energy policy in particular. Typical actions included the alignment of



viewpoints and preparations for meetings of the European Council of energy ministers, something which was of importance to the EEA countries Norway and Iceland. Cooperation was oriented towards further regional cooperation with adjacent areas. In the years to come, the technical and economic integration between the Nordic and the Baltic electricity markets was further developed, with Estonia, Latvia and Lithuania being part-owners of Nord Pool Spot. The cooperation with Northwest Russia aimed at creating partnerships for technological development and continuing the dialogue about key energy and climate issues and knowledge-sharing, building on the long history and energy dependence between the Nordic countries and Russia. Finally, all partners came together in the Baltic Sea Region Energy Cooperation (BASREC), which was foreseen to be the arena for implementing the EU's northern dimension and the EU–Russia dialogue. In the action plan 2009–13, international cooperation was influenced by the EU 20-20-20 by 2020 plan for Europe and the third energy package. Priority was given to EU–EEA cooperation and the exchanges and informal consultations prior to Council meetings. Nordic–Russia cooperation continued, very much supported by the Nordic Council of Ministers' offices in Kaliningrad and St. Petersburg and the Nordic financial institutions (NEFCO and NIB).

In summary, the period demonstrated two Nordic successes: the Nordic electricity market and the Nordic cooperation in energy research—both developed to a level far beyond knowledge-sharing, exchanges of experience, best practices and learning, reaching a position as a role model for regional cooperation in energy. In light of the European response to both the climate and energy security of supply challenges, Nordic cooperation continued to prioritise those areas that added value to the energy sector. By means of high political commitment, the necessary frameworks for the Nordic electricity market were developed step by step and country by country in a pragmatic opening up for cooperation of the willing. As for research cooperation, this was rather due to the allocation of relatively little but constant funding, which also allowed for the establishment of an institution that could take responsibility for commissioned reports and initiatives at the Nordic level. While the power market and research advanced, other areas of Nordic cooperation remained on the level of knowledge-sharing. This was the case for renewables where the testing ground in the Baltic Sea region never took off and where also the numerous studies on national support schemes for renewables revealed substantial differences in national policies, technologies and markets. Wider regional cooperation was further consolidated in the context of the Baltic Sea region and the North Atlantic region. But most importantly, Nordic energy policy cooperation was increasingly an integral part of European energy policy development. It was part of the EU Northern dimension in the EU–Russia dialogue. It was at the forefront of the EU 2020 targets in terms of ambitious national policies, the knowledge-sharing of those policies (e.g. support mechanisms), and demonstrated achievements in the Nordic electricity market and research cooperation.

## Discussion

Nordic energy policy cooperation was an integral part of the Nordic Council of Ministers from the very beginning. It became an area of cooperation in its own right in the wake of the oil crisis in the 1970s, which forced countries to develop long-term energy policies while also optimising the supply, production and consumption of the current energy system.

The *governance structure* followed the ordinary Nordic structures, rules and mode of operation with a Nordic Council of energy ministers supported by a committee of senior officials from each of the member states, which again would make permanent or ad hoc work groups for prioritised areas of cooperation. The chairmanship of the council rotated annually as did the chairmanship of the committee of senior officials. Budgets were relatively modest and were used on smaller initiatives such as studies and analyses, conferences, as well as on time-constrained initiatives to explore prospects for further cooperation or outreach. The cooperation was lean and relied on existing structures and institutions. However, with the establishment of Nordic Energy Research Programme in 1985 and the consolidation of the cooperation in Nordic Energy Research in 1999, the cooperation benefitted from having an institution that could focus exclusively on Nordic energy policy issues. This option was actively utilised in the last period where the work often was delegated to Nordic Energy Research, which to some extent became a knowledge centre for Nordic energy [technology] policy cooperation.

The need for *energy security* triggered Nordic energy policy cooperation to develop a long-term energy policy, and also to assure the necessary competency building of national experts in the field. Linkages were established between the governments and the advisory body of the power sector on long-term planning. In the 1990s, the energy security experience was handed over to the adjacent areas (the Baltic countries and Northwest Russia), which at that time also had to develop their energy policies with high security, diversity and efficiency. In the last period, it became increasingly clear that Nordic energy policy was an integral part of EU energy cooperation. On the one hand, the EU would set the overall agenda, but on the other hand the Nordic countries strived to align themselves in a way to exert greater influence over EU policy.

The cooperation on *energy markets* developed from a wish to make the important oil and gas sector an area of cooperation to finally recognise that national conditions, policies, technologies and markets were not ready for Nordic cooperation. Many Nordic studies, conferences and explorative actions paved the way for that recognition. In the power market, the sector itself had initiated cooperation long before the policy took over, and once the ministers agreed to a Nordic electricity market, it took off guided by a detailed action plan. Therefore, the Nordic countries were well prepared to influence and benefit from EU energy packages.

*Energy efficiency* remained a priority area since the very beginning, based on the premise that the best energy is the one that we do not use—knowledge-sharing, campaigns and labelling and standardisation were good, but far from sufficient to address this challenge.

*Technologies* underwent an interesting development. In the beginning, technology R&D was an integral part of finding long-term solutions for a sustainable energy system. But at that time, there was little consideration given as to how to bring them to the market. In the second period, technologies did not play a larger role, at least at the policy-making level, except when discussing the implementation of the Kyoto mechanisms in the adjacent areas. At present, energy technology policy is regarded as an integral part of energy policy; thus at Nordic level as well, combining the technology push with the market pull of new energy technologies. This was further strengthened institutionally by Nordic Energy Research's financing of research projects and its support for Nordic energy policy cooperation.

Challenges arising from *environmental and climate change*, unlike technologies, became more and more embedded in other policy areas such as agriculture and transport. Energy was partly responsible for climate change, albeit also one of the solutions to mitigate harmful emissions. Recent development had also shown that in times of crisis (financial, economic and energy), security of supply took precedence over climate, the latter of which having longer-term implications.

In conclusion, Nordic energy policy cooperation has come a long way, though it still has some much more ground to cover. It has provided deep insight into each country's energy system, policies, technologies and markets at multiple levels, and been complemented by numerous studies, reports, conferences and networks. The cooperation has acted as a support for policy- and decision-making at both national (and international) levels. Last but not least, Nordic cooperation has delivered concrete actions and policies for the energy markets and for the development of new energy technologies, not only for the Nordic countries themselves, but also in a wider European context. As the former Secretary-General of the Nordic Council of Ministers, Halldor Asgrimsson, often pointed out: "Nordic cooperation is a tool for regional cooperation, which can inspire and be used by other regions in the world".<sup>8</sup>

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<sup>8</sup> See, for example, the interview recently published in relation with the obituary by the General Secretary Dagfinn Høybråten, at <http://www.norden.org/da/aktuelt/nyheder/tidligere-generalsekretaer-halldor-asgrimsson-er-doed>.

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