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About SEFEP
SEFEP, the Smart Energy for Europe Platform, is an independent, non-profit organisation founded by the European Climate Foundation and the Stiftung Mercator. Based in Berlin, SEFEP offers a platform to stimulate cooperation and synergies among all European actors who aim to build a fully de-carbonised, predominantly renewable power sector.
Summary

With its vast hydropower and wind resources, Norway has the potential for playing a major role in greening the European power system by developing its large potential for additional power storage capacities as well as for additional renewable generation, including hydro, onshore and offshore wind, as well as biomass.

However, the Norwegian energy agenda is in many ways diametrically opposite to Europe’s. Norway is not characterised by energy scarcity but by energy abundance, nor are primary concerns about security of supply, but about access to export markets – foremost for oil and gas, and only secondarily for electricity.

This report explores the viewpoints of Norwegian actors and interests, seeking to assess Norwegian readiness to fully engage with the North Sea Countries Offshore Grid Initiative, focusing mainly on interconnections as key mean to unlock storage potential. In a first part, the report looks at the existing and potential resources, and summarises the long history of debates about power system interconnection from the 1920s until today. In the second part, this report analyses the current state of discussion, considering the position of the main actors and the arguments used in the discussion from a Norwegian perspective. In its concluding section, some considerations on the future framing of this debate in Norway are presented.

This report is a side product of a broader analysis of the politics of the North Sea Offshore Grid that SEFEP is working on, with the intention of facilitating the overcoming of political barriers to the deployment of offshore wind and of interconnection cables in the North Sea region.
Introduction

The North Sea Countries Offshore Grid Initiative (NSCOGI) was set up to “facilitate a strategic and coordinated development of offshore and onshore grids”, taking into account ambitious plans for the installation of offshore wind farms in the North Sea, while recognising that “the renewable energy sources of the North Seas have the potential to make a significant contribution” to the shared “common goal of moving to a sustainable low-carbon economy while maintaining security of supply most cost-efficiently.”

Norway has signed the NSCOGI Memorandum of Understanding and actively participates in its working groups. However, Norwegian enthusiasm for the North Sea Grid Initiative may not quite match European expectations. As Michael Köhler, Head of Cabinet for Energy for the European Commission rhetorically noted during a visit to Oslo in late 2011: “Norway is a good friend, we can even be best friends and that’s nice for us, but there is a difference between friends and family.”¹ In terms of energy priorities Norway has stronger familial resemblance to Russia and oil-rich Arab countries, in spite of its strong climate policy commitments and of its fundamental dependence on European markets. For this and other historical reasons, Norway has had an ambiguous relationship not only to the North Sea Grid Initiative, but also to the larger European project.

The Norwegian Resource Base

Norway has the potential to play a major role in stabilising North European power supply. As of January 2009, the country had developed 122.7 TWh of its 205.7 TWh annual hydro power generation potential. While 20 per cent of this potential is protected under the Water Resources Act (see figure 1), considerable additional hydropower resources (35+ TWh/year) remain available, some of which will be developed under the new Swedish-Norwegian Green Certificate Market.

¹ Said during seminar “The Next Decade of EU-Norway Energy Cooperation” arranged by the EU Delegation to
Most importantly, Norway has around 40 to 50 per cent of Europe’s total reservoir capacity. Thirteen out of the eighteen largest lakes in Norway are used for regulating hydropower, and the reservoir capacity is approximately 82 TWh – with 34 TWh located in Southern Norway, 22 TWh in mid-Norway and 26 TWh in Northern Norway according to The Norwegian Water Resources and Energy Directorate.2

Norwegian hydropower has for several decades been the backup system for the integration of growing wind power capacities in Denmark, based on spot- and balancing market trade in the Nord Pool system. The same could be done for Germany, the UK, and the rest of Northern Europe as existing capacity could increase with pumped storage. Statkraft currently does this on a small scale for seasonal variations, but Statkraft CEO Steinar Bysveen estimates that the general technical potential for pumped storage in southern Norway

Norway and the North Sea Grid

consists of about 10,000 to 20,000 MW. Because of an energy loss of about 25 per cent from pumping the water back up, there needs to be a price differential of at least 25 per cent to offset the cost according to Bysveen. As such, the foremost challenges to large-scale pumped storage seem to be commercial, rather than technical or environmental, as Petroleum and Energy Minister Ola Borten Moe (Center Party) has implied previously.

**Power Export Controversies – An Old Story**

The idea of using Norwegian storage capacity as a green battery for Europe is controversial in today’s domestic politics. This is, however, nothing new. Controversy over power export to continental Europe and the Nordic countries is an old story going back almost a century.

Norway started harnessing its vast hydroelectric resources at the turn of the 19th century based on a model of export-led growth, with electro-chemicals, electro-metals and processing of paper and pulp as the major commodities. As a small and newly revived nation with limited domestic capital, the country developed a protective ownership-regime around its hydropower resources in order to avoid international control of the hydropower-economy. The industrial development of hydropower soon spilled over to demands for electricity for general consumption fronted by regional and municipal initiatives.

As documented by the historian Lars Thue, the question of electricity export was raised early on, with focus on Denmark, Sweden and Germany. Power trade to Denmark was for example discussed by nationally appointed commissions already in 1921. The focus was on two trajectories: a sea-cable from Norway to Denmark, and a transit arrangement through Sweden. However, the project stranded – due in part to a downturn of the business cycle in the early 1920’s, and a fall in coal prices that made the project less interesting for the Danes. In Norway concerns were raised about prioritising domestic consumers and industry. Industry representatives were eager to point out that employment effects of power used at

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4 Morgenbladet: «Vil ikke bruke Norge som batteri» 9 September 2011.
home were extensive, and that Norway, by selling cheap electricity to neighbours, could face competition for its electro-based industry production in the world market.

In the late 1920’s and early 1930’s plans were also launched for Norwegian power export to Germany. Visions of connecting Norwegian electricity with the German market were presented by a Norwegian delegation from the electricity industry. The press reported from the event using headlines such as “Norway as Central Europe’s Power Plant.” The German engineer Oscar Olivin presented an ambitious European energy plan with power trade from Norway as a prominent element during the same event. The plans, perhaps not surprisingly, met with staunch criticism from the Norwegian electro-chemical industry. The influential director of Norsk Hydro, Axel Aubert, pointed out that employment per KWh power processed through his industry created 22 times more jobs than power export. The plans were soon buried.

The II World War and the German occupation of Norway saw once again a revival of power trade between the two countries. However, while Norwegian electrometallurgical industry was given a boost to serve the German war machine, the grid connection remained unrealised. Following the war, there was considerable European and Nordic pressure on Norway to facilitate electricity supply to both Denmark and Sweden. Marshall Plan Grants were promised in financial support. Afterwards, negotiations with Denmark failed because of disagreement on pricing as well as disputes over firm power versus surplus power supply. While Norwegians were interested in selling their over-supply, the Danes wanted guaranteed firm power. Export contracts to Sweden did however see the light of day in late 1950’s after several rounds of negotiations and pressure from regional electricity companies. Still, power export remained a controversial political topic. Both newspaper headlines such as “Selling Our Own Livelihood” and statements from trade unions representing heavy industry on the large job potential in domestic industrial power utilisation figured prominently.

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\(^6\) (ibid.)

\(^7\) (ibid.)
The formation of NORDEL in 1963 marked the start of a new era with more collaborative resource utilisation between the Nordic countries. Rather than focusing on export/import, concepts such as “power-collaboration”, “cooperation in power generation”, and “power exchange” were used. NORDEL was also a forum for contacts between TSO’s and market representatives, and trade between the countries was regulated through long term power exchange contracts with Statkraft which acted on behalf of itself and other Norwegian power companies. As indicated in figure 2 Norway largely figured as a net power exporter.

*Figure 2: Power Import and Export 1970-1998*

![Power Import and Export 1970-1998](chart)

Source: Nord Pool Power Market, 2000

Following early deregulation in Norway and the Nordic region, international trade became part of regular trade on the Nord Pool markets and bilateral contracting between the market players. The Nord Pool market started in 1993 in Norway, extended to Sweden in 1996, to Finland in 1998, to Denmark in 2000, and finally to Estonia in 2010. There were also early attempts to connect Norway and the Nordic region to wider European markets. In the 1990’s three large cable developments were launched but later cancelled (table A). A realisation of these projects would have boosted transmission capacity between the Nordic market and the Continent by 2400 MW. The two projects to Germany were terminated by German counterparts as EU deregulation evolved, and the parties faced shared trade advantages with the wider European market. The NSI cable was turned down by Norwegian authorities due to concerns about overall economic benefits.
Table A: Failed Interconnection Projects during the 1990’s

<table>
<thead>
<tr>
<th>Euro Cable</th>
<th>Viking Cable</th>
<th>North Sea Interconnector</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 600 MW planned capacity</td>
<td>• 600 MW planned capacity</td>
<td>• 1200 MW planned capacity</td>
</tr>
<tr>
<td>• Power exchange agreement between Eurokraft Norge AS and Eurostrom Trading GmbH received concession in 1995.</td>
<td>• Power exchange agreement between Statkraft and PreussenElektra (E.ON)</td>
<td>• Statnett SF and Natural grid Transco decided to develop the project in 1996.</td>
</tr>
<tr>
<td>• Statnett SF established Eurokabel together with Eurostrom in 1995</td>
<td>• A 50/50 joint venture between Statkraft and Preussen Elektra named Viking Cable was established in 1994</td>
<td>• Based on long term auction of physical transmission rights</td>
</tr>
<tr>
<td>• Eurokabel received investment concession in 1997</td>
<td>• Viking Cable received investment concession in 1997</td>
<td>• The project did not receive concession by the Norwegian Authorities in 2003</td>
</tr>
<tr>
<td>• Eurostrom terminated the power contract in 1999</td>
<td>• Preussen Elektra terminated the contract after declared hardship in 2001</td>
<td></td>
</tr>
<tr>
<td>• Eurokraft announced arbitration case in 2000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Econ Pöyry and Thema Consulting, Challenges to Nordic Power, 2010

Interconnections Today and Visions for the Future

There is currently a capacity of 3700 MW out of Southern Norway under normal operating conditions according to Statnett. 2050 MW of this is to Sweden, 950 MW to Denmark, and 700 MW to the Netherlands. There is in addition 1400 to 1700 MW capacity to Sweden from middle and northern parts of Norway, 120 MW to Finland and 50 MW to Russia.\(^8\)

Statnett has initiated building of a fourth connection over the Skaw to Denmark (Skagerrak 4). The cable will have a capacity of up to 700 MW, whereof 100 MW is reserved for system- and balancing services the first five years of operation. The cable is planned to be operative in 2014. Furthermore, Statnett and Svenska Kraftnät have agreed to establish a Southwestlink, securing transmission between Norway and southern Sweden with a capacity up to 1400 MW. This will in the next round strengthen transfers to continental Europe over the existing SwePol and Baltic cables connecting Sweden with Germany and Poland (figure 3).

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\(^8\) Statnett Grid Development Plan 2011.
In collaboration with foreign partners, Statnett is developing new interconnections to the United Kingdom and Germany. Statnett plans to finish one of these two interconnections in 2018 and the second in 2021. Taken together with the new South-Scandinavian connections this implies an increase of 4000 MW, which will double the Norwegian export/import capacity (table B).
Table B: Planned Investments in International Interconnectors

<table>
<thead>
<tr>
<th>Project</th>
<th>Capacity MW</th>
<th>Operational</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSN. The UK</td>
<td>1000</td>
<td>2018 or 2021</td>
<td>Joint project with National Grid.</td>
</tr>
<tr>
<td>NordGer/NORD.LINK. Germany</td>
<td>1000</td>
<td>2018 or 2021</td>
<td>Concession applied for April 2010.</td>
</tr>
<tr>
<td>South-West Link. Sweden</td>
<td>1400</td>
<td>2018-2020</td>
<td>Pre-application notice received by NVE in September 2011.</td>
</tr>
</tbody>
</table>

Source: Statnett Grid Development Plan 2011

The planned interconnections to the UK and Germany have both been delayed. It is still unclear at the end of 2011 whether Germany or the UK will be prioritised, as Statnett will not put the interconnections in place simultaneously. In addition, Statnett announced a reduction of the total capacity to Germany from 2800 MW (i.e. two cables) to 1000 MW (one cable), while the official message is that the exact capacity will be determined at a later stage. However, according to Erik Skjelbred Statnett is actively looking at solutions that would enable a 1400 MW connection each – one two Germany and one to the UK – as opposed to 1000 MW (see table B).9

The reason behind the delay was explained in Statnett’s Area Study of Southern Norway, released in August 2011, which showed that extensive domestic grid upgrades are necessary before any further international interconnections can be put into place. More interconnectors will make southern Norway a transit area for power exchange between the Nordic region and continental Europe. This will not only increase the strain on the power lines between southern, western and eastern Norway, but also other domestic Norwegian power lines across the country as most reservoir plants will react to the same price signals. Assessments on system operations and enforcements needs must therefore be made beyond southern Norway, although the impact on the grid will be greatest near the cables.10

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9 Said by Erik Skjelbred, Director of Infrastructure Strategy at Statnett during seminar «Grid Infrastructure and Climate Change Politics» organised by Bellona and Energi Norge, 28 October 2011.
10 See Appendix A for more information on the Area Study of Southern Norway.
Statnett has indicated that these revised plans should be considered ambitious, despite the fact that they have already been downgraded once.\textsuperscript{11} This might indicate an increased likelihood of further postponements in years to come.

Statnett’s announcement on the postponement of further overseas connections has caused a stir, especially in Germany. In June 2010 Statnett bought 50 per cent of the shares to the NorGer cable project, making Statnett the main developer on both planned routes to Germany. This, and other similar events, has made Germans and others question Norwegian commitment to interconnections and the Memorandum of Understanding on the North Sea Countries Offshore Grid Initiative. Much has been said about the reasons behind the delays and changes, but the general agreement in Norway is that the postponements are indeed due to technical challenges. There are however a few Norwegian players, most notably in the NGO-sector, that question the “timeliness” of the study, as it came out shortly after signals from the then new Petroleum and Energy Minister Ola Borten Moe, who made it clear that he did not endorse overseas interconnections. He has subsequently moderated his position during the winter of 2011.

Upgrade of the domestic grid involving erection of new masts has proven to be controversial, and may create political opposition to expansion of foreign power trade. At the same time, Statnett sees more overseas cables as an integrated part of the central grid, providing an outlet for renewables production and increasing domestic security of supply. The expected increase in domestic hydro generation will augment the difference between wet and dry years, and thereby put the electricity system under pressure. This again makes it important to expand import capacity in dry years and export capacity in wet years.

The joint Swedish-Norwegian market for electricity certificates that aims to introduce 26.4 TWh renewables in Norway and Sweden before 2020 also provides an imperative towards increasing transfer capacity both in the domestic and transnational grids. An alternative would be to attract new energy-intensive industry, or to undertake an extensive conversion

\textsuperscript{11} Statnett Grid Development Plan 2011.
from fossil to renewable energy in the Nordic region. Analyst Håkon Thaule suggests that the Nordic region will see a considerable power surplus notwithstanding, making interconnections even more important in order to avoid a price collapse.\textsuperscript{12}

Given the current highly integrated Scandinavian electricity systems, and following pioneering electricity market reforms, an analysis of Norway’s contribution to balancing North European power markets must therefore take into consideration the wider Nordic context (figure 4).

\textit{Figure 4: Power production in the Nordic countries 2010}

Source: Statnett Grid Development Plan 2011.


Actors, Interests and Strategies

Norwegian interests on the North Sea Offshore Grid Initiative relate to strong industrial clusters and vested interests – some of which have long historical traditions.

Hydropower and Export-Led Growth

Energy has been central to Norway’s export-led growth since the early 1900’s. Attractive and cheap hydropower resources were exploited for electro-metal and electro-chemical production for the world market. This strategy was reinforced during and after the Second World War, and became a cornerstone in Norway’s post-war economy. Out of this grew a hydro-based heavy industrial complex with companies like Norsk Hydro, Elkem and Orkla, as well as paper and pulp industry companies such as Borregaard and Norske Skog. These industries had the advantage, for a long time, of favourable electricity contracts, while they also built up some generation capacity of their own. This industrial complex, now coordinated through the organisation Norsk Industri, continues to be important today, and exerts at times considerable pressure on Government to continue to provide cheap electricity.

Deregulation and Decoupling of the Old Power-Industrial Complex

Together with the UK, Norway spearheaded deregulation of electricity markets in Europe. With a more dynamic commercial role, gradually expanding to other countries, the stage was set for a decoupling of the old power-industrial complex. More independent and commercially oriented electricity companies started to look for business opportunities beyond furnishing energy-intensive industry with cheap power. Load management and high priced export to continental Europe started to appear as a viable business opportunity. This development has created tensions between electricity industry and energy intensive industries in Norway.

The Oil-Industrial Complex

As the oil-industrial complex grew in Norway throughout the last quarter of the 20th century it came to take a hegemonic role in Norwegian state finances and export-led growth. As
opposed to hydro-electricity, oil and gas exports went directly to international markets, although with some refinery in Norway. Following the build-up of large pipeline systems to continental Europe, the petroleum sector was never locked into the domestic economy like hydropower. Prices, including domestic, were pitched at world market prices for oil, and gas was priced at negotiated international standards. Today, the petroleum industry is foremost concerned with optimising its position in the European markets as gas is becoming a major source of electricity generation. With considerable flexibility, gas turbines are also attractive alternatives for load management. Following the recent discovery of new large petroleum fields and gas deposits in the North Sea and the Barents Region, Norwegian petroleum interests are stronger than ever.

Strategic Interests in a Nutshell
To sum up, Norway’s position on power export to continental Europe is shaped by the engagement of a small number of core actors, their interests and their strategies:

*Electricity companies*, headed by regional pioneers like *Agder Energi* and *Lyse Energi* as well as the largest state owned company, *Statkraft*, obviously play a core role. Their interest lies in creating market access to competing buyers, in order to obtain fairly high prices. However, they also need to move along a price trajectory that does not shed large customer segments, provoking dramatic over-supply.

*Energy intensive industry*, including global players in electrochemical, electrometallurgical and forestry products, such as *Hydro, Yara, Elkem*, and *Norske Skog*. Their interest lies in securing low prices and long-term price stability in order to match their long-term investments, which remain locked-in to local plants for many decades to come. Securing price stability entails an interest in avoiding price spikes in dry periods, which may lead to supporting a moderate expansion of interconnection capacities. However, keeping average prices low entails an interest in avoiding “excessive” integration with the European power system. Their threat is to end investments in Norway and move to more lucrative locations,
unless satisfactory energy contracts are provided. This has again alarmed trade unions that have mobilized support for industry-friendly electricity prices.

*The public at large and other businesses,* lumped together for the sake of simplicity, have similar interests as energy intensive industry. They demand low electricity prices, although they are far less price-sensitive.

*The petroleum industry,* particularly its gas segment, spearheaded by the national champion *Statoil,* which has an obvious interest in supplying gas to continental Europe. This includes both base load and peak load supplies.

*The Norwegian state* has an obvious interest in maximising long-term value creation and employment for the domestic economy.

Investors looking for a better integrated European energy exchange market therefore face a many-headed Norwegian troll.

**From Tug of War to the December 2011 Initiative**

A period of tug of war between electricity companies and energy intensive industry over cable expansion has until recently provided mixed signals about the Norwegian position. Industry has sought to limit building of cables in order to lock-in electricity in the Nordic market, believing this would keep prices low. This strategy has in part also appealed to the general business community and household consumers. Electricity companies have sought to expand their international connections, following high paybacks on cable investment and expectations of arbitrage gains from trade – in addition to price increases in the domestic market. Energy-intensive industry has counted on implicit support from the petroleum industry that has not wished to compete with electricity export that would diminish the high priced need for gas-based peak load supply.
Recently, however, a joint initiative for increased value creation between industry (represented by the industry organisation *Norsk Industri*), electricity companies (represented by the industry organisation *Energi Norge*) and trade unions (represented by The Norwegian Confederation of Trade Unions LO) was launched. The initiative, presented on 6 December 2011, calls for a “holistic policy for climate change, energy and value creation.” The settlement aims to bring about a further development of renewable power resources and power exchange, and production and export of power-intensive products. Industry is to be secured global competitiveness – both through reasonable energy prices and through compensation for unilateral CO₂ reductions in the European Economic Area. The initiative also calls for “balanced power exchange with other countries, providing increased value creation and climate change advantages.” More specifically: “international interconnectors should be built if they bring socio-economic advantages, and should be provided before Europe finds other solutions” the initiative states.

The spirit of the initiative has recently materialised in a series of long-term contracts between energy-intensive industry and electricity companies, notably *Statkraft*. A core motivation for electricity generators to enter into such contracts is probably the fear of massive price decreases should energy-intensive industry relocate outside Norway. The prospect of an extensive increase in renewable electricity under the Swedish-Norwegian Certificate Market has also been a strong motivating factor. Estimates presented by *Statkraft* at the 6 December conference indicate that the effects of the settlement for the Norwegian market would be a slight increase in prices under a static perspective, and where new investments are not considered. However, this price effect is expected to be counteracted by new investments in electricity generation that the settlement is likely to unleash. *Statkraft*’s estimates are by and large confirmed in a report by *Thema Consulting* and *Econ Pöyry* (figure 5).

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Petroleum Industry Not on Board

While the initiative aligns electricity and energy-intensive industries with support from top leadership in trade unions and the Minister of Trade and Industry Trond Giske (Labour Party), it does not include the petroleum industry. Given the latter’s major contribution to national value creation, its interests will weigh in heavily. The initiative is obviously a wise strategic move towards a more expansive cable-regime that the government may find hard to resist. However, the petroleum industry is not part of the deal, and Petroleum and Energy Minister Ola Borten Moe and State Secretary Per Rune Henriksen have previously declared that Norway will not be a green battery for Europe. The argument is that Norway is already providing Denmark with balancing power, and that Norway does not have enough storage capacity for any larger pan-European visions. The explicit focus is therefore on export of Norwegian natural gas and measures to increase energy efficiency which is seen as a “low-hanging fruit with enormous potential.” The line taken by the Ministry of Petroleum and Energy is essentially one that prioritises security of gas demand, and ensures the core...
interests of Statoil. While Statoil recognises that the share of renewables in the European energy mix will increase, the company also argues that natural gas should be the preferred long-term option for flexible base load. All in all, Statoil seems to perceive high renewable scenarios more as a threat than as an opportunity for their gas business. Furthermore, the strong industry and energy workers union Industri Energi retains its negative attitude to expanded interconnections with other countries.

The petroleum sector is, after all, absolutely dominant in the Norwegian economy. For 2010, gas exports alone measured in energy content was about nine times that of the normal Norwegian production of electricity, and Norwegian gas export covers close to 20 per cent of European gas consumption.14 Most of the exports go to Germany, the UK, Belgium and France, where Norwegian gas accounts for between 20 and 35 per cent of total gas consumption. As indicated in figure 6 the gas sales are expected to peak around 2020 at a level between 105 and 130 billion scm in 2020, with expected sales between 80 and 120 billion scm in 2025.

Figure 6: Gas Sales from Norwegian fields

![Graph showing gas sales from Norwegian fields from 1985 to 2025](image)

Source: Ministry of Petroleum and Energy, 2010

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14 Gas activities make up a growing share of the petroleum sector, and provide the State with considerable revenues. Producing companies on the Norwegian continental shelf have gas sales agreements with buyers in Germany, France, the UK, Belgium, the Netherlands, Italy, Spain, the Czech Republic, Austria and Denmark. The Snøhvit facility delivers LNG (liquefied natural gas) to countries including the US, Brazil, South Korea, Turkey and several countries in the EU area.
The gas sector has to a large extent built up a North Sea Super Grid to facilitate gas transport which trumps electricity infrastructure. This includes a network of pipelines with a length totaling more than 7975 km, and with a transport capacity of about 120 billion scm per year. There are four receiving terminals for Norwegian gas on the Continent; two in Germany, one in Belgium and one in France. In addition, there are two receiving terminals in the UK (figure 7).

*Figure 7: Existing gas pipelines*


**Norwegian Offshore Wind – high potential, but not in the short-term**

Large areas of the North Sea have good wind conditions but deep waters, and thus the development of large scale offshore wind in Norway depends on the development of floating wind technologies. Accordingly, Norwegian industry has positioned itself with *Hywind and Sway*, both combining state of the art wind-turbine technology with Norwegian offshore experience in the hope of making floating offshore technology commercially viable.
Under the Petroleum and Energy Minister Åslaug Haga (Center Party), the vision was to initiate a renewable energy programme for post-petroleum Norway: “We will produce many times today’s energy consumption in Norway if we succeed in developing large-scale offshore wind ... but we must dare to think both big and long-term ... offshore wind will be important in the future, both to substitute gas on the Norwegian continental shelf and to produce electricity for onshore end customers.” Indeed, several independent sources confirm that Norway’s main motivation to sign the North Sea Countries Offshore Grid Initiative was to support the Norwegian offshore wind industry. There was also considerable pressure from the political opposition for Government to sign. The idea was that the North Sea Grid Initiative would bring about massive investments in Norwegian wind industry.

The mood has however changed from hype to critical realism since Åslaug Haga ended her term in 2008, and the new mood is embodied in the current Minister Ola Borten Moe. The tune is now that Norway has an energy surplus and does not need more energy. Furthermore, the Green Certificate Market with Sweden is designed to pick low-hanging fruit, such as small hydro and onshore wind, and not to pioneer expensive offshore installations. Emissions from gas powered offshore platforms will be offset by much cheaper emission trading and clean development mechanisms (CDM) abroad.

Given the new oil and gas discoveries, thinking beyond petroleum in Norway remains economically irrelevant, and the role of driving offshore wind technology is happily left to the UK. This arena also attracts Norwegian industrial investments, even though plans also exist for a few installations in Norwegian territorial waters.

Norway’s Conflicting Interests

To summarise: vested interests of domestic energy clusters indicate deep divergence. Given their rivaling interests in export to the European electricity markets, both for base load and

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16 Several offshore wind projects are planned for in Norway, but so far only one larger project – Havsul 1 (350 MW) – has been given concession to operate per October 2011. It is expected that an investment decision on Havsul 1 will be taken before the end of 2011, with a projected building start in 2014. In addition to Havsul 1, six small-scale pilot projects have been given concession for test and build.
load management, the conflicting interests between Norway’s gas export and electricity export businesses are obvious. Norwegian petroleum industry has traditionally had a powerful ally in the el-metallurgical/el-chemical and paper and pulp industries who lobby cheap power contracts. Together these two sectors can mobilise in order to block electricity export. The recent settlement between energy-intensive industry and the electricity industry has reduced opposition to further expansion of interconnectors. However, the petroleum sector remains a powerful opposition in itself, and revenues from gas trade to Europe completely dwarf any scenario for profits from electricity exchange.

A Difficult Political Sell

The topic of interconnections is a tough political nut for Norwegian politicians, when taking into consideration that trade and exchange is often misunderstood as export, and as such it is viewed as sacrilegious. This is a challenge that hampers any serious discussions about international power trade, price volatility, and security of supply. This challenge becomes even greater when taken into consideration that many Norwegians still view cheap hydropower as a “birthright.” Norwegian electricity prices are low in a European perspective (table C), but unlike many other European countries, Norwegian households are directly exposed to power price fluctuation in the market and react strongly when there are price-hikes under cold winters following dry autumns. High electricity prices hurt extra much as many Norwegian homes use electric heating. Public outcry on high prices – on “exporting our birthright cheaply in the summer and importing expensive Swedish nuclear in the winter” – follow like clockwork every cold winter. In short, Norwegians have a similar relationship to electricity prices as Americans have to gasoline prices.

In addition, issues pertaining to nature conservation hold sway in public opinion. This was clearly demonstrated during the summer of 2010 when the Sima-Samnanger power line, a very important line for security of supply to the Bergen region, was to be built. The Government was forced to back down and carry out an additional feasibility study after massive public mobilisation to protect what was perceived as a pristine and archetypical Norwegian nature landscape. What proves interesting in this case and many similar previous
ones, is that developments did not only cause local opposition, or so called NIMBY-opposition, but mobilised civilians from all over the country. As such, one might talk to a certain degree about “NIMC-opposition” in Norway – “Not in My Country.”

Table C: Average Electricity Prices for Norwegian Household Consumers

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average household KWh price 2010, tariff included</td>
<td>103,8 øre NOK = 13 cents EUR</td>
</tr>
<tr>
<td>Average household KWh price 2009, tariff included</td>
<td>85,9 øre NOK = 10 cents EUR</td>
</tr>
<tr>
<td>Average household KWh consumption per calendar year</td>
<td>20,000 KWh</td>
</tr>
</tbody>
</table>

Source: Statistics Norway (SSB), 2011

Arguments based on domestic business interests are likely to convince politicians especially from the Conservative Party (H) and The Progress Party (FrP), but only parts of the Labour Party (Ap) and the Center Party (Sp). However, it is important to note that even the most eager defenders of a North Sea Grid vision ask for moderation. Climate Change and Energy Spokesperson for the Conservative Party, Nikolai Astrup, admitted that he was eager to see the current Government participate more actively on the NSCOGI-agenda, but simultaneously called for caution and the need for “somber ambitions, as plans for a full-scale meshed network in the North Sea has no economy in it.”

The Center Party will support any schemes that will bring business opportunities to the districts while otherwise adhering to a nationalist/isolationist line in energy policy and supply. There is a schism in the party between those more progressive and in search for new “green business adventures”, and those that toe the line of national oil and gas interests. Previous Petroleum and Energy Ministers during the current Government coalition, Åslaug Haga and Terje Riis Johansen, represent the latter line, whereas the current Minister represents the former nationalist fossil fuel agenda. A similar divide to that within the Center Party exists within the Labour Party – with the Minister of Foreign Affairs, Jonas Gahr Støre, representing more progressive and European-minded views in the current coalition and Labour Party leadership. At the moment, most politicians hide behind the need for massive
domestic grid upgrades and investments, and thus push the discussion on a possible North Sea Grid into the future.

**NGO’s Cautiously Positive**

The NGO-sector is cautiously positive to the settlement, although it remains expectant of further developments. Representatives say they are positive to what might seem like a new emerging coalition on the issue in Norway, but await a concretisation of the ambitions which for now are relatively general. They also question to what extent The Norwegian Confederation of Trade Unions LO’s President Roar Flåthen actually backs up the initiative, as he is known for having praised the Petroleum and Energy Minister Ola Borten Moe on several previous occasions. There are also questions on the back up of Norsk Industri President Stein Lier Hansen, who as recently as May 2011 called for moderation in electricity export.\(^{17}\)

**Strategic Reflections**

Recent events suggest a moderate but growing Norwegian engagement in Northern European energy exchange with the December initiative. Norway is after all, according to Statnett’s latest development plans, going to double its interconnector capacity by the end of this decade. The extremely short payback time (approximately two years) for the latest cables indicates that interconnections are good business, although with declining payback as price differences between the two markets diminish with increasing interconnector capacity.

However, massive North Sea Grid meshed network investments are not likely to be pioneered by Norwegians, even though such visions did exist in Norway at an early stage. A North Sea Grid was then seen as a means to electrify petroleum installations which have been a major source of domestic CO\(_2\) emissions. The North Sea Offshore Grid was also seen as a business opportunity for Norway to put its petroleum-generated offshore technology into new use in floating wind installations, scaled up to serve wider European markets. However, later analyses revealed high costs and extensive technological hurdles. In order to

\(^{17}\) Fædrelandsvennen: «Vil bruke kraften hjemme» 27 May 2011.
be successful in a Norwegian perspective, any North Sea Grid plans would primarily have to be export-motivated, and they would have to rest on a sound economic calculus where alternative super-profitable petroleum investments would set the benchmark. The perceived competitive challenge to Norway’s prioritised gas exports also weigh against any ambitious plans to connect the North Sea Countries together through a Super Grid.

For Norway as a whole, benefits from trading might outweigh the average increase of power prices over the year. However, these benefits would be owned by the operators of storage facilities and of interconnectors. Even though generators and storage facility operators are mainly owned by the state and local authorities, redistributing these benefits to power consumers would not be a trivial matter. Thus, a convincing scheme appeasing power consumers needs to be developed.

Within a more modest marginal expansion trajectory, Norway’s European counterparts could facilitate trade by developing more transparent market designs. The lack of an open and transparent North European market for balancing power is seen by Norwegian actors as a major obstacle. Whereas the Norwegian electricity industry is accustomed to a domestic market with open auction for balancing power organised by the TSO, they have perceived the German market as closed and dominated by insider transactions organised and controlled by the largest energy players. Developing a more transparent Nordic-style market for balancing power is likely to provide better incentives to engage Norwegian players.

Another hurdle is the financing and project management capacity for a major expansion within the TSOs. In order to realise the potentials for power balancing envisaged by Statkraft in its most expansive scenarios, there would probably be a need for supplementary financing sources, possibly including merchant interconnectors. This would however collide with present EU policy, and possibly Statnett’s interests which favour TSO control.

While the Norwegian side controls hydropower resources, the European side could possibly promote greater urgency by outlining their alternative. There is already growing recognition on the Norwegian side – notably in the December initiative – that there is a limited window
of opportunity for Norway to profit from being a green battery for Europe. Pro-interconnector actors worry that if Norway hesitates, or moves too slowly, Europe will find other workable solutions within EU. This worry is related to bigger meta-level discussions and sentiments on Norway’s role in Europe, which is a debate which is largely “owned” by EU-skeptics, at least in the public debate.

With respect to politics, the Norwegian public debate indicates that the topic of a North Sea Grid is best framed as one of business opportunities and value creation, while focusing on price-stability for Norway, rather than security of supply for Europe. A second best option is probably to address the North Sea Grid as a means to help Norway fulfill its renewables targets.

Norwegian realities indicate that the North Sea Grid will not emerge as a massive coordinated project. Rather, it will probably emerge through piecemeal investments. However, the gas sector that went through such an evolution now has an impressive integrated network.
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Table C: Average Electricity Prices for Norwegian Household Consumers. Source: Statistics Norway (SSB), 2011.
References


Morgenbladet: «Vil ikke bruke Norge som batteri» 9 September 2011.


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We would like thank the following people for taking the time to share their thoughts on issues pertaining to the North Sea Grid Initiative.

Interviewees
Astrup, Nikolai. Member of Parliament, Member of the Storting Standing Committee on Energy and the Environment. The Conservative Party (H).
Isachsen, Øyvind. CEO. Norwea (Norwegian Wind Energy Association).
Løken, Kristian. Project Manager, Norwegian Water and Energy Resources Directorate (NVE).
Marcussen, Kristian. Project Manager, Norwegian Water and Energy Resources Directorate (NVE).
Sharifabadi, Kamran. Principal Lead Power Grid and Regulatory Affairs. Statoil.
Stene, Janne. Head of Clean Energy Programme. The Bellona Foundation.
Strømmen Lycke, Anne. Vice President Asset Management. Gassnova.
Sund, Karen. Founder and Owner of Sund Energy.

Others
Burnett, Mark. Climate Change and Energy Advisor for the British Ambassador to Norway, Jane Owen. The British Embassy in Norway.
Ulseth, Oluf. CEO. Energi Norge.
Appendix A - Statnett’s Area Study of Southern Norway: Consequences of More Interconnections between Norway and the Continent

The study looked at the period from the commissioning of Skagerrak 4 and ten years in to the future (2021). A key element was to view the development of interconnectors in connection with the feasibility of Statnett’s ongoing voltage upgrade programme (from 300 to 420 KV). Whereas previous studies were based on the assumption of an already upgraded power grid, the new study has been based on a more gradual upgrade, based on an assessment of a practical feasibility. The complexity in connection with the implementation of the voltage upgrades is significant, and this in combination with strained operations in an intact grid makes a gradual and controlled development of the overseas interconnectors necessary.

The analysis confirms the experiences gained by system operations that the grid operations are already strained, and that the situation will be further strained once Skagerrak 4 comes online, even if the “Eastern corridor” is upgraded. The analysis shows a need for grid upgrades in the “Western corridor” as well, in order to ensure secure operations and full utilisation of Skagerrak 4.

More interconnectors will make southern Norway a transit area for the power exchange between the Nordic region and continental Europe. This will not only increase the strain on the power lines between southern, western and eastern Norway, but also other domestic Norwegian power lines across the country. This is due to the fact that most reservoir plants will react to the same price signals. The more cables and stronger domestic grid, the further away power generation will respond and consequently impact flow in the grid. Assessments of system operations and enforcement needs must therefore be made beyond southern Norway, although the impact on the grid will be the greatest near the cables.

The challenges with a biased flow distribution in the southern Norwegian grid, and increased transit in other parts of the country, necessitate grid reinforcements beyond those already identified previously. This can influence the order and prioritising of the grid reinforcement
measures and will also impact the operation of the interconnectors. Significant duration of outages in the Western corridor due to the voltage upgrade work will cause extensive restrictions on the utilisation of the interconnectors.

Having two new 1 400 MW interconnectors come online in addition to SK4, will require extensive measures both north of Sauda and towards/in eastern Norway, in addition to the necessary measures internally in the area. Which measures will be necessary in order to have one new interconnector come online will depend on the point of destination. Locating the cable in Kvilldal or Feda/Tonstad will necessitate grid measures north of Sauda, as well as possibly in the east/west connections. Locating it in Kvilldal will require fairly few grid measures south of Sauda beyond the necessary measures for full utilisation of SK4. Locating the cable to the Feda/Tonstad area will require further reinforcement of the grid from Feda/Tonstad and northwards to Sauda.

Source: Statnett Area Study of Southern Norway, 2011

Appendix B – Important existing and forthcoming policy documents

Important forthcoming policy documents
Storting White Paper on Climate Change. Postponed three times, new expected release in early 2012.

Existing policy documents relevant for the North Sea Grid Initiative
Statnett Grid Development Plan of November 2011.
The Offshore Energy Act of July 2010.