



TOWARDS A STRATEGIC VISION ON ENERGY TRANSITION IN THE NORTH SEA REGION

Jointly debated and created on 20 November 2012 at the 4th Partner Meeting in Groningen

1. Introduction

To deliver the “20-20-20” climate and energy goals as well as sustainable growth, the European energy system has to change rapidly. The EU energy system has to change in 2 ways: by cutting down the primary energy demand¹ and by large scale deployment of renewables. This energy transition process is simply a no-brainer for the North Sea Region. Energy transition will create and retain welfare by investments, job creation, countering energy poverty and lowering future energy costs and will lead to sustainable development of the North Sea Region reaching environmental goals and providing the region with an acceptable climate adaption scenario.

The recent rapid expansion of renewable (mainly wind and solar) power has cemented the position of renewables as an indispensable part of the EU energy mix. And in 2015 renewables will account for almost one-third of the total NSR electricity output. The rapid increase in renewable energy is underpinned by security of supply issues, introduction of new technologies, low carbon pricing and high dependency on subsidies. Taking all developments and policies into account Europe needs to put the energy system evermore onto a more sustainable path.

The INTERREG 4B-projects “*Energy Vision North Sea Region*” and “*LOWCAP*” are clustering the current INTERREG IVB energy projects. EVNSR and LOWCAP are drawing on the value and strengths identified in the individual projects/clusters in order to apply the in an interrelated and mutually reinforcing way, facilitating an aligned regional expression of and implementation of the EU 20 20 20 climate and energy goals. Based on that lessons learned EVNSR and LOWCAP are trying to speed up the energy transition in the North Sea Region. The NSR has all the ingredients to increase the deployment rate of renewable energy and fully unlock the real economic potential of energy efficiency, in order to create jobs, strengthen the regional economy and deliver a contribution to the climate goals.

The INTERREG 4B-clusterproject *Energy Vision North Sea Region* has started in January 2012 and will be finished in July 2013. The aim of the project is to provide a *roadmap* to increase the deployment rate of renewable rate in the NSR, based on the results of the renewable energy project. This paper identifies the first results of the analysis done by the EVNSR-partnership and is hoping to provide the Programme Preparation Group with ‘*aanknopingspunten*’ for the new INTERREG-North Sea program.

2. Europe’s Challenge

The European Union faces some serious challenges as a result of policy objectives like ensuring a competitive, sustainable energy supply by 2020 and achieving a resource- efficient and low carbon economy by 2050. Currently, policy trajectories focusing on energy innovations through knowledge exchange are thought to face three key objectives for 2020:

- A 20% reduction in EU greenhouse gas emissions from 1990 levels;
- Raising the share of EU energy consumption produced from renewable resources to 20%;
- A 20% improvement in the EU's energy efficiency.

¹ The Efficient World Scenario of the World Energy Outlook 2012 recently published the International Energy Agency Our shows how energy efficiency investment can unleash the huge potential for reaching environmental goals and realize huge gains for energy security and economic growth.

A shift towards renewable energy is necessary as fossil resources becoming depleted. The European Commission acknowledges the energy production capacities in the Northern Seas and proposes that an offshore grid in the northern seas with connection to Northern as well as Central Europe is among the priority corridors which will make Europe's electricity grids fit for 2020.

The use of more durable energy sources, such as renewable energy sources, will play a key part in achieving CO2 reduction targets. Renewable electricity generation will need to double between now and 2020 to meet the EU's 2020 targets. Up to 60% of this new capacity is expected to come from offshore renewables, with much of this being installed in the North Sea Region. Operating a power network with a high share of renewables will be very different from the way these networks operate at present. Their presence will create significant challenges to maintain quality and security of supply, mainly because of the variability (or intermittency) of their output. Managing a rising share of fluctuating renewable energy production through a combination of flexible technologies including demand side management, more use of energy storage, more flexible generation and more interconnection between networks while meeting social, legal and economic feasibility conditions. Building an *integrated cross border renewable energy system* is Europe's challenge in order to succeed reaching the previous mentioned targets.

3. A regional contribution to Europe's Challenges

Given its natural assets and technological expertise, the region can strongly contribute to and thereby take a leading role in the needed energy shift. The NSR has a huge potential for renewable energy from wind, waves, tide, currents, hydropower and biomass. Given the progress and application in hydro-, wind- and biomass-energy and using the energy in a European integrated system, focus on these three types of renewable energies can generate a world leading position.

The North Sea Region Strategy 2020-document states that energy is one of our main challenges (safety, environment, investments) and one of our main opportunities (transport links, trade and renewable energy). The NSR can provide a large share of the needed renewable energy (derived from the 2050 energy goals) if we can transport, store and convert it for the use in the NSR and in other parts of Europe when production exceeds demand.

The costs of renewable energy technologies remain high for individual regions. A joint strategy could boost their development and competitiveness. Besides this regional energy planning and social acceptance processes are key for successful implementation of new technologies. Strengthening the knowledge transfer between region can lead to more synergy in energy transition approach and therefore can lead to a better integrated cross border energy system. A role of the NSR-region is not only to make the right decisions for renewable energy, but take advantage of the opportunities to develop our regions even further.

4. Future energy recommendations

In the NSR, energy from wind and biomass needs to be further developed, researched and promoted. Transition towards these types of renewable energies is only possible via system integration. The main conclusion from the EVNSR Cluster project is that *system integration is crucial for speeding up the process of the wanted energy transition*.

Balancing of renewable and fossil energy is needed to facilitate the transformation of our Energy System. One of the main solutions for speeding up the process of energy transition lies in tackling storage problems. The (technical and potential) availability of renewable energy is a matter of time and political will, but *if the NSR can tackle the storage issues, the NSR is able to move faster in the deployment rate of renewable energy*.

Planning for a North Sea Energy grid –a comprehensive energy transport network – has been set in motion to realize the full potential of renewable forms of energy. *Strong collaboration between NSR States, regions and private partners is necessary* in order to progress towards a EU-smart grid and successful renewable energy generation.

The balancing dilemma is so complex, since numerous different situations have different pre requisites to be met (political, economic, social, legal and technical aspects). Complex dilemmas can best be tackled by the biggest thinkable group of stakeholders. *The “triple helix”, being the industries, the politics and science, is needed to work on innovation in the energy sector.* Coordination of different attempts can contribute to better understanding the dilemma, from the perspective of the whole value chain.

Different analyzed INTERREG-projects add *public participation* and *social acceptance* to the triple helix. This 4th element creates a “quadruple helix”, where local action groups can interact with companies, politicians and academia. The NSR has to invest in stakeholder involvement.

To secure a sustainable energy future of the NSR the following is needed:

- Build coherent and integrated policies (visions that last to create an environment in which planning authorities, companies etc. can react - minimizing the risk and take into consideration other policy areas e.g. nature protection, regional development possibilities)
- Develop a applicable EU-legal frame work (to ensure reflected decision-making and investments)
- Invest in a shared and flexible (and easy accessible) transport system
- Promote technology development and knowledge sharing, especially in relation to enhancing energy efficiency and renewable energy (network of energy academies).
- Build a human capital agenda (network of energy colleges)

Appendix 1 Summary of the *SWOT / PESTEL analysis*

This appendix summarizes the essence from the SWOT/PESTEL-analysis undertaken in the six partner regions of the Energy Vision project. Outlined below are coincident topics between the NSR and related suggestions for future development.

Political Framework

The ambitions are in most regions high and the political support strong, BUT the political support varies between the different political levels and cross borders, i.e. making planning and sustainable development difficult. The swot suggests:

- A strong need for coherent and long-term visions followed up by plans for implementation (move away from “sit and wait”)
- Policy must be in place to meet ambitions – National policy must support regional ambitions
- Need of stable and transparent regulation and financial settings for the transition to a renewable energy system to accelerate sustainable investments and to buttress the business structure and future development
- Integrated approach between policy levels and different fields of administrations
- Tipping balance from competition to cooperation within and between regions

Rethinking business

Several regions point out the potential of the expanding future renewable energy markets e.g. wind (manufacturing, maintenance, service) and the potential for regional development. Not least because the NSR have geographical and social prerequisites, that supports this point (wind, gas, industrial traditions, knowledge institutions, cooperatives etc.). BUT the regional renewable energy businesses are pressed by e.g. Asian companies (taking over and out sourcing) and by lack of investment capital. The SME need a secure foundation on which to build their businesses.

The swot suggests:

- Supportive tools needed for renewable energy businesses in order to develop and increase their business
- Linking different areas of business to create new synergies, e.g. off shore wind with maritime industry; offshore wind with offshore gas/oil
- Different scale of investments need different scales of investors, suggest: business- and financial models be developed
- Need of investment programmes focused on e.g. demonstration “out of lab” and spatial planning
- Strengthen the work force - specific skills in relation to sustainable energy and system transition
- Smart specialization strategy for regional businesses – add value by identifying position of strength

NSR holds strong knowledge bases (universities, public-private partnerships, knowledge centres in renewable energy and business development, well-established whole chain “areas of business”. Area of focus differs between NSR. The following recommendations have been identified:

- Communication, cooperation and knowledge sharing – act on “shared” experience instead of inventing old inventions again
- Common challenges in relation to renewable energy is storage, grid and balancing
- Promote R&D cooperatives in NSR

Make RE competitive with other sources of energy

NSR swot points out several environmental benefits from the transition to renewable energy, i.e. suggests:

- The renewable energy added value should be made available to companies in “real money”. Capitalization of affiliated values (reduction of CO₂ emission, nutrient release etc.)
- Realistic CO₂ price
- Regulation (tax, subsidies, permits etc.) needs to be adjusted and consistent with political visions
- Create (if necessary aid) stable economic conditions to promote constructive decision-making.

From fossil fuel to renewable energy

The existing energy system is not prepared for a transition of the energy system. Fossil energy prices are increasing and most likely accelerate renewable energy development (at the risk of sub optimisation?). Each NSR region is not isolated, hence need:

- Coordinated and holistic planning and development of infrastructure
- Transport sector is pointed out as an area that needs focus, not yet ready for transition
- In relation to biomass NSR need sustainable models that handle the inherent dilemmas (food/feed, local/import etc.)
- Level playing field throughout the whole life cycle of all energy sources
- Though several mature renewable energy technologies exists, technology development is still needed, especially grid + balancing – also in relation to continuous adaption and regional development (low cost countries are able to compete if we rely on known technology)
- Interregional collaboration to create the best possible foundation for a transformed energy system in the NSR, build on regional strength and experiences
- Business model/market place for selling/buying small scale decentralized renewable energy production

Handling the NIMBY

Common statement from NSR: The public opinion is important

- Need for business models/anchorage of e.g. onshore windmills in local societies
- Develop local business models to enhance acceptance and economic gain in local “back yard”
- Change potential negative public attitude by elucidating pros and cons to layman and decision makers
- Increase social awareness by objective information to the consumers

The unique role of NSR?

The legal authority in relation to renewable energy is in most cases not regional but the regions are co-responsible for sustainable development and creating a platform for businesses to profit of the potentials related to the transition of our energy system. How can NSR regions support expedient development both concerning transition of the energy system and the development of regional enterprises/community?

- NSR could potentially provide a big share of the needed renewable energy for the rest of Europe
- Different regional knowledge in relation to both fossil fuel and renewable energy can be transferred and combined cross border
- Collaboration NSR partners between to provide intelligent integrated energy system incl. balancing

Appendix 2: Summary of the *Regional road maps for energy vision*

Background

As a part of the Energy Vision NSR project the partners in the project were asked to fill out a questionnaire concerning the visions, goals, plans etc. of their own regions regarding renewable energy with focus on both transition and business development. The purpose was to find differences and similarities between the regions as a contribution to develop an energy vision for the North Sea Region.

All the partners in the project have contributed - although with more or less levels of details -by filling out the questionnaire, which means that there are information from regions representing Scotland, the Netherlands, Belgium, Germany, Sweden and Denmark.

The completed questionnaires were analyzed and discussed at the partner meeting in Groningen, November 2012, and this document is a short summary containing the conclusions from the meeting.

To make the picture more complete covering the whole North Sea Region, England and Norway also should be represented. This document will be send to representatives in these two countries for commenting and verification of relevance according to their visions.

Renewable energy ambitions of the regions

The analyses shows, that most of the partner regions have stated their own visions concerning the transition to renewable energy supply, and that the rest of the regions have such a vision under development. Some of the regions also have developed more or less completed road maps showing how to fulfill the visions.

The EU has stated the 20/20/20 goals for 2020, including 20% renewable energy, CO₂ reduction and energy efficiency goals. The Energy Vision project is focusing on renewable energy, and the analyses shows, that most of the partner regions have higher renewable energy goals compared with the EU goal.

Main energy resources

The partner regions were asked which renewable resources are planned to or expected to play an important role in the coming transition from fossil to renewable energy resources. All of the regions point out wind power as an important energy resource for the future and all of the regions especially mention offshore wind power.

Also biomass will play an important role according to all of the partner regions. Biogas and other green gases are mentioned by most of the regions.

Other renewable resources mentioned are: Waste, surround heat (heat pump technology), solar, wave, tidal, hydro and geothermal energy.

Focus areas for transition to renewable energy

The main issues which have to be developed in the future in order to promote the transition to renewable energy can be summarized to the following focus areas:

- Grid infrastructure and capacity
- Smart grid and energy storage
- Energy system integration and coordination
- Sustainable production and use of biomass
- Traffic and transportation
- Establishment and expansion of district heating
- Utilization of waste energy from industry etc.
- Energy savings and efficiency

Focus areas for business development

To promote the business development in the area of renewable energy the following focus areas are pointed out:

- Renewable energy cluster development
- Knowledge transfer between universities and SME's
- Network cooperation between SME's and connections between networks
- Optimizing of value chains
- Test and demonstration of new technologies
- Support of incubator environments
- Upgrading education
- More cooperation between education institutions and businesses

Conclusion

This analyses show, that the partner regions to a large extend are aiming at the same type of renewable energy resources and are facing similar challenges in the promotion of renewable energy; hence collaboration and knowledge sharing across NSR borders in the field of renewable energy technology and integration are obvious options.

The partner regions are extremely focused on creating business development in the area of renewable energy and are utilizing or planning to utilize business development instruments that in many ways are identical from one region to the other.

So the overall conclusion is that there seems to be great potential for further cooperation between regions in the North Sea Region in the efforts to promote renewable energy transition and business development. Some specific areas for cooperation are indicated in this document which together with the other analysis being done in the Energy Vision NSR project will create the foundation for the white paper as the final outcome of the project.

Regional road maps for energy vision – an example: Central Denmark Region

To illustrate the content of the individual regional road maps for energy vision a summary of the regional road map of Central Denmark Region:

Central Denmark Region (Region Midtjylland) has in cooperation with the 19 municipalities in the region formulated the common goal to reach 50% in 2025 and in longer term 100% renewable energy of the total energy consumption in the region. The purpose of setting up this goal is both improvements related to climate change and energy security and to boost the development of the renewable energy businesses, which already have great importance for the economy and employment of the region.

For each year in the period 2006 to 2011 energy and climate accounts have been calculated for each municipality and for the whole region. In that period the share of renewable energy has risen from 22% to 29%. Although a positive tendency there is a fare way to go to fulfill the 50% goal. So in 2012 the region presented a report, including scenarios on how to reach the goal. The most important proposed initiatives from the report are:

- Energy savings / energy efficiency must be promoted
- Wind power must be developed to deliver 80% of the annual electricity consumption
- Biogas must developed, so that 75% of the animal manure and an equal quantity of other biomass are used for biogas production
- The central power stations must be fully converted to solid biomass
- District heating must be expanded by 30% and developed to use large electric heat pumps and solar heating for 20% of the heat production

At the moment –start of 2013 – the region together with the municipalities and energy companies are planning a strategic approach for the period 2013 to 2015, where the final outcome are planned to be coordinated energy plans for the municipalities.

Since 2007 Central Denmark Region also more directly has supported the renewable energy business development by co-financing projects and programs – especially concerning technical and organizational development and demonstration and businesses networks and cluster development.