

# **VALUE AND STRENGTHS OF THE NSR ENERGY REGIONS**

# STRATEGIC ANALYSIS OF THE REGIONS AND INTERREG IVB PROJECTS INVOLVED IN THE ENERGY VISION NORTH SEA REGION PROJECT



## SUPPORTED BY:

**The Interreg IVB  
North Sea Region  
Programme**

*Investing in the future by working together  
for a sustainable and competitive region*



European Union



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## COLOPHON

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## Disclaimer

Analysis of projects and regions in this publication is approached from the perspective of system integration and their particular significance within this context. EVNSR project analysis focuses upon those contributions that have added value by contributing to the integration of different renewable energy technologies within the North Sea region. Project aims and outcomes (accomplishments) were deliberately not included from this analysis and therefore results presented within this section may differ from and do not necessarily represent the views and perspectives presented by the project consortia.

# INTRODUCTION

This publication entails the high level results of a strategic regional analysis executed within the Energy Vision North Sea Region project. It supports the high level recommendations included in the projects “Vision paper” which was communicated on the 26th of June 2013 at the EU Sustainable Energy Week 2013 in Brussels.

The Roadmap 2050; a practical guide to a prosperous, low-carbon Europe states clearly that the European energy system has to change significantly and rapidly. The energy system must change by:

- cutting down the primary energy demand
- large scale deployment of renewable energy.

The INTERREG IVB-projects “Energy Vision North Sea Region” (EVNSR) and “LOWCAP” are clustering current and executed INTERREG IVB energy projects. Whereas LOWCAP is focusing on reducing demand, EVNSR is trying to speed up the energy transition in the NSR, with a focus on renewable energy. The strengths of the individual regions and the greatest achievements (big wins) of the executed Interreg IVB energy projects are brought together, facilitating an aligned regional expression of the way towards the EU 2050 climate and energy goals.

The analysis of projects and regions in this publication is approached from the perspective of system integration and their particular significance within this context. EVNSR project analysis focuses upon those contributions that have added value by contributing to the integration of different renewable energy technologies within the North Sea region. Project aims and outcomes (accomplishments) were deliberately not included from this analysis and therefore results presented within this section may differ from and do not necessarily represent the views and perspectives presented by the project consortia.

We wish you an inspiring EVNSR experience,

The partners of  
Energy Vision North Sea Region project  
June 2013

# FUTURE

# REGIONS

## STRATEGIC ANALYSIS OF THE STRENGTHS OF THE NORTH SEA ENERGY REGIONS

EVNSR is drawing on the values and strengths of the North Sea Region (NSR). These values and strengths are identified in existing regional energy plans, that often show similar and highly complementary strengths that could be utilized more efficiently, in our pursuit of a “prosperous and low carbon Europe”. Different regions deliver different contributions to speeding up the deployment rate for renewable energy in the North Sea Region.

Together, the regions in the North Sea Region have all the ingredients to increase the deployment rate of renewable energy and fully unlock the real economic potential of energy efficiency. Given its natural assets and technological expertise, the region can provide a large share of the needed renewable energy in the EU energy mix and take a worldwide leading role in the needed energy shift. The NSR has a huge potential for renewable energy from wind, water flows and biomass; if only we can transport, store, convert and finance it.

Besides this regional energy planning and social acceptance processes are key for successful implementation of new technologies. The role of the NSR-region is not only to provide the right knowledge base to make the right decisions to speed up the deployment rate of renewable energy, but to really take advantage of each other's unique selling points. A joint implementation strategy based on regional smart specific specialization will boost the development and competitiveness of the EU renewable energy mix.

This joint implementation strategy is further explained and visualized in the EVNSR Vision paper. In this publication the Unique Selling Points of each region are highlighted and visualised. The USP's do not necessarily represent a complete view on all strengths of each region, but they offer a quick view on each region's unique contribution to speeding up the deployment rate for renewable energy in the North Sea Region.

The regions involved in the EVNSR project are:

Central Denmark Region (DK)

East Scotland (UK)

Halland (SE)

Northern Netherlands (NL)

Schleswig Holstein (DE)

West Flanders (BE)

# CENTRAL DENMARK REGION (DK)



## UNIQUE SELLING POINTS

- Strong wind industry onshore and offshore.
- Strong partnership traditions.
- Political consensus.
- Biomass traditions and biomass utilisation.
- Existing heat networks.



## REGIONAL CHARACTERISTICS:

The Central Denmark Region, also referred to as the region of Midtjylland, has great potential for utilising wind and biomass resources. There is already a strong wind power generating industry, exploiting both on and offshore locations. For the transition to renewable energy, smart grid solutions and integration of the existing infrastructure (i.e. power grid with district heating and the natural gas grid) are decisive in utilizing the large amounts of wind power.

The region also has a very strong tradition of partnerships and political consensus. Central Denmark Region's energy and environmental effort will support the targets of the Danish government and of the EU; an integration that contributes to long-term business development. The regional development plan and the regional business development strategy provide the framework within which the regional renewable energy initiatives are carried out.



# CENTRAL DENMARK REGION (DK)

## DEVELOPMENT STRATEGIES:

The Regional 'Plan and Prospects' reflects on different ways to attain the goal of 50% renewable energy in 2025 and 100% in 2050 and lists different scenarios with unique premises and consequences. By balancing combinations of scenario elements and technologies, the region can fulfil its ambitions. A fulfilment of the vision and realization of the plan will help to solve the issues related to the present use of fossil-fuel resources and provide new opportunities for the many companies in the Region's energy sector.

## TRANSITION & BUSINESS GOALS:

The overall ambition is to solve some of tomorrow's large energy challenges and simultaneously to generate sustainable economic growth in the region. Therefore, the regional effort is concentrated on:

- business development in relation to biomass for energy;
- support to small and medium sized clean-tech companies;
- business development in relation to the wind industry entity;
- business development in relation to district heating.

## ACTIONS:

Concrete action in the Central Denmark Region focuses on:

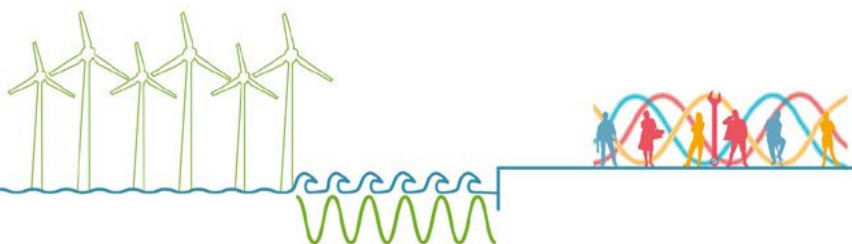
- strategic energy planning in municipalities and coordination of actions across municipality borders; development of a coordinated strategy for the erection of wind turbines;
- improving the models for conversion and expansion of district heating;
- a coordinated planning approach for the establishment of bio-gas plants and exploitation of bio-gas;
- development of a coordinated strategy for procuring biomass;
- active promotion of large solar thermal power plants and heat-storage methods;
- amendments to fiscal legislation concerning the use of large heat pumps;
- promotion and development of demonstration transport projects with renewable energy.

# EAST SCOTLAND (UK)



## UNIQUE SELLING POINTS

- Scotland has some of the best renewable resources in the world.
- With 25% of Europe's offshore wind potential.
- Scotland's wave and tidal energy resource is almost unparalleled, representing a quarter of Europe's tidal stream and 10% of its wave energy potential.
- Excellent research facilities in its world class Universities.
- An excellent supply of skilled engineers and other technical people.



## REGIONAL CHARACTERISTICS:

Scotland has massive green energy potential - from our vast natural resources of a quarter of Europe's tidal and offshore wind potential and a tenth of its wave power, to the legacy of Scotland's traditional energy industries. Scotland has set an ambitious target for the equivalent of all of Scotland's electricity needs to come from renewables by 2020. This is one of the most demanding anywhere in world. It is a target that is necessary to reindustrialise Scotland through 21st century technologies and seize the opportunities to create tens of thousands of new jobs and secure billions of pounds of investment in our economy.



# EAST SCOTLAND (UK)

## DEVELOPMENT STRATEGIES:

The Routemap for Renewable Energy in Scotland is an update and extension to the Scottish Renewables Action Plan 2009. The original Renewables Action Plan set out short-term actions towards the delivery of 2020 targets for renewable energy. The updated and expanded Routemap reflects the challenge of meeting new ambitions: an equivalent of 100% demand for electricity from renewable energy by 2020; and Scotland's target of 11% heating from sustainable sources. The Energy Efficiency Action Plan established a target to reduce total final energy demand in Scotland by 12% by 2020, covering all fuels and sectors. The actions set out in the full Renewables Routemap will be taken in tandem with Scotland's continuing drive to reduce demand.

## TRANSITION & BUSINESS GOALS:

Energy transition and economic goals are closely related in Scotland where jobs in some regions still heavily depend on fossil-fuel based energy industries. The research and development, design, construction and servicing of new technologies will create highly skilled jobs, give investors the confidence to continue to invest and give Scotland a sustainable, energy secure future. More specific goals are: tens of thousands of jobs and £30bn investment within the Scottish economy during the life of the Routemap; strengthening of future energy security through the harnessing of sustainable, indigenous resources.

The scale of investor interest in Scotland's offshore renewables leasing is one of the largest in Europe (approximately 12 GW), and shows clearly that the targets are viable and deliverable.

## ACTIONS:

The Routemap for renewable energy was created to ensure that Scotland benefits from the low carbon opportunity, and renewable energy is at the heart of that ambition of the Scottish Government. Scotland's 100% renewables target is the most ambitious in the European Union. Actions concentrate upon:

- development of the offshore wind industry;
- further development of the onshore wind industry;
- development of wave and tidal energy;
- development of the renewable heat industry;
- development of industry around bio-energy and energy from waste;
- further development of hydropower;
- further development of micro generation;
- development of emerging technologies and energy storage.



# REGION OF HALLAND (SE)



## UNIQUE SELLING POINTS

- Energy focus: expanding district heating networks and biogas.
- Integration of multiple renewable resources.
- Strong focus on the use of renewable energy in transport and zero emission vehicles.



## REGIONAL CHARACTERISTICS:

The region of Halland is located on the western coast of Sweden just south of Gothenburg and has 300.000 inhabitants. The biggest Swedish nuclear plant is located in the region. Despite this, the region also has a good renewable energy mix that consists of different natural resources. The use of district heating is increasing; several district heating networks were extended in the last 10 years. Two bio-gas plants have been running for some years and the number of landbased windturbines recently passed 100.

The region is increasing the use of biogas in transportation, biomass in heating and is increasing the use of solar and wind power within a smart grid. New buildings are passive- or even plus-energy buildings. Existing buildings are undergoing renovation targeting low energy consumption. On top of this the region wants to shift to a substantially more energy efficient transportation system with near zero emission vehicles.



# REGION OF HALLAND (SE)

## DEVELOPMENT STRATEGIES:

An important part of the region's energy strategy focuses on stimulating commuting by bus. The most important goals are:

- in 2016 at least 90% of urban traffic and 60% of all other traffic is fossil-fuel free;
- in 2020, 90% of all public transport is fossil-fuel free.

The region of Halland also set the internal goals listed below:

- total energy consumption reduced by 20% by 2015 (base year 2007);
- average consumption/m<sup>2</sup>: 176 KWh
- 50% of all their shipments will be made with renewable fuels by 2015;
- the share of renewable thermal energy for heating shall be 90% in 2015;
- carbon dioxide emissions will be reduced by 5% per year to 2015;
- LCC (life cycle cost) should be used in 80% of all procurements;
- by 2020 the amount of renewable electricity produced in Falkenberg Municipality will be equivalent to the annual consumption.

## TRANSITION & BUSINESS GOALS:

The Region of Halland focuses on bio-energy and bio-gas. Some municipalities have plans to promote onshore wind farms.

The Region of Halland does not have a specific business development priority but each municipality has business development support albeit not specifically for businesses focussing on renewables. Support is organized in the Alexanderson Institute and the Energy- & Environment Coalition. Both organisations support companies in (energy)transition industries. They arrange networking seminars and provide examples of good business cases.

## ACTIONS:

Short term actions of the County Administrative Board Halland between 2012 – 2015 are:

- development of a study and strategy to ensure the potential of organic waste to produce bio-gas locally;
- development of a regional district heating study on the viability of a regional district heating network;
- development of a regional commuter investigation to get more people to take the train instead of the car.

# NORTHERN-NETHERLANDS (NL)



## UNIQUE SELLING POINTS

- Energy focus: natural gas and LNG, bio-methanol and bio-coal.
- Strong regional political support & triple helix cooperation.
- Demand driven education on college and academic level.
- Knowledge of subsurface storage & energy infrastructure.
- Energy Port Harbours such as Eemshaven.
- Future energy focus: offshore wind, biomass, hydrogen/ syn(thetic)gas into the chemical sector.



## REGIONAL CHARACTERISTICS:

The Northern Netherlands is well known for its activities in the field of gas. There is a well developed manufacturing industry focussed upon gas technology and the control of gas-fuelled and renewable energy-fuelled equipment and infrastructure.

The Northern Netherlands plays a major role in the international gas industry. The region also enjoys a strong national and international position in the field of bio-methanol and bio-coal. Energy is an essential topic for local and regional government and therefore support is strong and well organized. Besides that, the Northern Netherlands has its own platform for public-private collaboration and mediation, "Energy Valley", which plays a key-role in the national energy-economy. Education joins forces in the "Energy Academy Europe" and "Energy College" to respond to the increasing demand for well-trained personnel for energy projects.

The Eemshaven is conveniently located to support North Sea offshore wind and LNG developments. It also has three large, coal and gas powered, energy production facilities.

The region's main resources for future renewable energy systems are offshore wind power, biomass, and syn(thetic)gas/ hydrogen.



# NORTHERN-NETHERLANDS (NL)

## DEVELOPMENT STRATEGIES:

The Northern Netherlands wants to shift to renewable energy. The region has its own specific goals relating to renewable energy and transition of the energy strategies. These are more ambitious than the European and national vision. Regional strategies are combined within:

- Energy Programme 2012-2015;
- Energy Valley Programme 2011-2014;
- Energy Agreement Northern Netherlands;
- European Region of Excellence.

The Northern Netherlands is far from the decision-making in the Hague and Brussels and therefore the bundling of regional lobbying efforts is necessary. On the other hand, the triple helix vision of the North is very much alive: policy makers, industry and education share a strong belief in the future and together they form the pillars of the Energy Valley Foundation.

## TRANSITION & BUSINESS GOALS:

The Northern Netherlands has ambitious goals concerning the production of renewable energy and increasing the number of energy related businesses. Overall, there is a strong focus to connect business opportunities for SME's to the energy goals and to provide new opportunities for Northern companies.

Creating green gas hubs will enable companies to develop bio-based products as well as bio-energy; there is business potential in offshore wind developments; and energy-saving efficiency in the (process) industry. The work programme Energy Valley 4 focuses on five top themes: 'Green Gas Hub/Bio-based Energy', 'Power Production & Balancing/ Decentralized Energy Systems', 'Research & Education', 'National and International cooperation' and 'Organisation and Communication'; Various goals and plans are the:

- creation of more than 9,000 "new energy" jobs;
- settlement of 25 (new) start-ups and the establishment of an equal number of new companies;
- extension of the electricity generation capacity by an additional 3,500 MW over and above the current 8,700 MW;
- increased green gas production with a projected production volume of 500 million m<sup>3</sup> a year;
- strengthening of the position of the Northern region and regional economic developments for offshore wind;
- strong trans-national cooperation with Hansa Energy Region/ ENSEA.

## ACTIONS:

Concrete action is concentrated around the development of wind parks, green gas hubs, CO<sub>2</sub> valorisation, 2nd generation bio-fuels, smart energy districts, innovative decentralised power generation and reuse of waste heat within the built-up area and industrial applications in Energy Transition Parks.

The Northern Netherlands also faces challenges. Power transportation is a big issue since the high voltage grid is currently under capacity. The absence of costly to develop district heating systems is another problem.

# SCHLESWIG HOLSTEIN (DE)



## UNIQUE SELLING POINTS

- Established on and offshore wind industry combined with geological potential for gas storage.
- Established biomass sector.
- Harbours and logistical service.



## REGIONAL CHARACTERISTICS:

The region of Schleswig Holstein in Northern Germany has considerable strengths in wind energy generation, both on-shore and offshore, as well as in the field of biomass. Energy transition conceivably creates opportunities for regional development within the REK corridor, defined by the A25 / B5 road corridor serving western Schleswig-Holstein. The region is predominantly rural, resulting in weaker than average infrastructure. Based on a regional SWOT analysis, the strategic plan seeks to optimise the leverage of the strengths available, and avoid the pitfalls associated with the local weaknesses. As such, the concepts are tailored to the specifics of the region and do not necessarily seek to replicate or surpass those of the EU. The concept is also referred to as “Energiewende”.



# SCHLESWIG HOLSTEIN (DE)

## DEVELOPMENT STRATEGIES:

In line with the regions strength, key resources on the ten-year planning horizon revolve around wind energy; both onshore and offshore; port infrastructure; and the development of wind farm operation and maintenance sectors. Biomass activities will also maintain a degree of importance on the decentralised level, but the focus on wind and port infrastructure is considered to be at the strategic forefront.

Hidden energy potential under the surface of Schleswig Holstein may become a key strategic future “resource”; specific geological structures with caverns that carry large storage opportunities.

## TRANSITION & BUSINESS GOALS:

The Energiewende concept uses the process (of energy transition) as a driver to develop a stronger regional economic base as well as a stronger profile and identity on the European stage. The underlying goals are to:

- form a regional cluster of competence by bundling regional capacities for R&D and production of renewable energy;
- maximise synergies along the value creation chain by prioritising the promotion and funding of wind energy, including production, maintenance and logistics; to ensure a complete and reliable regional support system for the offshore wind sector by developing cooperation with the ports on Schleswig-Holstein's west coast.

## ACTIONS:

The region wants to speed up the Energiewende by taking up the following actions. Some are clearly politically oriented:

- start a lobby towards the national and local government and grid owners, showing a united voice aiming to achieve a quick and effective development of the grid infrastructure;
- pressurising local government with the aim of ensuring early consensus with regard to underground grid routing;
- positioning the region as a model pilot region with regard to the implementation of the transition goals of the Energiewende;
- development of regional competence with regard to harnessing energy and efficiency;
- to foster the work between potential actors in the field of energy storage with the aim of testing technological opportunities.

# WEST FLANDERS (BE)



## UNIQUE SELLING POINTS

- High potential for wind energy (7 offshore wind farms – 2000 MW).
- Dense network of anaerobic digestors.
- Many SMEs with activities related to renewable energy and energy efficiency.
- Network of knowledge centres, research institutes, the Green-bridge incubator and cluster organisations with clean tech related activities.
- Ports of Zeebrugge and Ostend as logistic harbours for offshore wind parks and as hubs for biomass and CNG/LNG.
- Factories of the future.



## REGIONAL CHARACTERISTICS:

West Flanders is the only Belgian coastal province. The harbours of Zeebrugge and Ostend are important logistic harbours for the Belgian offshore wind farms. The region's inland agricultural area, where there is a strong emphasis on animal husbandry, horticulture and the production of vegetables and potatoes is a significant characteristic of West Flanders. The agro-industry is one of the main industrial sectors in the province.

West Flanders is represented in the EVNSR project by the POM West Flanders (Provincial Development Agency), Power-Link (a knowledge and research platform of Ghent University concerning sustainable and renewable energy) and the Port of Ostend. The partnership is supported by a network of stakeholders representing the triple helix with activities related to energy efficiency, renewable energy and clean tech business development. Some cities subscribed to the Covenant of Mayors.



# WEST FLANDERS (BE)

## DEVELOPMENT STRATEGIES:

The province is aligned with Flemish, national and European policies and goals. In order to achieve the Roadmap 2050 objectives, more attention should be given to energy efficiency in industry and buildings; the development of waste heat networks and reductions in transport CO2 emissions; new industrial estates developed according to CO2 neutral principles; new industrial policies focussing on renewable energy and clean-tech; clear definition of the offshore wind farm zones in the North Sea off the Belgian coast; support systems for renewable energy based on Tradable Green Certificates (temporarily high support for solar panels) and a support system for green heat networks.

## TRANSITION & BUSINESS GOALS:

The region has a strong belief in development of 'clean-tech and blue energy' and the agro-food cluster as 'factories of the future'. Factories of the future are also within the scope of the New Industrial Policy of the Flemish government. This complies with the goal to relate business development to a renewable energy transition. The region stimulates further production of renewable energy. West Flanders will elaborate upon a vision and a regional energy strategy for the province, focussing on energy efficiency in SMEs, the production of renewable energy and the valorisation of waste heat on business parks, the development of smart grids and sustainable mobility. The development of onshore wind parks is stimulated by the development of a 'wind farm plan' with an indication of the areas where they can be built.

## ACTIONS:

The West Flanders' pathway to accelerated energy transition employs the following actions:

- investments in start-up infrastructure for emerging high-tech companies (the Greenbridge Incubator and science park in Ostend);
- development of the Port of Ostend as logistics harbour for the construction and the maintenance for offshore wind farms;
- multiple demonstration and research projects focussing on the development and monitoring of small wind turbines, PV-installations, smart grids, sustainable mobility, heat valorisation, hydrogen, high value products and renewable energy from micro-algae, the production of energy crops, short rotation coppice, power to gas, sustainable public lighting, conversion of biomass, development of offshore wave energy technology, energy neutral buildings, etc;
- promising feasibility studies on waste heat valorisation by industry on business parks, heat exchange between industry and greenhouses and on shore power in the harbour of Zeebrugge;
- development of a CO2 monitoring instrument for business parks, group purchases etc.



**INTERREG IVB'S  
BIG WINS FOR  
RENEWABLE ENERGY  
IN THE NSR**

# PROJECTS

## INTERREG IVB'S BIG WINS FOR DEPLOYMENT OF RENEWABLE ENERGY IN THE NSR

This publication entails the high level results of a strategic regional analysis executed within the Energy Vision North Sea Region project. It supports the high level recommendations included in the projects "Vision paper" which was communicated on the 26th of June 2013 at the EU Sustainable Energy Week 2013 in Brussels.

The INTERREG IVB-projects "Energy Vision North Sea Region" (EVNSR) and "LOWCAP" are clustering current and executed INTERREG IVB energy projects. Whereas LOWCAP is focusing on reducing demand, EVNSR is trying to speed up the energy transition in the NSR, with a focus on renewable energy.

After clustering nine different renewable energy related projects executed in the current 2007-2013 NSR Program, EVNSR can conclude that INTERREG IVB has played an important role in creating momentum for a highly efficient NSR energy transition.

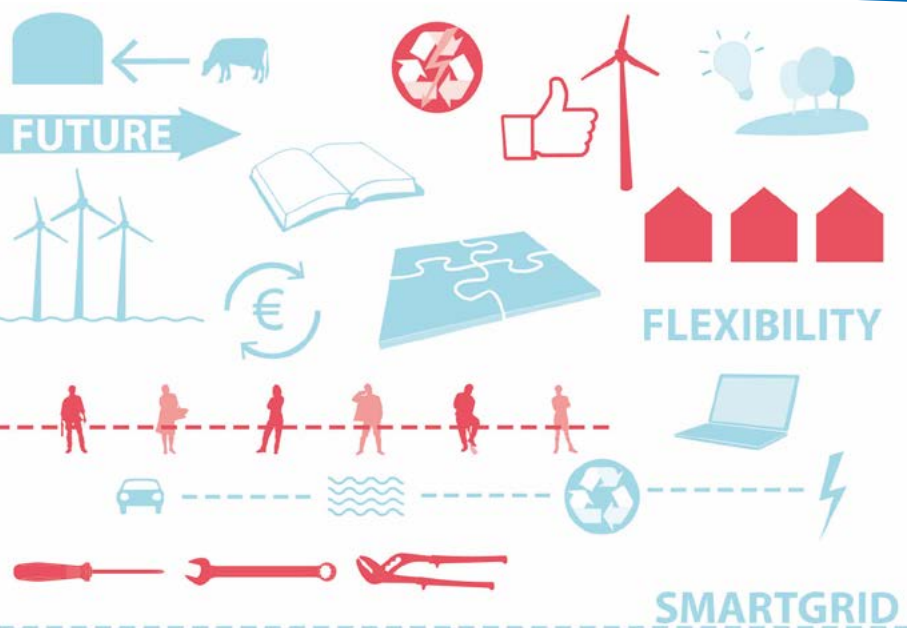
Analysis has been carried out on the following nine projects:

- ANSWER;
- ARBOR;
- Cradle 2 Cradle Islands;
- E-Harbours;
- Enercoast;
- HEC (Interreg Iva)
- Innovative Foresight Planning;
- North Sea Supply Connect;
- North Sea Sustainable Energy Planning.

An integrated NSR perspective on efficient energy transition has been derived from analysis of the key results and recommendations. The individual project's greatest achievement(s), the big wins, are highlighted by comparison with those of the other projects.

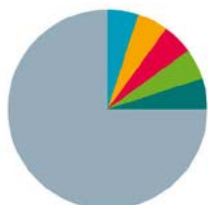
Analysis of projects in this publication is approached from the perspective of system integration and their particular significance within this context. EVNSR project analysis focuses upon those contributions that have added value by contributing to the integration of different renewable energy technologies within the North Sea region. Project aims and outcomes (accomplishments) were deliberately not included from this analysis and therefore results presented within this section may differ from and do not necessarily represent the views and perspectives presented by the project consortia.

# ANSWER



## BIG WINS

- Easy multipliable tools for CO<sub>2</sub> and EE in schools and communities.
- Relation between social acceptance and Energy efficiency.
- Climate idols and artists for climate change.
- Energy clubs.
- Exchange of good practices in the EU green business network.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal

**ANSWER**  
A NORTH SEA WAY TO ENERGY-EFFICIENT REGIONS

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# ANSWER

## SUMMARY:

The (2007) ANSWER project's aim is to help reduce energy use and thus contribute to the European targets towards 20% improvements in energy efficiency by 2020.

ANSWER has created an ambitious partnership of North Sea regions. A range of proven and innovative measures, interventions and actions was explored to reduce carbon emissions of communities, individuals and businesses. The main measures were improved energy efficiency and behaviour change. The models, tools and techniques are transferable to other regions within the North Sea region. An initial research stage identified currently faced obstacles and a package of pilot projects demonstrated a method for tackling them, resulting in increased activity on energy efficiency and carbon reduction measures. Some actions taken:

- climate idols - Artists for Climate Change - Climometer (real-time monitor screens with the city carbon footprint);
- children are the Answer (training for teachers);
- workshops, case studies and "energyclubs" for SME's: development of tools to heighten employers' sensitivity and awareness of the need for energy savings;
- European green business network and award (exchange of best practices) – Carbon charter – carbon neutral industrial estate.

## CHALLENGES:

- lack of political backup to support the project, because energy is not (always) a priority for politicians at local and regional level;
- poor coordination between initiatives within the same area, causing frequent duplication or inconsistencies in work;
- long payback time for most of the investments in energy saving technologies or renewable energy;
- people and SME's are poorly informed concerning the impact of measures or their current behaviour. Accurate, accessible and engaging "footprinting" tools and action plans are necessary;
- receiving data from businesses or accessing energy consumption data from energy suppliers or distributors is not obvious because of privacy reasons;
- changing subsidy policy makes people/SME's hesitate to invest in energy savings or renewables;
- regulation sometimes does not meet practice; e.g. wind (energy) policy is over restrictive due to spread spatial planning, resulting in few projects being realised without objections.

## SOLUTIONS AND OPPORTUNITIES

Involvement of engaged politicians from the start of the project is important since they can introduce the project in their (international) political and business network. This might also secure follow-up and funding after the project. Other challenges faced in ANSWER are:

- a mix of loans and grants are necessary to support energy efficiency and renewable energy. Bureaucracy around finance needs to be reduced;
- business testimonials and showing good practices of pioneers investing in new technologies might help to convince others;
- The outcome from EU projects needs to be disseminated broadly and to be supported by Interreg or other project secretariats, EU commission etc in order to avoid double work. They must keep an overview of the existing supply and match partners/regions where appropriate;
- for small businesses hands-on information and tailor made guidance is necessary. Pilot projects showing how much they can profit from energy savings and build a green image might help;
- a stable, long term subsidy vision is necessary to stimulate investments in energy measures and renewables.

# ARBOR



## BIG WINS

- Optimisation of the biomass supply chain.
- New conversion techniques.
- Waste stream valorisation.
- Development of regional strategies for biomass optimisation.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal



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## SUMMARY:

ARBOR stands for “Accelerating Renewable Energies through Valorisation of Biogenic Organic Raw Material”. ARBOR wants to accelerate the sustainable development and use of biomass in North Western Europe, to facilitate the achievement of the 2020 energy objectives and to realise a world-class utilisation of biomass. Biomass is key to ensuring our future supply of sustainable energy. Biomass currently accounts for around half (44-65%) of all renewable energy in the EU. It is estimated that this could increase by 69% to 2020, but only if significant improvements to the supply chain are made, e.g. through the energetic use of currently disposed waste streams or the sustainable production of biomass on non-agricultural land.

Regions across NWE are facing common issues of how to satisfy the increased demand for biomass. On the other hand they are dealing with important regional waste streams going to landfills. A common approach in exploring potentially complementary life cycles as well as in activating hitherto unused biomass streams can help to resolve these issues.

Therefore, the ARBOR project was launched, an Interreg IVB NWE project with 13 partners from 6 European regions dealing with the development of technological solutions and regional strategies for improved sustainable biomass utilisation. The project is co-funded by local authorities from the United Kingdom, Flanders, Saarland, Luxemburg, the Netherlands, and Ireland.

## CHALLENGES:

Challenges the ARBOR project faces are mainly related to efficiency and sustainability of the biomass chain:

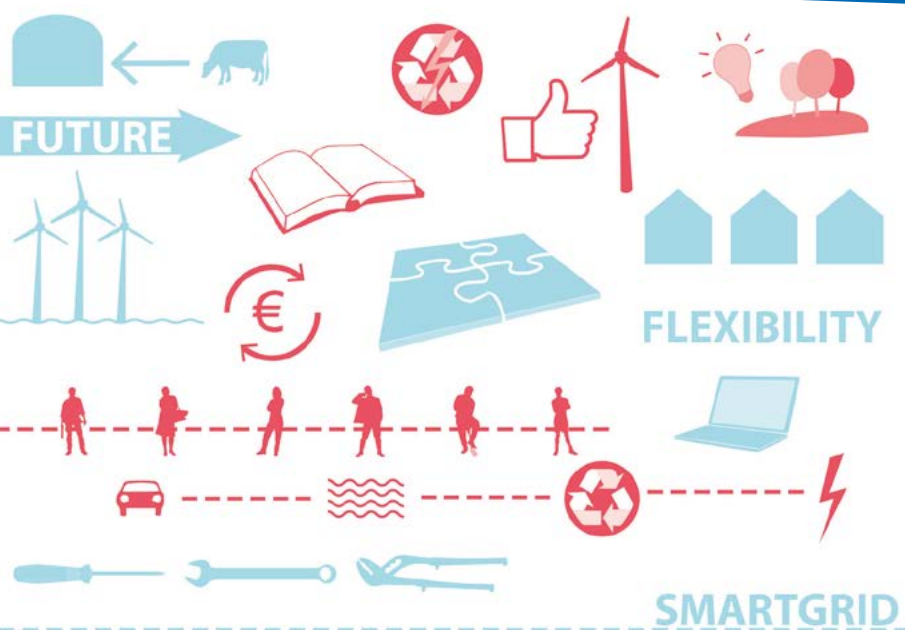
- territorial disparities in regulations and policies hindering the development of a harmonised biomass-based renewable energy policy;
- technological barriers to the development of an efficient value chain for the conversion and optimisation of biomass to energy and the subsequent recovery of residues from biomass conversion processes;
- sustainability concerns regarding the use of biomass for energy;
- difficult economic climate slow down investments in bio-energy.

## SOLUTIONS AND OPPORTUNITIES

The ARBOR project offers solutions and opportunities for other biomass developments:

- develop a state of the art analysis of biomass for bio-energy initiatives and projects in North Western Europe;
- foster trans-regional knowledge sharing to exploit the biomass potential of both the rural and the industrialised NWE regions;
- boost local economies and contribute to the development of a green, low carbon economy in NWE;
- indirect business development mainly in the field of new (small scale) conversion techniques, nutrient recuperation, waste stream valorization;
- evaluate the sustainability and economic aspects of biomass valorization and conversion technologies. In combination with the development of 6 biomass pilots this serves as a basis for elaborated biomass strategy development;
- inform local, regional and European stakeholders and raise public support through a range of communication tools and activities.

# CRADLE 2 CRADLE ISLANDS



## BIG WINS

- Integration of energy saving and renewable energy in spatial planning and regional/local development.
- Participation models for social acceptance.
- Involvement of Islands communities and visitors;
- Islands as innovation centres;
- Sustainable innovations for island environments.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal

cradle to cradle



islands

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# CRADLE 2 CRADLE ISLANDS

## SUMMARY:

Cradle to Cradle Islands seeks to accelerate development of new energy related technologies and strategies. With the Cradle to Cradle® concept as a guideline, the project stimulates the establishment of new initiatives, pilot projects and research of sustainable energy generation. This is undertaken in relation to community issues, territorial issues, water, mobility and materials. The islands around the North Sea Region function as innovation centres for the development of sustainable resource projects.

Some of the direct outcomes of the project are:

- a renewable energy system, integrated with an education programme, in a school on Anholt (Denmark);
- testing of electric scooters on the Shetland Islands;
- involvement in the realisation of a Blue Energy pilot power plant on the Afsluitdijk (Netherlands).

The project succeeded in developing relevant networks and delivering sustainable innovations for the island environments. Further development and implementation is fostered by incubator centres on partner islands.

## CHALLENGES:

Transition to renewable energy is the focus of the Cradle to Cradle Islands project and to a lesser extent the development of renewable energy businesses. The most important challenges discovered in this project are:

- social resistance and acceptance of visible impacts (eg. wind-mills);
- political acceptance of the necessity to change;
- risk avoiding behaviour in reaction to new innovations;
- restrictions of environmental and spatial planning laws;
- obstacles in the practical application of lab developments;
- lack of finance and the will to invest.

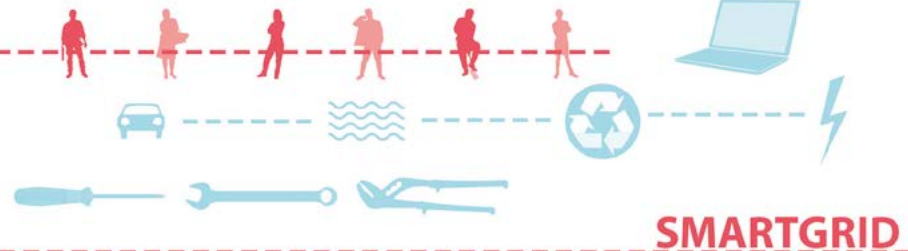
## SOLUTIONS AND OPPORTUNITIES

The project recommends the following solutions of which some were tested in the project and others discovered through the project:

- raising awareness through the practical demonstration of successful pilot projects;
- use international projects as an international demonstration floor during project meetings. Putting the development of the Cargo Bike in the framework of sustainable mobility resulted in serious interest from companies like IKEA and TNT-post;
- involvement of politicians in international cooperation projects;
- bringing stakeholders together, such as a building company on Runde (Norway) that became involved in the Runde Environmental Centre. This changed the mind of the building company and resulted in building an energy efficient, sustainable house on the island;
- integration of water management and water technology;
- reconsideration of some environmental laws that may no longer be appropriate to current (re)development.



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100%

- A working smart grid.
- Business models for flexibility: flexibility is crucial to the future energy system and has gained a price.
- Triple Helix cooperation focusing on a more sustainable energy model in harbour regions.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



## Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal



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# E-HARBOURS

## SUMMARY:

E-Harbours is an ambitious project to create a lasting change towards sustainable energy logistics for NSR harbour cities. It sets innovative energy standards to create a transformation of the energy network in harbour areas.

Show case examples for the whole NSR, guided by a European expert platform, implement EU energy policies, innovate and permit economic growth. The partnership consists of a Triple Helix cooperation to create change: ambitious public authorities, municipal harbour/energy companies and national research organisations from the whole NSR. Based upon innovative intelligent energy networks (smart grids), the challenge is to create a more sustainable energy model in harbour regions.

E-HARBOURS focuses on 3 objectives:

- increasing production and use of renewable energy in harbour cities. Harbour cities have extensive industrial areas with a great potential for the development of sustainable energy from wind, solar PV, tide, waves and the reuse of available industrial waste heat or cooling;
- increasing the use of energy smart grids. Attuning demand and supply of energy by flexible demand management, instantaneous load shedding (in both directions), energy labeling and intelligent storage;
- increasing the use of electric transport. This is a perfect partner to connect to large-scale renewable energy and to a more healthy environment in the harbour regions.

## CHALLENGES:

The focus of E-HARBOURS prominently places some challenges on the agenda:

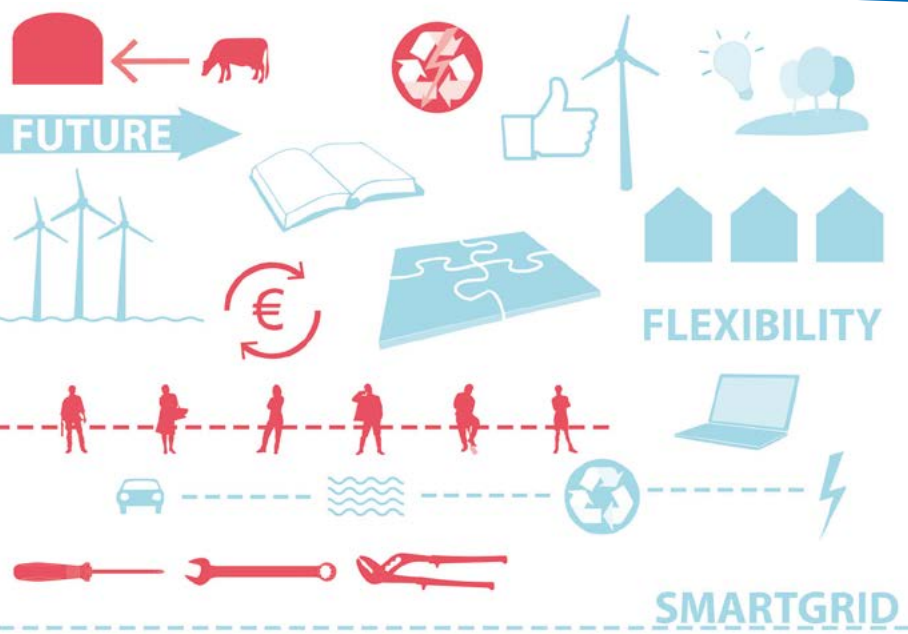
- the energy market has to become more transparent, for example, by adopting real-time measurements;
- a new European legal framework has to be developed to create a smarter energy system;
- market tendencies towards (temporary) storage are due to changing market conditions, but demand adaptation (shift in use) is more (energy) efficient;
- smart grids and balancing are not visible and yet essential issues that need to be communicated to improve insight.

## SOLUTIONS AND OPPORTUNITIES

E-HARBOURS found a number of solutions and opportunities, mostly focusing on balancing energy demand and supply and efficient use of decentralised energy grids:

- flexibility is now valued. There is a new business of energy consumption flexibility;
- flexibility is crucial for the future energy system. Demand side management flexibility will play a major roll. ICT systems currently take care of loading E-cars when energy prices are low;
- the theme energy logistics will gain a whole new meaning. Smart energy solutions are an emerging market. New services will arise to support large end consumers in their energy transition;
- modern energy contracts force suppliers to become part of the energy saving ambitions of the organization. With flexibility the end-user will gain a stronger position.

# ENERCOAST



## BIG WINS

- ➔ Regional biomass market solutions.
- ➔ Developed and implemented business plans for the local mobilisation of different biomass resources.
- ➔ Tools for resource assessments ►sustainable use of biomass.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal



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## SUMMARY:

ENERCOAST is focused on biomass. The project aims to strengthen the regional logistics around the production of biomass as a source for renewable energy. The project developed and implemented substantiated and consolidated business plans based on commercially viable bio-energy supply chains. The business plans will be applied parallel to differentiated blue-green energy clusters in the North Sea Region to ensure transfer of management expertise between the clusters and identify to market interdependences.

ENERCOAST has sought to open new sources of bio energy and reduce the regional dependency of energy imports by integrating the biomass producers at one end and the energy producer at the other end. The commercial mobilisation of bio energy resources increases the competitiveness of regional energy producers as well as ensuring sustainable business models with a long-term perspective.

ENERCOAST's results are a North Sea bio-energy market network including operative bio-energy supply chains and mobilisation strategies. In line with Interreg IVb, ENERCOAST focused on cross-national adoption of partner solutions and implementation of development strategies.

## CHALLENGES:

Most prominent challenges for further development in relation to the ENERCOAST vision are related to business development.

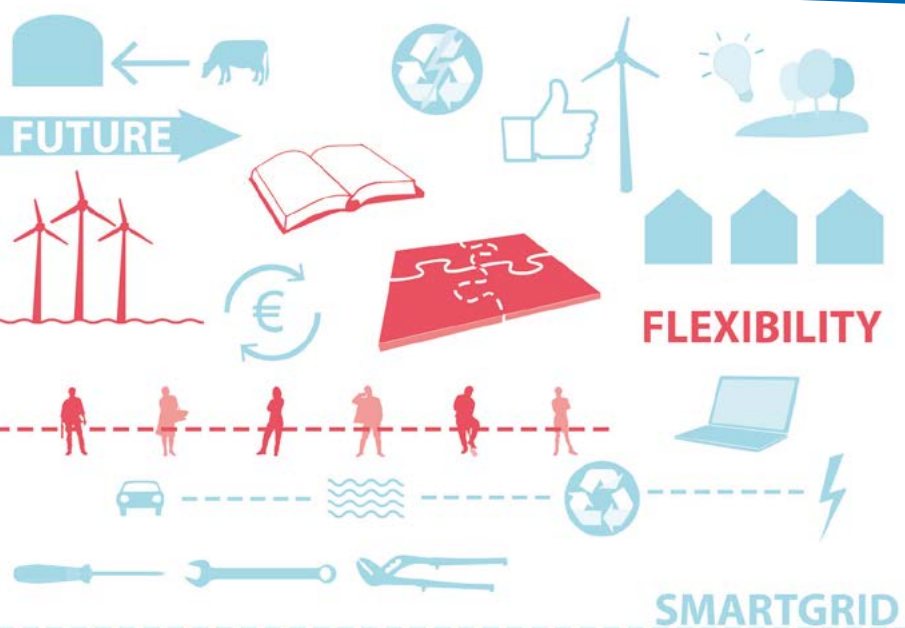
- A publicly regulated market (feed in tariffs, taxations) makes markets vulnerable and investments dependent on short-term decisions.
- there is still great need for the demonstration of second generation technologies and bio refineries;
- public awareness and attitude is decisive for further development and NIMBY attitude has been known to obstruct planning and investments;
- the inherent dilemma: competition between food, fodder and energy production.

## SOLUTIONS AND OPPORTUNITIES

Key driver for further development of local bio-energy markets identified by the ENERCOAST project partners is continuity. Solutions to be worked on in future projects include:

- a long-term political framework agreed on EU, national and local levels;
- long-term decisions and goals on taxation, support schemes etc;
- documentation for and communication about sustainability with citizens is important to encourage them to contribute and to prompt personal responsibility;
- participatory planning processes are needed to create ownership;
- ensure stable market development by providing continuous and complementary conditions.

# HANSA ENERGY CORRIDOR (Interreg IVa)



## BIG WINS

- ➔ Strategic cross border cooperation aimed to jointly become a "region of excellence in energy".
- ➔ Cross border cooperation in research, knowledge transfer and triple helix cooperation.
- ➔ Experience in a multi-level cooperation chain.
- ➔ Substantiation of the need for international cooperation on the energy system integration model and offshore wind as a central driver for system integration.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal



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# HANSA ENERGY CORRIDOR (Interreg IVa)

## SUMMARY:

HANSA ENERGY CORRIDOR (HEC) is a so called platform project (Interreg IVA) that aims to use the strengths of companies and knowledge institutes in the Northern Netherlands and Northern Germany in order to develop a European region of Excellence in energy that supports the energy transition. Both the Northern Netherlands and Northwestern Germany are two strong neighbouring energy regions. Both border-regions are internationally relevant, however, great synergy potential lies in further integrating them.

In the HANSA ENERGY CORRIDOR (HEC) the partners are striving for a strategic and practice-oriented collaboration between key players in energy. Key players come from economy, science and politics, to enhance innovation, growth and competitiveness of the cross-border energy sector. Key-themes include: Smart Grids, Balancing & storage, Learning from Nature, E-mobility, The Role of Law, Blue Energy, Security of Smart Grids, Education and Public Acceptance.

## CHALLENGES:

During the project the partners in the HANSA ENERGY CORRIDOR (HEC) experienced the following challenges that need to be taken into account in future cross border cooperations and energy transition projects:

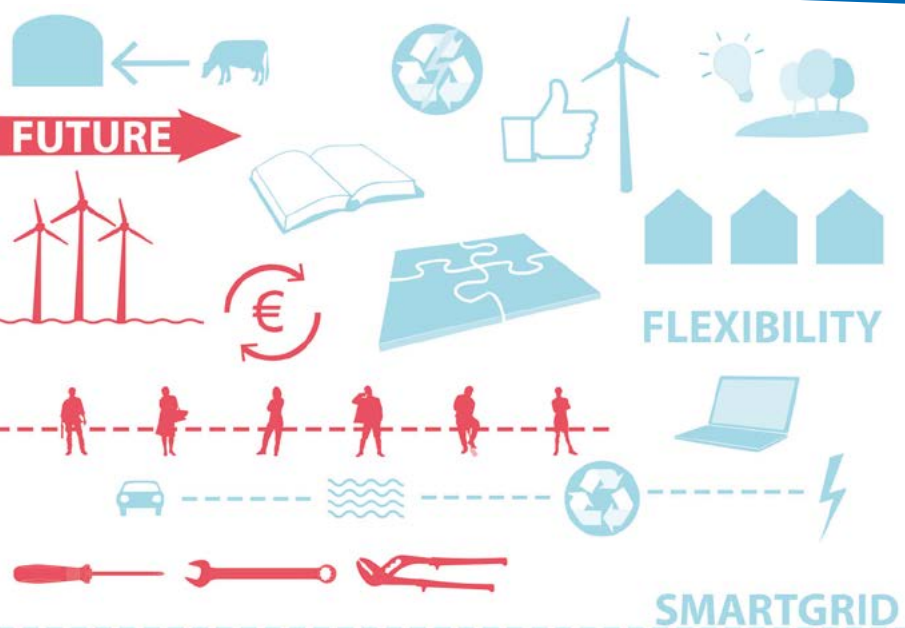
- political coordination of visions and goals across the border;
- incorporation of an increasing share of renewable energy into the energy networks;
- cross-border interconnections and integration of national energy systems;
- the need for cost-effective (gas-based) balancing to keep energy 'triple A';
- public acceptance;
- Involving SME's in projects;
- reducing burden of bureaucracy.

## SOLUTIONS AND OPPORTUNITIES

The HANSA ENERGY CORRIDOR (HEC) project recommends the following solutions and opportunities for future energy transition projects:

- create critical mass for R&D, innovation, employment and technology/service export to other regions with cross border triple helix collaboration;
- search for synergies and complementarities with other North Sea countries;
- use projects like HANSA ENERGY CORRIDOR (HEC) as an umbrella for smaller projects that otherwise wouldn't have the same impact;
- cluster cooperation between triple helix organisations;
- offshore wind as central driver for system integration;
- develop a chain in multi-level cooperation: regional (Energy Valley), cross-border (HEC), international: ENSEA.

# INNOVATIVE FORESIGHT PLANNING



## BIG WINS

- Tools related to shaping and planning for future business opportunities.
- A structured approach for gathering intelligence for strategic transnational cooperation of regions and clusters.
- Business collaborations and new networks around the offshore wind industry.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal



innovative foresight planning  
for business development

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# INNOVATIVE FORESIGHT PLANNING

## SUMMARY:

The Interreg IVb project INNOVATIVE FORESIGHT PLANNING (IFP) wants to accelerate the transfer of knowledge and technology from the mature and world-class oil and gas sector in the North Sea area into the emerging global renewable energy sector. The project uses the method of foresighting. This is a systematic approach for projecting the longer-term future of science, technology, economics and society to identify the emerging generic technologies likely to yield the greatest economic and social benefits.

The project focused primarily on offshore wind. In this sector, the opportunities for knowledge and resource transfer were considered highest. During IFP, plans for cooperation, assessment of joint projects, business collaborations and new networks were born out of the foresighting activities, together with suggestions for solutions to energy transition problems.

By connecting knowledge and competence of universities, research institutes and the public sector, innovative foresight planning developed a tool both for the private sector and public bodies related to business development in, amongst others, the energy sector.

## CHALLENGES:

During the project several, general challenges were encountered, some relevant to all sectors addressed, some relevant primarily to the energy sector:

- some regions and countries have established long-term energy policies in order to ensure energy transition. There is, however, often little or no coherence in policy between regions and countries, making NSR forecasting difficult;
- the difference in domestic interests and agendas are a barrier to transnational cooperation;
- market-driven transition could be considerably accelerated if the private sector were more secure about the investment environment.

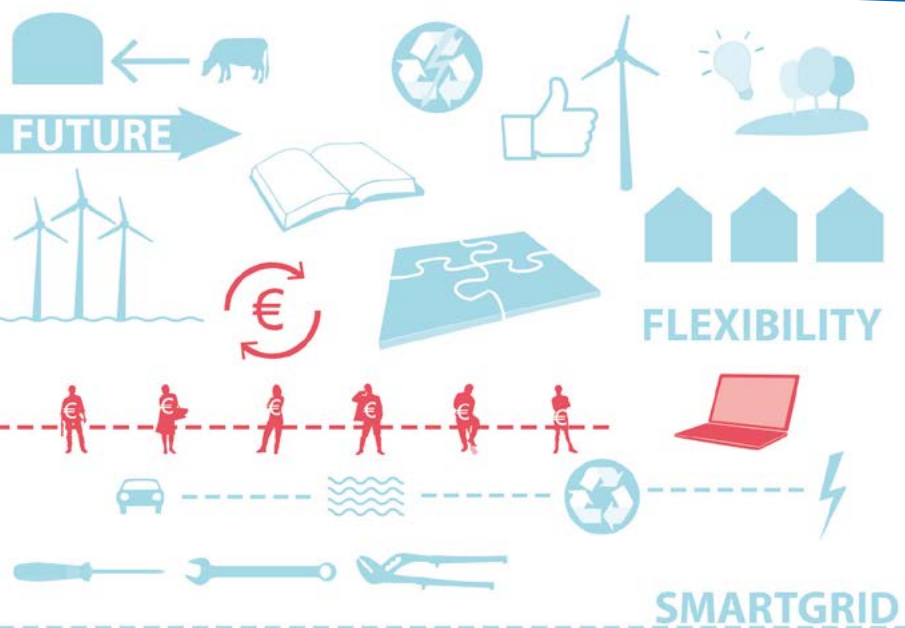
## SOLUTIONS AND OPPORTUNITIES

Implementation of transnational Innovative Foresight Planning for businesses and business clusters may be a tool for energy transition. In IFP it resulted in:

- several highly successful energy sector events that led to on-going transnational business developments;
- mapping the NSR offshore wind industry supply chain;
- introduction of new Business to Business networks relating to offshore wind;
- an expert workshop in Brussels to foster transnational discussions around energy storage and smart grid solutions.



# NORTH SEA SUPPLY CONNECT



## BIG WINS

- ICT/SME's EU Tendering.
- EBSN European Business Support Network.
- Online tool and internet based service platform [www.eubizz.net](http://www.eubizz.net) for SME's.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal



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# NORTH SEA SUPPLY CONNECT

## SUMMARY:

The main goal of the Interreg IVb project North Sea Supply Connect is the strengthening of regional economies across the North Sea region by increasing the access of SMEs to the European market.

The project established a service network of regional development agencies, business development organisations, government agencies and knowledge institutions. They will help small and medium sized enterprises (SMEs) to identify new business opportunities and to cooperate across regional boundaries for sustained success on interregional supply markets. For this purpose, the project created the "European Business Support Network" (EBSN) as a personalised network partnership operating an internet-based service platform ([www.eubizz.net](http://www.eubizz.net)). EBSN and its network partners offer innovation, market development and training services to SMEs striving for enhanced competitiveness as innovative suppliers to buyer companies at interregional level.

## CHALLENGES:

NORTH SEA SEP took the challenge to link energy policies North Sea Supply Connect focused on specific challenges often concerned with SME's trying to gain access to new markets:

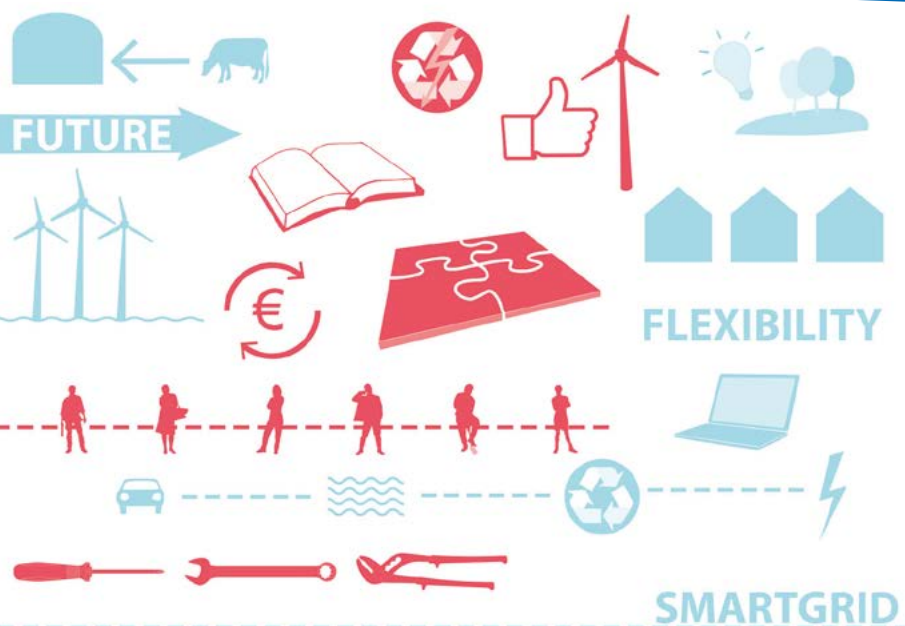
- supply chains often play safe by working with companies they know, and may therefore miss out on innovations other SME's could offer;
- sometimes SME's are too small to obtain orders on their own and language is also often a barrier;
- SME's are sometimes inward looking and unaware of the business environment around them;
- SME's are vulnerable to global changes and competition in the supply chain.

## SOLUTIONS AND OPPORTUNITIES

For the first time in the history of INTERREG there have been two complementing projects working on the same topic (North Sea Supply Connect SSC & BALTIC SUPPLY). This resulted in synergy and the development of an `open` platform. This is to be recommended for new programmes. Furthermore the partners in North Sea Supply Connect recommend the following solutions and opportunities for strengthening the position of SME's in energy transition:

- extend networks of partners by linking them to the networks of other partners (e.g. networks of chambers of commerce in different countries);
- facilitate matchmaking;
- facilitate border crossing partner- & technology searches;
- develop or use a digital platform ([www.eubizz.eu](http://www.eubizz.eu)):
  - Training
  - Coaching
  - Supporting tendering

# NORTH SEA SUSTAINABLE ENERGY PLANNING



## BIG WINS

- Development of Regional Energy Strategies in 6 NSR regions.
- A transferable planning and policy approach with energy and sustainability at its core.
- Regional cooperation and built up regional energy networks.
- Development of an appraisal model and financial tools for decision-making.
- Increased knowledge and heightened awareness of energy in the participating regions.
- Sustainability criteria.



### Projects energy focus

- Wind power
- Wave or tidal energy
- Blue energy
- Solar energy
- Geothermal energy
- Biomass or biogas
- Integration of renewable energy
- Renewable energy in general
- Rational energy use



### Programme priority

- Building on capacity for Innovation
- Promotion of sustainable Management of our Environment
- Improving the Accessibility of Places in the NSR
- Promoting Sustainable and Competitive Communities



### Project issues

- Political
- Economic
- Social
- Technological
- Environmental
- Legal

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**NORTH SEA**  
**SUSTAINABLE**  
**ENERGY**  
**PLANNING**

# NORTH SEA SUSTAINABLE ENERGY PLANNING

## SUMMARY:

NORTH SEA SEP'S long-term goal is to create energy self-sufficient regions. During the project 14 project partners from different fields (local authorities, municipalities, companies and educational institutes) from six countries within the North Sea Region exchanged their experiences and best practices in order to create new tools for regional planning to increase the use of sustainable energy.

During the North Sea SUSTAINABLE ENERGY PLANNING project, the project partners collaborated intensively on European as well as regional levels. An increase in the use of sustainable energy has to be seen as a necessity to prevent the climate change and some of its side effects.

NORTH SEA SEP resulted in a toolbox for regional energy planning, more regional and transnational collaboration and exchange of know how between the different interest groups involved in developing sustainable energy in the region. In this sense, the perception of new businesses and public-private partnerships developing is relatively important. Regional energy suppliers dealing with renewable energies should not only have the technical, but also the administrative and logistical knowledge to be able to produce and deliver sustainable energy.

## CHALLENGES:

NORTH SEA SEP took the challenge to link energy policies with the regional and/or local developments. This applies to yet more regions in and around the NSR, especially in those facing population decline, rising energy costs and capital outflow (as opposed to inward investment). For the implementation of regional development and energy strategies there is a need for guidelines, roadmaps and financial models.

It is important to note that deficiencies in competence, capacity, control, mutual trust and too many conflicting interests, create constraints to the development of well functioning business models and coherent planning at regional, sub-regional and local scales.

## SOLUTIONS AND OPPORTUNITIES

NORTH SEA SEP developed and tested solutions that may serve as guidelines for other regions, to initiate development of regional energy strategies, and as valuable resources for future regional projects:

- make an analysis of the status quo of the regions energy consumption and identify existing energy saving potentials;
- establish an energy strategy for the region, including models for self-sustainable regions;
- use the NORTH SEA SEP appraisal model to analyse plans and activities and to facilitate decision making;
- disseminate and improve knowledge to raise capacity for further sustainable development and cross-fertilisation of innovation;
- use and develop new models for public-private sector cooperation as well as new business models for local/regional "renewable energy markets".
- All findings of the project have been compiled into a compendium to be used as a basis and guideline for other regions in the future.

# Legenda of Big Wins

## EXPLANATION OF THE ACHIEVEMENTS OF THE INTERREG IVB NSR PROJECTS ON RENEWABLE ENERGY IN RELATION TO SYSTEM INTEGRATION



optimisation of the biomass chain



sustainability related to energy projects



valorisation of the biomass chain



social acceptance for renewable energy



foresighting



transferable tools for energy planning and optimisation of stakeholder involvement



pushing offshore wind developments



cross overs between energy, materials, water and mobility (C2C)



social energy networks and stakeholder involvement



island innovation centres on renewable energy



triple helix networks



on line service tool for businesses in EU



business networks and involvement of SME's



business plans



developed smart grids



energy education, e-learning and dissemination



developed (regional) energy strategies



renewable energy related to urban environment



strategic cross border cooperation

## FLEXIBILITY

balancing and flexibility