

North Sea STAR Spreading Transnational Results

Targeted Analysis 2013/2/23

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This report presents a more detailed overview of the analytical approach to be applied by the project. This Targeted Analysis is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

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1. Introduction

The area covered by the North Sea Region Programme (2007-2013) is shown in Map 1 below. This area is characterised by the high density of population and activities in the southern North Sea, largely connected with the existence of large ports such as Rotterdam, Antwerp and Hamburg and its connectivity to Europe's "core" region. The more northerly parts of the North Sea, in particular the coasts of North East England and Scotland, Sweden and Norway are more sparsely populated and remote. Whilst the North Sea has suffered due to pollution caused by discharge of organic pollutants into the Sea from large estuaries such as the Rhine and Elbe, climate change remains the greatest challenge to the area as rising sea levels and the threat of increased coastal flooding and tidal surges affect the many low lying areas of the east coast of England and in the Netherlands.

Map 1: The North Sea Region

Map 2.1: The North Sea Region



Source: North Sea Region Programme (2008) *Operational Programme*.

Connected to this is the North Sea's recent economic history as one of Europe's main energy producing regions. According to the ESPON ESaTDOR project, large-scale oil and gas production mostly in Norwegian, UK and Dutch waters has been significant over the past 40 years but output is declining and there is a shift to more, smaller fields. The region is also home to the greatest concentration of offshore wind farms in the world and further expansion is planned, particularly in UK and German waters. In Scotland, the European Marine Energy Centre (EMEC) based in the Orkney Islands is a centre of excellence for testing wave and tidal energy devices. In addition, the North Sea Countries Offshore Grid Initiative, a major infrastructure project proposed by the EU and supported by Norway aims to develop an integrated offshore energy grid to connect wind, wave and tidal power with the North Sea region, making use of Norway's hydro-electric power stations to store energy until it

is needed. Looking to the future, the North Sea is well placed to make the transition from being a centre of fossil fuel production to a renewable energy region.

1.1 The Analytical Approach

In the North Sea Star project there are a number of inter-related European policy dimensions that need to be recognised and understood. Perhaps the most important in the context of this project is Europe's drive towards a low carbon economy, driven by a short to medium terms strategy to reduce Europe's energy dependency on fossil fuels by 20%; to ensure that 20% of Europe's energy demand comes from renewables and there is a 20% increase in energy efficiency (thereby reducing demand) by 2020. Whilst this plays to an environmental agenda, it is also addressing longer term concerns regarding energy security by promoting greater energy self-sufficiency, at European, national, and regional scales; protecting the wider economy from projected fluctuations in global commodity prices, thereby promoting economic resilience; and acting as a motor for innovation and growth to help Europe emerge from the recent financial crisis. The second dimension is in relation to Europe's growth strategy, which is focused on 'smart sustainable and inclusive growth' within which climate change and energy is one of five priorities and a resource efficient and low carbon Europe as being one of seven flagship or major priority initiatives, intended to deliver up to one million new jobs. The third dimension is the European mechanism, through transnational regional policy, which is designed to facilitate encourage and enable these agendas to be delivered.

More specifically this ESPON targeted analysis project seeks provide advice and guidance to specifically the North Sea Operational Programme team, but also possibly other transnational Interreg project teams, as to how climate change and energy dimensions can be best built into the new Operational Programmes, so that projects can be developed that can contribute to broader agendas outline above. From the outset we recognize that the contribution that this programme of activities will have in relation to wider strategic and capital intensive energy projects such as new smart energy grids, new large scale energy production methods, will be modest. Hence for illustrative purposes only and before EU budget negotiations have been completed our best guesstimate suggests that EU funding within the North Sea Operational Programme 2013-2020 may amount to about 100-120 million Euro, with matched funding provides an available pot of approximately 240 million Euro.

More specifically this research proposal seeks to:

- Provide a deeper understanding of the most likely future energy scenarios for the North Sea Region;
- Evaluate the effectiveness of European, national and regional energy policies;
- Assess the role of transnational cooperation projects in this process, and ascertain the added value of a project clustering approach; and
- Provide recommendations on accelerating the take-up of renewable energy technologies and supporting relevant green economic activities in the North Sea Region.

In order to achieve these objectives the research team perceives that the following tasks will need to be undertaken:-

- To update and map the current energy situation in the North Sea Region (if possible both on land and within the marine environment) in terms of both the demand and supply of energy as a mechanism for beginning to build future energy scenarios;
- To evaluate the current European, national and regional action plans being developed in trying to achieve the 20-20-20 energy goals by 2020;
- To evaluate the effectiveness of policy delivery from a transnational perspective in terms of both individual energy related projects and the project clustering approach.
- To provide policy recommendations related to how both the governance arrangements for transnational co-operation and the delivery of regional energy self-sufficiency can be improved in relation to the prospective post 2013 funding period.

However we recognize from the outset that the North Sea region is not self-contained and behaves more as a 'prosumer' in that it produces energy, it consumes/uses energy for regional development and it imports/exports its energy to other regions. To this extent the concept of regional self-sufficiency is likely to be contested.

2. Research Hypothesis and Methodology

The nature of this ESPON project as a *Targeted analysis based on User Demands*, does not easily lead to a traditional single research hypothesis. The focus of the work is to advise the North Sea Region in particular and other INTERREG transnational regions as to whether energy related perspectives relating to the Europe 2020 vision can be better integrated into their operational programmes for the 2014-2020 programming period. From this perspective it can be hypothesised that:-

Energy projects under the North Sea Region Operational Programme can provide significant examples of best practice at the local and regional scale in meeting the Europe 20-20-20 targets. The new Operational Programme offers the opportunity for energy and energy related projects to play a more significant role, either as a freestanding Priority, as a cross-cutting perspective across Priorities or a combination of the two.

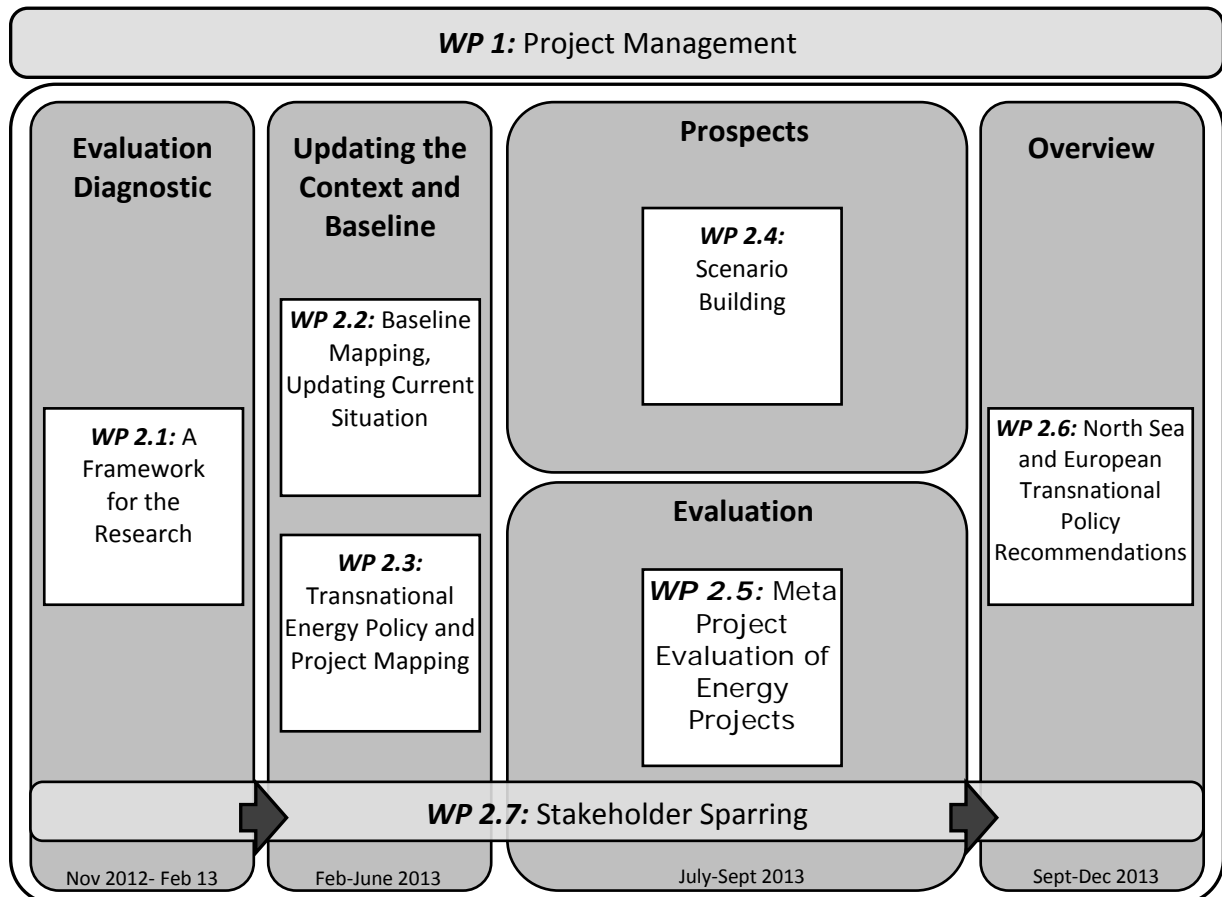
In order to test this hypothesis, the following research questions are proposed:

- What is the policy context at European, national and regional levels driving the North Sea Region towards the Europe 20-20-20 targets and beyond?
- To what extent is the North Sea Region self-sufficient in terms of energy production, and how may this change in the future?
- How effective are current projects under the North Sea Region Operational Programme in contributing to energy objectives? What benefits can be achieved from the clustering of projects?
- How should energy projects under the forthcoming Interreg North Sea Operational Programme be developed in order to contribute to future energy scenarios and goals?

Hence the approach follows four key perspectives. First we engage in a context setting and baseline mapping exercise to better understand the European, national and regional policy context in relation to the Europe 20-20-20 energy debate, and

secondly to identify and map the existing regional energy situation. This baseline mapping perspective is then used to help develop future energy scenarios for the region, which is the prospect stage. A third dimension involves evaluating the efficiency and effectiveness of energy related projects under the current North Sea Star Operational Programme and in particular questioning whether the clustering approach to project management adds significant benefit. This in turn leads a synthesis of the findings and policy recommendations. Figure 1 provides a schematic perspective of this approach which is elaborated further in the following sections.

Figure 1 The Analytical Approach



The individual work packages are structured as follows:

Work Package 1: Project Coordination

This work package relates to the coordination and management of the project. The Lead Partner will be responsible for the overall management of the project, ensuring that there is good communication between the project team and the ESPON Co-ordinating Unit and project steering committee in relation to all parts of the project.

In addition the Lead Partner will be responsible for:

- Co-ordinating and liaising with the partners to ensure that the methodology for various aspects of the research is properly understood and being applied in the thematic studies, the seas analysis and the case studies;

- Monitoring the progress of partners and subcontractors in delivering the work;
- Ensuring that proper liaison and contact is maintained with other ESPON projects to ensure that methods and the data collected in this project complements and is coherent with other projects;
- Drafting (within inputs from all partners) inception reports, interim and final reports;
- Ensuring appropriate project reports are delivered to the ESPON Co-ordinating Unit on time;
- Participating in various ESPON seminars (either directly or ensuring that the team is fully represented); and
- Managing the contracts with the partners and various subcontractors

WP 2.1: A Framework for the Research

Objective: To refine and extend the framework for the research

Tasks:

- Identification and review of key literature at European, transnational national and regional contexts in relation to ongoing energy policy;
- To review the availability and limitations of various data sources that have been used in other ESPON and North Sea energy related projects in relation to sustainable energy for the North Sea Region;
- Development of the research approach and methodology, including an initial identification of the specific projects (individual and cluster) for further evaluation;
- Refinement of project management arrangements and risk assessment;
- To agree the data sets to be used for baseline mapping exercise

Outputs: Inception Report

This work stream forms part of the initial Analysis and Diagnostic stage of the project and is designed to provide a more in-depth framework for the research upon which subsequent work packages will build.

A key aspect will be the development of a baseline understanding of data availability in line with the overall project specifications. It will focus on the scale at which the data is available, national NUTS level 3 and perhaps lower, both on land but also within the maritime environment. It will explore the extent to which existing data sets are up to date and ease with which they can be maintained for monitoring purposes.

The Inception Report will provide a more detailed elaboration of the research approach and will through dialogue begin to identify a list of datasets to be updated and mapped in the next phase (including an evaluation of data source limitations).

WP 2.2: Baseline Mapping Exercise

Objective: To provide a baseline mapping exercise against which progress against the 20-20-20 targets can be evaluated.

Tasks:

- To synthesise the existing information regarding energy supply and demand in the North Sea Region

- To update where possible the information sources and map these at NUTS 3 (for land) and include where possible maritime information
- To identify critical gaps in the data availability
- To provide recommendations as to which are the key indicators to monitor progress
- To explore relevance of regional self-sufficiency when it is likely that the region will continue to be an exporter to other Meta-Regions of the EU

Outputs: A working paper including regional maps and other databases alongside policy recommendations as to how such information can be kept up to date.

During this part of the research the data sets will be assembled and where possible mapped at the appropriate scale for the North Sea Interreg area. During this process we will be looking to assemble data from existing European and other data sets that we have agreed through dialogue are appropriate to update/create baseline information against which data can be mapped. We are seeking to map information both on land and at sea. On land we will look to be mapping information at a NUTS level 3 scale and at sea, and following the perspectives of the INSPIRE directive, we will be looking to map information based on a 10 km grid square frame.

This mapping exercise will help to provide a baseline against which recommendations for future monitoring and the development of scenarios will be based.

WP2.3 Transnational Energy Policy Mapping exercise and initial review of NSR Programme Energy Projects

Objectives: The purpose of this work package is to provide an overview at European, transnational, national and regional scales of the policy initiatives in relation to energy initiatives.

Tasks:

- To review European and North Sea Regional energy policy;
- To review energy policy documents in each of the member states of the North Sea (Belgium, Netherlands, Germany, Denmark, Sweden, Norway and UK);
- To review any important sub-national policy initiatives that may be relevant to particular states;
- To undertake a mapping exercise of energy related projects that are transnational in character that has been funded through the North Sea Interreg Programme;
- To undertake a mapping exercise of other energy related projects in the North Sea Region that are transnational in character;
- To agree up to eight projects as case studies

Outputs: Eight working papers on North Sea energy policy in the EU and seven member states and a synthesising paper.

In this phase of the work we will undertake a review of energy policy initiatives as they relate to European, National and regional perspectives with a particular focus on the countries in the North Sea Region. The Lead partner will take an overview of the process and review European policy perspectives as well as providing a framework

for other partners to review energy policies in each of the seven countries surrounding the North Sea and also where appropriate at sub-national levels, e.g. Germany and Scotland). The information will be synthesised into a working paper which provides a synthesis of the current policy context, which is rapidly changing.

The second part of this work package is to develop a list of potential projects from which case studies can be selected. There are three types of project we will be looking for. Individual projects within the Interreg programme, individual projects within the programme that have been clustered to create synergies and other projects in the North Sea area that might be contributing to broader policy objectives, but not formerly part of the North Sea Programme. This approach is based on the idea that there are likely to be other and more significant transnational energy related projects in the North Sea and it will be interesting to see whether there are any lessons to be learnt for future programmes, or whether the Interreg Programme could in the future add value. This mapping exercise will provide the basis for case study selection. An initial scoping exercise has already been undertaken and the outcomes reported in WP2.5 and Annex 3.

WP2.4 Scenario Building

Objectives:

- To update the Operational Programmes baseline to begin to explore whether the objectives of the programme are being achieved in relation to energy;
- To identify emerging trends;
- To extrapolate to 2020 and 2050 to see what progress can be made towards a zero carbon energy policy for the North Sea Region;
- To begin to identify actions that could be taken to accelerate the current trends.

Tasks:

- Identify driving forces
- Rank importance & uncertainty
- Select scenario logics
- Flesh-out the scenarios
- Select indicators for monitoring
- Assess impacts for different scenarios
- Evaluate alternative strategies

Outputs: Scenarios Briefing Paper including reflections from the stakeholder sparring

Scenario building will be used to contemplate the range of possible futures that could develop from the influence of key drivers, events and issues. The scenario building approach will follow the general methodology of the UN Millennium Ecosystem Assessment. Scenario development will be based on stakeholder workshops, structured interviews and, if available, also on an analysis of consultations on energy for the INTERREG V B Operational Programme. Emerging trends will be identified beyond the historical bias of quantitative forecasting approaches. Work will be done in close co-operation with WP 2.5 and WP 2.7. Actions and background information will be identified for policy recommendations in WP 2.6.

WP2.5 Case Studies

Objectives:

- To provide a critical and reflective evaluation of the impact of energy related projects in the North Sea Region

Tasks:

- To create an agreed and common approach to each of the case studies;
- To produce eight case study reports based on documentary reviews and structure interviews;
- To produce a synthesis report summarising the key lessons learnt, with a view to developing policy recommendations

Outputs: Case study template working document, 8 case study reports, one synthesis briefing paper

This is probably one of the key elements of the research where we use case studies of projects to evaluate whether they have delivered their intended outputs or not. Once the case studies have been selected, a working methodology will be established which creates a structure for the case study work and a template through which these findings are going to be presented. The key is to try and establish a common approach both in terms of the research and reporting mechanisms. The case studies will explore the effectiveness of the partnership and evaluate the sustainability of the project, they will explore success stories and barriers to delivery, and they will consider the contribution of the projects to wider policy objectives.

The key of this analysis is to provide advice and guidance for future programmes in terms of top down versus bottom up approaches, the added value (or otherwise) of a clustering approach, and some appreciation of the North Sea Interreg programmes activities in relation to other transnational energy related initiatives.

Further information on case study selection and the future development of the case study methodology are included in Annex 3. The shortlist of potential case studies is shown in Table 1 below:

Table 1: Short list of potential case studies

Project	Horizon	Objectives
Clustered projects		
SEP (ENVSR + LOWCAP)	31/08/2012	Energy demand & supply: multiple objectives
CARE-North (LOWCAP)	31/01/2013	Energy demand: transition
Stand alone projects		
C2CI	31/12/2012	Energy demand (efficiency/savings) & supply: transition
POWER Cluster	30/06/2011	Energy supply (transition); multiple objectives
Biochar	01/10/2013	Energy supply (transition); multiple objectives
enercoast	30/09/2012	Energy supply: transition
E-harbours	31/08/2013	Energy demand: savings/efficiency + use of renewable energy (transition)
GSA	30/09/2013	Energy demand: transition; multiple objectives
Source: project sheets NSR Website (http://www.northsearegion.eu/ivb/projects/) accessed 13 February 2013		

WP2.6 North Sea and European Transnational Policy Recommendations

Objectives: To draw together the main results of the project and identify policy recommendations in support of regional energy self-sufficiency for the North Sea Region in particular but also with reference to other transnational co-operation regions

Tasks:

- Produce a summary document showcasing the main result of the project;
- Produce a short executive summary;
- Produce a scientific report largely built around the working papers;
- Produce policy recommendation in relation to how progress towards regional energy self-sufficiency can be monitored, suggestions as to potential areas for future projects (including views on the clustering approach) and how the governance of new operational programmes might be enhanced.

Outputs: Draft Final Report, Final Report and accompanying scientific and working papers

Project Partner Involvement: Lead Partner with contributions from all other partners

WP2.7: Stakeholder Sparring

Objective: To engage in inter-active dialogue with key stakeholders drawn from the steering group and interested regional partners to feedback the results of the work and shape future activities and policy recommendations.

Tasks:

- To prepare periodic briefing papers on findings, future work and emerging recommendations
- Organise three interactive stakeholder workshops
- Organise a closing North Sea Star event

Outputs: Three sparring document briefing papers based on:

- Research Design
- Baseline and Scenarios
- Case study lessons and recommendations

Stakeholder sparring is seen as a critical and interactive dialogue between the research team and wider beneficiaries of the research. We see the approach as being a reflective discussion whereby preliminary thinking about the research path, initial findings and policy recommendations can be discussed and debated in a critical but supportive forum. Three stakeholder sparring sessions are planned, the first two within scheduled meetings of the North Sea Region Operational Programme and a final session geared towards stakeholder inputs that may benefit the preparation of the final project report:

- *7th/8th May 2013 – Edinburgh*
The main audience for the Edinburgh meeting will be the Programme Evaluation Steering Group - administrators and national representatives. Discussion here may focus on case studies.

- *11th/12th June 2013 – Halmstad, Sweden*
(as part of North Sea Region Programme's annual conference). There is an opportunity here to present in a workshop on the morning of June 11th and there will also be up to 3x20-minute workshop sessions where stakeholder sparring/discussions can take place and may provide an opportunity to discuss some of the energy scenarios. Some inputs from the NSS Interim Report at this event might be helpful to affect future decision making on the Operational Programme. The audience here is likely to be local politicians and project developers.
- *9th September 2013 – TU Delft (to be confirmed)*
The audience for this depends on what advances have been made in project content since June, but is likely to be wide and include not only representatives from the Operational programme team, but also potential project beneficiaries. This is the time when states will be considering the draft operational programme (closing date for consultation is October 2013). The workshop could thus be presented either as an opportunity to discuss scenarios in further detail, to road test draft policy recommendations or in terms of what is forthcoming and what people can bid for in future programme.

WP3: Dissemination of the Results

The third main work package involves the dissemination of the outputs from this research. More details are provided later in section IV this paper, but we conceive as this being an ongoing process whereby the research team engages proactively with the scientific and practitioner community throughout the research. It will primarily involve the LP and other PP working principally with the stakeholder community.

Whilst most of the dissemination will take place towards the end of the project this work package will involve:

- Presentation and discussion of the methodology and interim results at various internal and external ESPON seminars during the project itself;
- Specific activities organized by the TPG during the project in the form of project workshops involving with interested stakeholders;
- Recurring articles about the project and its results in a well-established international coastal and marine e-newsletters such as EUCC Coastal News;
- Looking for interaction and feedback between the project and decision makers and politicians towards the end of the project to feed into policy recommendations but also guides and handbooks. In this context it will be important to look for innovative ways of engagement;
- Presentation and discussion of the methodology and results at various scientific meetings and international conferences (for example Joint AESOP/ACSP Congress Dublin 2013; EUCC European Maritime Day Stakeholder Conference; Institute of British Geographers Conference; European Regional Science Association Conference; Regional Studies). This will be an on-going dissemination that can involve all of the project partners;
- Production of various academic journal articles targeted at different types of academic and practice communities e.g. Town Planning Review, Marine Policy etc.;
- Presentation of the results at a national level, co-operating with relevant ESPON co-ordinating points to provide national and trans-national seminars

to deal with the specifics of particular regional seas, or sectoral priorities and to learn from experiences elsewhere;

- Creation of a Spatial Data Infrastructure (SDI) for integrated spatial data information and knowledge. The SDI will harmonize and normalise data coming from WP 2.2, WP 2.3, WP 2.4, WP 2.5 and WP 2.6, as well as those data from external sources. This will provide a data platform /data network for making available the data, information and tools that we have used for developing maps, statistics and analysis; and
- Creation of a section on the websites of the partners involved in the project specific to the activities/ outcomes of this project and a link to the project space in the ESPON website.

Further information on project outputs expected from each partner per work package and a breakdown of partner costs per budget line is included in Section 6.

3. Main Literature and Data Sources

The following section outlines some of the key literature and data sources that will be used as part of the North Sea Star project, in particular informing work packages 2.2 (baseline mapping of energy data), 2.3 (energy policy mapping) and 2.4 (scenarios). Here a brief summary is given of European energy policy and current trends in energy production and consumption, and a summary of data availability is provided. Energy policies (and thus sources of further literature) are contained within Annex 1 (national policy overviews) and potential sources of data are examined in more detail in Annex 2.

3.1 European Energy Policy Debates

Energy has been at the centre of EU policy since the European Coal and Steel Community (1951) and the Treaty of Rome (1957), which established the European Atomic Energy Community (Euratom) alongside the European Economic Community (EEC). A major step was taken by the Treaty on European Union (the Maastricht Treaty) in 1992 by giving the Community the task of creating 'trans-European networks' in energy, telecommunications and transport. In 1994 eight priority energy projects of European significance were identified. More recently, the Treaty of Lisbon has enhanced the EU's objectives for energy policy.

Current policy: Energy 2020 and the Energy Roadmap 2050

EU law and policy on the energy sectors of oil, gas and nuclear, electricity transmission, energy efficiency, renewable energy and other matters is set out in more than 170 directives, regulations and decisions together with many communications and other statements. Current policy is set out in two main documents: '*Energy 2020 A Strategy for Competitive, Sustainable and Secure Energy*' (CEC 2010a) and the '*Energy Roadmap 2050*' (CEC 2011).

The immediate goal is '20-20-20'. By 2020 in the EU, there should be at least a 20 % reduction in greenhouse gas emissions compared to 1990; a saving of 20 % of energy consumption compared to projections for 2020; and 20 % share of renewable energy in consumption. These policies are made in light of the need to provide for

more security of energy supply and the contribution that energy production makes to climate change.

Energy 2020 sets out the 'urgent need for far-reaching changes in energy production, use and supply' (p. 5). Some member states will have to renew up to a third of energy generation capacity by 2020 because of redundancy of existing installations. This will require an investment of one trillion Euro to replace and diversify existing sources. Europe is in a particularly vulnerable position in the face of 'peak oil' given that it is the world's largest energy importer.

Evaluations show only weak implementation of these policies with energy systems adapting too slowly, notably in the switch to low-carbon renewable energy sources and more energy efficient transport. Even energy legislation is slow to be enacted locally, with the Commission taking action against many member states for failures to implement EU law. Among the reasons for slow progress, the Commission highlights the fragmented European market which is hindered by 'different national rules and practices', barriers to competition, and national subsidies that are environmentally harmful.

The new EU energy strategy focuses on five priorities:

1. Achieving an energy efficient Europe by reducing waste and achieving a 20% saving by 2020, with emphasis on the building stock and transport sector, making industry more energy efficient and gaining more efficiency in supply and consumption;
2. Building a truly pan-European integrated energy market: dismantling existing national monopolies, supporting the 20% target for renewable energy supply by 2020, and facilitating pan-European infrastructure to support the free flow of energy across Europe, and to support streamlined 'permit procedures' for projects of 'European interest';
3. Empowering consumers so that they can access energy at the most affordable prices, and achieving high levels of safety and security;
4. 'Extending Europe's leadership' in energy technology and innovation; with technology roadmaps in wind, solar, bio energy, smart grids and nuclear fission; and four major pan-European projects on linking European electricity grids, electricity storage, sustainable biofuel production and energy saving technology in 'smart cities'; and
5. Strengthening the external dimension of the EU energy market by reaching agreements with neighbours who adopt the EU market model.

The *Roadmap 2050* accepts that uncertainty about policy and conditions beyond 2020 is not conducive to making investment now, whilst at the same time there is an urgency to make changes that will need many years to deliver improved performance in the energy sector. The *Roadmap* proposes that a 'decarbonised European energy system by 2050' is possible and required, though requiring 'structural changes' in terms of much higher capital expenditure to replace and change sources; increasing the role of electricity including in transport; higher consumer costs; an important contribution from renewables and low carbon sources, particularly nuclear; and a strong linkage between energy and 'climate action', though not at the risk of economic competitiveness.

The trade-offs between goals of energy security, climate action and economic competitiveness illustrate the many tensions and dilemmas in implementing EU energy policy. There is little attention the 'territorial dimension' in the policy. Yet the impacts of the policies will vary considerably across Europe, depending on the specific conditions and potentials of regions. Furthermore, implementation is largely a matter for member states and regions acting cooperatively in transnational groupings, where cross-border cooperation can assist in achieving objectives. This has been recognized by the Commission which established in 2006 'regional initiatives' 'to provide a forum for regulators, network operators and other stakeholders of neighbouring countries' (CEC 2010b, p. 2).

This then sets the broad direction in policy terms, and individual nation states will be pursuing their own programmes of activities depending on their country specificities. Through a number of more directed policy initiatives, usually in the form of directives, the EU is seeking to provide further guidance on how the direction of travel outlined above can be effectively operationalized. Much depends on effective and consistent reporting of data, often at the level of the nation state, and the three key objectives have been subject to various forms of European policy initiative.

The examples given below are illustrative rather than exhaustive. First, longstanding concerns regarding the polluting impacts of large scale fossil fuel combustion plants has led to restrictions and limits on the pollution such activities can generate. The *Large Scale Combustion Directive* of 2001 seeks to control the emissions of sulphur dioxide, nitrogen oxides and dust of these plants, which alongside other initiatives such as emissions trading, has helped to move Europe towards the target of reducing by 20% the greenhouse gas emissions from this form of energy production. The 2009 *Renewable Energy Directive* requires nation states to produce a certain proportion of their total energy consumption (including transport) from renewables by 2020. These targets, set against a 2005 baseline, vary depending particular circumstances and range from 10% of energy consumption from renewables in Malta to a 49% target for Sweden. Key to delivering these targets is the requirement to produce national action plans and to report on performance on a national basis following a common template.

The Commission, in reviewing progress against the 20-20-20 targets remains confident that reductions in gas emissions and the renewable targets are likely to be achieved, but have serious reservations regarding the objective of improving energy efficiency, which in turn should reduce demand for energy. To provide momentum and encouragement to this part of the agenda, in October 2012 the *Energy Efficiency Directive* was adopted, which as well as seeking to liberalize energy markets; require energy producers and suppliers to become more efficient in delivering resources and requiring national governments to report on progress, also places an emphasis on improving the energy efficiency on residential and commercial buildings with an emphasis on public buildings being used as an exemplar of what could be achieved. With such direction it seems likely that future European funding programmes might major on this form of activity, although it is worth noting that a recent European Court of Auditors report has questioned the cost effectiveness of investing in public buildings when the payback period could be anything from 50-150 years. The report was based on evidence gained from Cohesion Countries and the expectation was that greater scrutiny of such projects should be made before they are approved.

Hence within Europe, energy production and consumption is seen as being a critical component of the potential for global competitiveness, economic development and social cohesion and wellbeing. Much of the European wide statistics are provided at a national scale only and looking at the countries that border the North Sea as a

whole some interesting trends become visible, and these are briefly outlined here as providing a broad context of the current situation.

Currently Europe's overall dependency on the import of energy is growing over time, from 46.7% in 2000 to 52.7% in 2010. Against this backdrop it could be argued that the countries that border the North Sea are performing reasonably well. Norway (-517.4%) and Denmark (-18.2%) are net exporters of energy, based around their exploitation of oil and gas reserves in the North Sea. The availability of such reserves also means that other North Sea countries, (with the exception of Belgium) are less dependent on energy imports than the rest of Europe. However it is evident from the available statistics that this level of self-sufficiency is declining and growing dependency on imported energy is increasing for countries in the region.

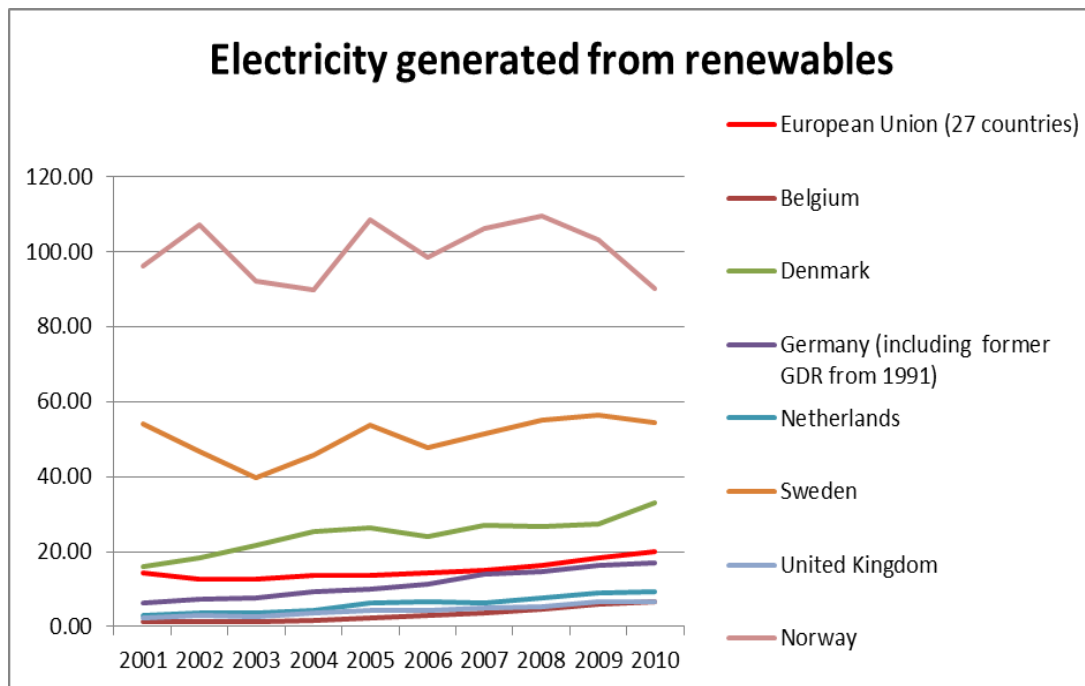
Table 2: Energy Dependency Ratios by countries adjacent to the North Sea (all products)

	2000	2006	2007	2008	2009	2010
EU27	46.7	53.7	53	54.6	53.7	52.7
Belgium	78.1	79.7	77.1	79.9	74.3	76.8
Denmark	-35.3	-35.9	-24.7	-22.9	-20.6	-18.2
Germany	59.5	60.7	58.1	60.5	61.5	59.8
Netherlands	38.7	37.4	38.9	34.4	36.5	30.7
Sweden	39.2	37.8	36.3	37.9	37.1	36.5
UK	-17	21.2	20.4	26.2	26.2	28.3
Norway	-731	-664.8	-654.4	-612.3	-639.1	-517.4

(Source: DG Energy, 2012)

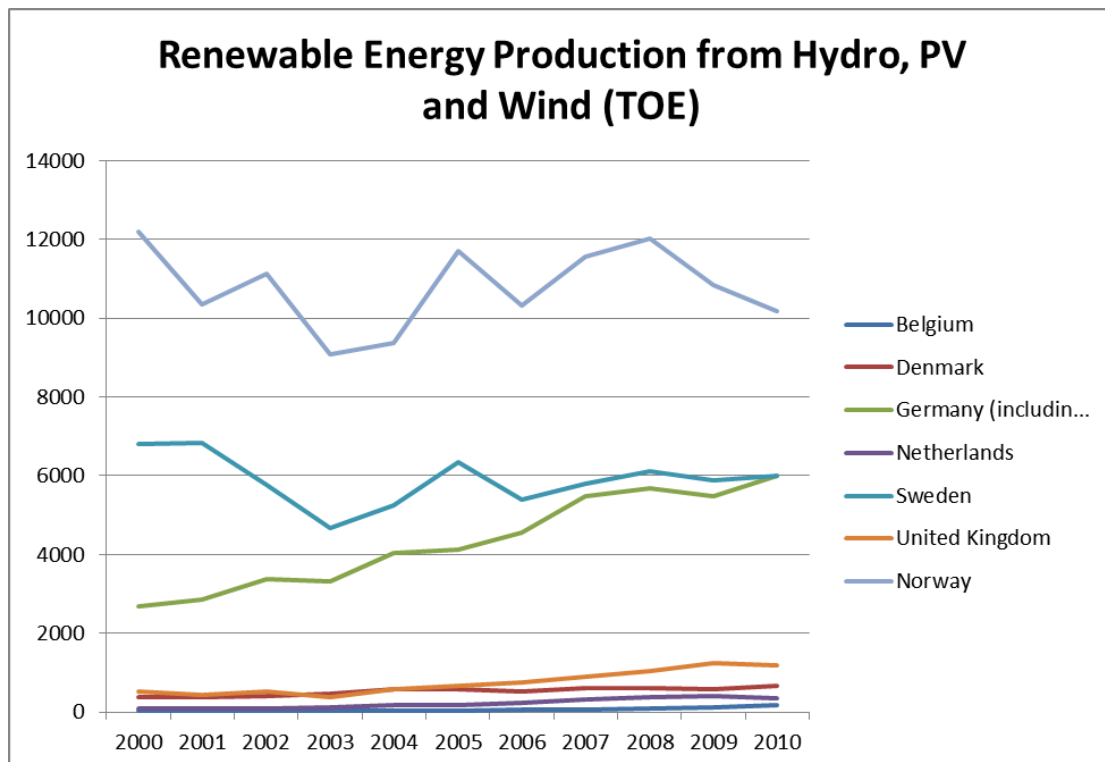
Furthermore a regions propensity to produce its energy needs from renewable resources in part depends on its natural resource asset base. Renewable energy is divided into two broad categories, renewables utilizing natural assets (wind, water and photovoltaic) and renewables that have been produced or manufactured, such as bioenergy and biofuels. The following three figures (2, 3 and 4) provide an overview of renewable energy production for the countries bordering the North Sea. The availability of natural resource assets, particularly in Norway and Sweden means that a significant proportion of their primary electricity needs are generated from hydro resources. Elsewhere there is greater reliance on wind and photovoltaic sources which, albeit from a very small base, are becoming more significant as an energy source. They generally remain limited in overall energy dependency terms, although their significance in terms of electricity generation is growing. Biofuels are a very small contributor to total energy production across Europe, although it is interesting to note how Germany is a big producer of biofuels and this could be quite an important fuel for transportation. The biggest user of biofuels for transport is Poland, where 17% of private transport miles were fuelled in this way (Eurostat 2012).

Figure 2: Electricity generated from renewables in the North Sea region (percentage)



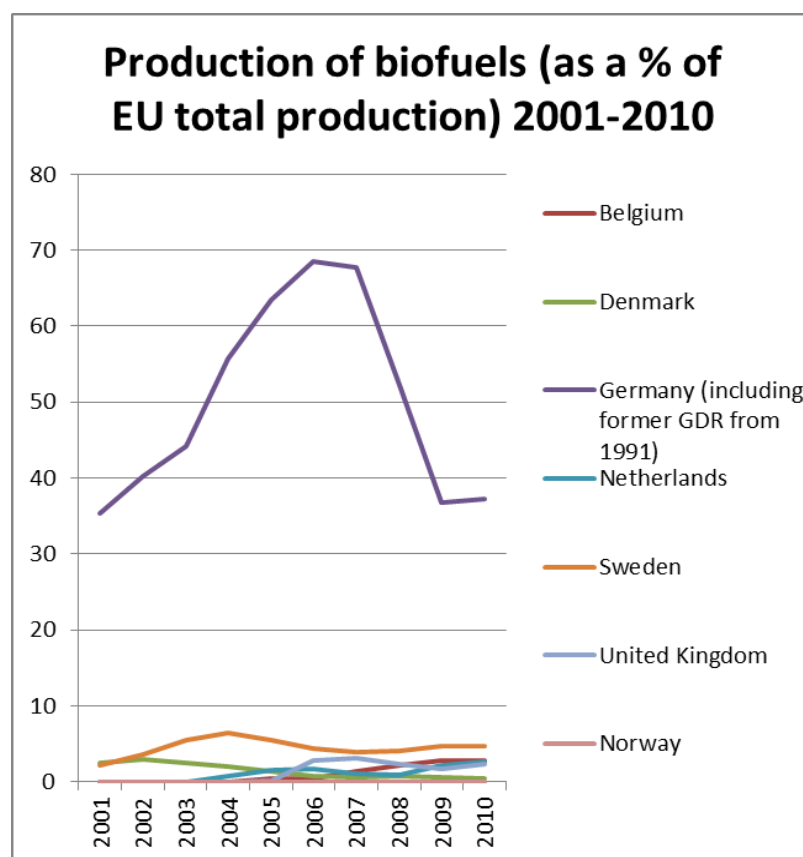
Source: Eurostat (2013) Electricity generated from renewable sources - annual data [nrg_ind_333a]

Figure 3: Renewable Production from Selected Sources



Source: Eurostat (2013) Supply, transformation, consumption - renewables (hydro, wind, photovoltaic) - annual data [nrg_1072a]

Figure 4: Production of Biofuels



Source: Eurostat (2013) Supply, transformation, consumption - renewables (biofuels) - annual data (nrg_1073a)

3.2 Data and Mapping

Given the growing importance of energy policy as part of the European Union's deliberations, there is certainly a great deal of data available on energy policy, particularly in terms of different forms of energy production and energy dependency. These are available in Eurostat and also reviewed in various commission publications. Furthermore, recent energy directives (in particular relating to National Renewable Energy Action plans) are requiring nation states to report on progress on an annual basis using a prescribed format to produce consistent information across the EU27. There is trend data available demonstrating how energy consumption, dependency and production has changed over time from about 2000 onwards, but a major limitation of all of these data sets is that they are at NUTS 0 (national) level. This means that whilst they provide useful contextual material on patterns and trends for countries neighbouring the North Sea as a whole, European statistics are of limited value.

The tables in Annex 2 provide an overview of various energy data sources that might be available, both at European level and within North Sea countries (national, regional and local level), although at this point in time these data sets have not yet been evaluated to see whether North Sea datasets can be built from the bottom up.

There are likely to be limitations based on variation in the way that information is recorded and presented and spatial resolution to which it is available.

4. Use of existing ESPON results relevant for this project

The following projects have been identified as being able to provide further background data, policy reviews and recommendations which may be highly relevant to the North Sea STAR project:

The ESPON 2006 project (2.1.4) “Energy Services, Networks, and Territorial Impact of Energy Policy” (completed 2005), which provides background information on energy infrastructures, production and consumption in Europe in order to analyse the potential impacts of changes to European energy policy on different types of region. This report uses employment in high-energy purchase industries as a proxy for energy consumption in NUTS2 and NUTS3 regions, however much of this data comes from 2001-2002 and is therefore not recent enough for use in North Sea Star

ReRisk (“Regions at Risk from Energy Poverty”), completed 2010, which examines current trends in energy production and consumption across Europe in the context of ambitions outlined in the Territorial Agenda (2007) to explore opportunities for the development of renewable energy supplies. This project provides data on energy pricing, transport, climate, wind power and PV potential.

CLIMATE (Climate change and territorial effects on regions and local economies in Europe), completed 2011, identifies which European regions are most vulnerable to different types of climate change-related events (e.g. more frequent flooding), potential impacts and capacities for mitigation and response.

GREECO (Territorial Potentials for a Greener Economy - ongoing) seeks to identify the territorially relevant aspects of a green economy to highlight opportunities for European regions through implementation of strategic territorial development and cohesion policy actions. One task of this project will be to provide indicators at NUTS2 level to understand the current state of the green economy.

ESaTDOR (European Seas and Territorial Development, Opportunities and Risks) – completed 2012 - examines the role of coastal and maritime regions in territorial cohesion and provides useful background material on marine energy infrastructure including offshore wind, wave power potential and shipping of energy (liquid bulk) products at North Sea ports. One annex is dedicated to characterisation of the North Sea in terms of its current state and future opportunities and risks related to coastal and maritime activities.

TransMEC (Transnational Support Method for European Cooperation), completed 2011, provides a method for Operational Programmes for capitalisation and communication of ESPON and INTERREG project results in support of further programme development cooperation projects. The recommendations of this project may contribute to the development of case studies and ways in which stakeholder sparring between the North Sea Star project team and INTERREG participants may be framed.

SS-LR (Spatial Scenarios – New Tools for Local-Regional Territories), completed 2010, which aims to provide both qualitative and quantitative scenarios and forecasting methods for regions and local areas at NUTS2, NUTS3 level and below. This may be particularly useful in developing energy scenarios for INTERREG participants who work at regional and local levels.

5. Project Specific Responses

There are a small number of content related issues that required comment a response to be included in the Inception Report.

1. There was a suggestion that the team needed to enhance its energy expertise. We feel that within the team, or within our respective institutions there is considerable experience we can already draw upon as illustrated by Table 3 below. These are illustrative rather than inclusive.

Table 3: Energy Expertise of Project Partners

Partner	Additional Energy Expertise Relevant to the Project
Univ. of Liverpool	Within the University, energy, climate change and transitioning to a low carbon economy are big research themes with the Stephenson Renewable Energy Research Institute focusing on technology and the Peak Oil group focusing more on policy related matters.
NIBR	Currently involved in the “Climate Innovation Systems in Cities and Urban Regions: Energy efficient buildings as a road to resilient post-carbon cities” project, funded by the Norwegian Research Council. Also participating in OREEC, the Oslo Renewable Energy and Environment Cluster.
University of Delft	Members of the TU Delft team have contributed to the Atlas ABC project, identifying spatial structures in the north west of Europe which may contribute to the transition of energy market structures to greater sustainability.
University of Oldenburg	The University of Oldenburg is a partner in the INTERREG North Sea “Enercoast” project, looking at the potential of blue-green energy.
IOW	Significant expertise in climate change adaptation and mitigation strategies.

2. Stakeholder mapping. Following further discussions with the client we have been able to identify an approach to stakeholder mapping where the three events and critical stakeholders have been identified. Within each of these events the team is willing and able to invite (at their own expense) other stakeholders from other transnational groups to learn from the experience of this ESPON project. Also as the project proceeds the stakeholder net widens (see details under WP2.7).
3. Dissemination. In the original proposal dissemination was embedded in work packages 1 (project management) where contributions to the ESPON seminars are located and work package 2 where stakeholder sparring was also perceived, in part, as a dissemination activity. Additional resources have now been allocated to a dissemination work package to provide an opportunity to talk about the research to both academic and professional audiences.

6. Summary of Project Outputs and Deliverables, Partner Budgets

Table 4: Project Outputs and Deliverables per Work Package

Partner/ Work Package	University of Liverpool	NIBR	TU Delft	IOW/Oldenburg	Malaga
2.1 A Framework for the Research	Inception Report, European and UK energy policy overviews	Norway and Sweden energy policy overviews	Netherlands and Belgium energy policy overviews, case study selection guidance	Germany and Denmark energy policy overviews	European data overview and mapping guidelines
2.2 Baseline Mapping	Identification and validation of European/national data sets	Identification and validation of European/national data sets	Identification and validation of European/national data sets	Identification and validation of European/national data sets	Mapping of available data across North Sea area, working paper on data sources and monitoring
2.3 Energy Policy Mapping and Review of NSR Energy Projects	European and UK Energy Policy Reports	Norway and Sweden energy policy reports, Energy policy synthesis report	Netherlands and Belgium energy policy reports	Germany and Denmark energy policy reports	
2.4 Scenario Building				Scenarios Briefing Paper	
2.5 Case Studies	2 energy case studies	2 energy case studies	Case study methodology briefing note, 2 energy case studies, case study synthesis report	2 energy case studies	
2.6 N Sea and Transnational Policy Recommendations	Final Report	Contributions to final report	Contributions to final report	Contributions to final report	Mapping input into final report
2.7 Stakeholder Sparring	Various project briefing papers prior to meetings				

Table 5: Breakdown of Partner Budgets by Budget Lines

Partner/ Budget Line	1. Liverpool, UK	2. TU Delft, Netherlands	3. NIBR, Norway	4. IOW, Germany	5. Oldenburg, Germany	6. Malaga, Spain	TOTAL
Staff	€ 95,808.96	€ 31,531.09	€ 36,492.60	€ 17,931.25	€ 18,112.50	€ 18,562.50	€ 218,438.90
Administration Costs	€ 23,577.24	€ 7,882.84	€ 9,123.15	€ 4,232.81	€ 4,528.13	€ 4,640.63	€ 53,984.80
Travel and Accommodation	€ 14,500.00	€ 8,000.00	€ 8,000.00	€ 5,500.00	€ 1,500.00	€ 8,000.00	€ 45,500.00
Equipment	€ 0.00	€ 0.00	€ 0.00	€ 0.00	€ 0.00	€ 0.00	€ 0.00
External Expertise and Services	€ 5,500.00	€ 5,500.00	€ 5,500.00	€ 0	€ 0	€ 5,500.00	€ 22,000.00
Total Budget	€ 139,386.20	€ 52,913.93	€ 59,115.75	€ 27,664.06	€ 24,140.63	€ 36,703.13	€ 339,923.70

7. Likely Barriers to Project Implementation

Table 6 : Risk Assessment

Risk	Assessment of Significance	Response
<p>Partner Issues</p> <p>1) Failure of a partner to deliver an agreed outcome on time</p>	<p><i>Amber/Red</i></p> <p>This could be of significance at all stages of the project but particularly so in relation to WP2.1 and WP2.2 as these set the framework for the key data collection phase of the project and may hold up progress here. It would also be of significance towards the end of the project if outputs delayed the preparation of the final report.</p>	<p>Development of a clear work programme detailing partner responsibilities, outputs and time frames and dates of Project Team Meetings and associated work briefings.</p> <p>Monthly management group meetings via Skype/conference calls .</p> <p>Fortnightly email updates to all partners from Lead Partner.</p> <p>Appointment of project manager to maintain dialogue with partners and hopefully identify potential delivery issues at an early point.</p> <p>All partners have worked closely together on other projects.</p>
<p>2) Withdrawal of partner due to unforeseen circumstances</p>	<p><i>Amber</i></p> <p>It is felt that this is unlikely to happen, but it could cause a temporary hold-up to aspects of the work until a replacement is found.</p>	<p>Responses as above plus the development of a stakeholder data base by the Lead Partner for project dissemination purposes that may be used to identify potential sub-contractors to meet any capacity shortfall.</p>
<p>Reporting /Finance Issues</p> <p>Failure of partners to submit properly formatted project returns within the allotted timescales</p>	<p><i>Amber</i></p> <p>It is recognised that the submission of properly formatted and timely returns are essential to trigger payment from ESPON and that failure to comply with the necessary procedures by one party may delay payment to others placing stress upon partner relationships. This would be a particularly significant issue for some partners who rely on external funding for their operation.</p>	<p>In recognition of the significance of this issue to the smooth running of the project, part of the Lead Partner Team will be a finance officer with particular expertise in managing EU awards. They will assist the Project Manager in guiding partners through the reporting process and collating returns.</p> <p>The reporting requirements will be fully explained to project partners at the first Team meeting and will form a standing item for management group and project team meetings and team newsletters.</p> <p>All partners (where relevant) have made arrangements for suitable external auditing of their returns and these are reflected in the project budget.</p>

Table 6 Continued

Risk	Assessment of Significance	Response
<p>Data Issues Data availability and consistency related to particular seas or thematic areas</p>	<p><i>Amber/Red</i> It is envisaged that this is likely to be the most challenging issue for the project. The project specification emphasises the need to provide consistent, reliable and updatable data that is in compliance with the INSPIRE Directive Principles and comparable amongst different regional seas' units, structured and defined for GIS and mapping purposes. A balance may however need to be struck between the ambition to be comprehensive both geographically and thematically and in the consistency of spatial units of analysis used</p>	<p>Early identification of problems in data availability is a key element of WP2.1. This will enable problem areas to be highlighted in the Inception Report so that issues can be discussed with the Steering Committee and to a lesser extent through Stakeholder Sparring.</p> <p>Close liaison will also be important with the Steering Committee during WP2.1 regarding the definition of core indicators and data collection templates in relation to each thematic area.</p> <p>Prioritise the main thematic areas and datasets to be used for the “baseline mapping”. Identify, using the stakeholders’ knowledge the comparability of the sub-regional datasets and the reliability of regional datasets to be used to address the current energy situation of the North Sea region.</p> <p>Data consistency, reliability and updatability will be a key area to be considered when making recommendations in the final reporting stages of the project.</p>
<p>Cost of data acquisition</p>	<p><i>Amber</i> It is possible that certain key data sets may only be available at a cost</p>	<p>We are aware that this is a possibility but feel on balance that the spirit of the project is to use publicly available data sources only. We have not therefore made any provision in the budgets for payment to cover this eventuality. We are aware that information on the value and outputs of energy resources is commercially sensitive.</p>

8. Orientation of the project towards the Interim Report

The Interim Report, due on the 30th June 2013 will focus on the presentation of intermediate project results. The results will be largely based on the baseline study and the mapping of the current energy situation in the North Sea Region and where possible will draw upon the results of other ESPON projects. Preliminary scoping of European wide energy sets suggests that whilst there is an improvement in the reporting of energy related information at NUTS 0 (national scale) there is less comparable information at a sub-national or regional scale. From a national perspective there is a growing body of energy data at a subnational and indeed in some cases local level, on consumption and production terms. As yet it is unclear whether this information can help to build a picture of the situation in the North Sea region from the bottom up. Although it is recognised that this approach is highly aspirational, it is likely to be problematic. Also the report will elaborate further on the policy approaches being adopted at a European and national scale (with further development and syntheses of the Annexes to this Inception Report). The report will also seek to provide some preliminary, and perhaps speculative, recommendations as to how energy projects of various types might be integrated into what will be at this time an emergent Operational Programme for the North Sea region.

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