



ECOWinds – The European Clusters for Offshore Wind Servicing

FINAL REPORT

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Project Partners:



Danmarks Tekniske Universitet



Third Parties:



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PROJECT FINAL REPORT

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4.1 Final publishable summary report

4.1.1 An executive summary

The vision of the European Clusters for Offshore Wind Servicing (ECOWindS) Project has been:

To pave the way for new research and understanding of how the costs of offshore wind servicing can be driven down through research, innovation and cross regional cooperation.

All clusters have successfully carried out a detailed regional map of the clusters characteristics and internal dynamics with a focus on offshore wind servicing, which served to identify similarities and complementarities between clusters. Regional mapping was carried out on the basis of a SWOT analysis and involvement of regional stakeholders.

The focus of WP3 Regional Complementarities and Synergies was to establish research priorities based on the needs of the offshore wind servicing (OWS) sector. The main objectives were:

- Formulation of strategic objectives
- Brainstorming of potential research options
- Appraisal and selection of options
- Assessment of possibilities for international cooperation

The ECOWindS Joint Action Plan (JAP) is a trans-regional action plan or a roadmap that translates research and innovation priorities selected in earlier work packages to concrete actions. The JAP is based on the analysis conducted in ECOWindS and shaped by the stakeholders needs. The JAP proposes eight actions that support reaching the goals for offshore wind and offshore wind services through research, development and innovation.

One of the key project elements is WP5 'cross cluster workforce competences and capacities', where the aim is to define a common training and learning platform for realistic real-time simulation of OWS operations.

The first stage of developing the training platform was the mapping the OWS competences across the ECOWindS regions as well as defining the key operations that the training simulator would need to cover.

The second stage of the work is to describe the training platform including mapping the core characteristics. In its work on cross cluster workforce competencies and capacities, the ECOWindS project sets out to create a training and learning platform that is based on creating a virtual simulation based training tool.

Listed below are the key benefits of using training by simulation in a virtual environment:

- Simulator training is flexible and safe
- Simulator training is better structured and more efficient as opposed to learning on the job
- Simulator can be used to try out and study difficult or extraordinary operations, in single mode (single person training on skills) or in team mode.
- Simulation of operations under different weather conditions
- Emergency training, due to malfunction of accidents.
- Preplanning of operation, briefing and debriefing.
- Secure contracts due to customer confidence, risk level and time of operation.
- Well trained crews work more efficient and have fewer accidents.

The final stage of the work was to put forward recommendations for implementation of the simulation tool in the offshore wind industry. A joint cooperative and competitive approach is suggested. A Cooperative approach in the sense of sharing results in the innovation process, and a competitive approach in the training of individuals and teams.

The overall objective of WP6 Research and Innovation Ideas Generation was to develop a set of early stage research and innovation ideas aimed at implementing the measures from the ECOWindS Joint Action Plan. This led in to the creation of the Innovation Ideas Catalogue that will be used for the creation of future projects.

A wide range of dissemination activities have been carried out throughout the project. They have successfully raised awareness on the ECOWindS project. All stakeholder groups have been reached and many representative from industry, science and administration have become involved. Results have been distributed widely within the clusters and beyond.

4.1.2 A summary description of the project context and the main objectives

The vision of the European Clusters for Offshore Wind Servicing (ECOWindS) Project has been:

To pave the way for new research and understanding of how the costs of offshore wind servicing can be driven down through research, innovation and cross regional cooperation.

The project has sought to achieve this through pursuing the following objectives:

- Increase capacity for innovation amongst and within ECOWindS Research Driven Cluster (RDC)
- Develop regional strategies for Offshore Wind Servicing (OWS), via smart specialisation, which are integrated in a inter-regional Joint Action Plan (JAP)
- To develop an international cooperation strategy for innovative OWS clusters to internationalise and exploit new business opportunities
- To increase innovation driven cooperation of stakeholders (authorities, research entities and local business communities) within and amongst the participating clusters by means of regional research agendas and a joint action plan
- To improve qualification capacities within and amongst the RDCs to secure a capable workforce and intelligent researchers that respond to the needs of the OWS sector across Europe and internationally

Four clusters have participated in the ECOWindS project:

- South Denmark (Region Syddanmark Southern Jutland),
- East of England (Counties of Cambridge, Suffolk, Norfolk, Hertfordshire, Essex, and Bedfordshire),
- North West Germany (Federal states [Bundesländer] of Bremen, Hamburg, and Niedersachsen),
- The region of Møre in Western Norway.

These regions are well suited to collaborate on measures to improve the development of OWS through targeted innovation. They are home to leading RDCs within the offshore energy industry and maritime operations with existing expertise in offshore engineering and are, in three of the four cases, located in countries with substantial offshore wind markets that serve as drivers for national and regional technology development.

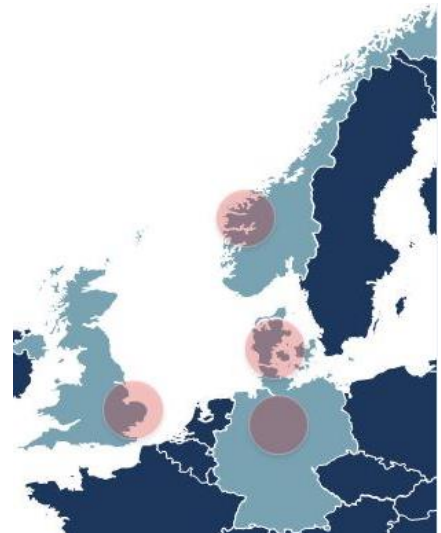


Figure 1 Map of the ECOWindS Clusters

They have national and/or regional business development strategies and plans focused on offshore wind energy and they have a strong research and science base to support the endeavor of ECOWindS.

The ECOWindS project runs through three successive phases;

1. Analysis and integration of research agendas of actors in regional clusters,
2. Initiatives to improve integration: definition of the Joint Action Plan,
3. Measures towards the implementation of the Joint Action Plan.

The work is divided into work packages (WP) accordingly (figure 2).

Methodologically, the first two phases, i.e. WP2-WP4, were implemented with the use of a systematic strategic planning process, starting with regional SWOT analysis feeding into a Strategic Orientation (SOR), which finally enabled the consortium to define an Action Plan with concrete objectives, activities and outputs.

The final phase, i.e. WP5-WP6 elaborates on measures towards implementing the Action Plan including an examination of skills competencies and capabilities in OWS and how these can be improved, and

the development of a detailed catalogue of innovation opportunities developed through a systematic research and stakeholder consultation process.

WP1 and WP7 dedicated to Management and Dissemination of the project and results were conducted throughout the whole project period.

Phase One:

WP 2 “Regional Mapping” aimed at mapping and analysing each of the participating RDCs to build a thorough understanding of each of the clusters’ internal dynamics with regard to their innovation capacity, knowledge fields and competence areas in the field of offshore wind (OW) and the particular subsector offshore wind servicing (OWS).

An analytical framework was developed to facilitate data collection and assessment focusing on the economic, political and structural conditions for research based innovation, research capabilities, infrastructures and commercialisation in the OWS sector. The information collected was used to inform the completion of SWOT analysis in each RDC, built with the input from regional stakeholders.

The overall purpose of the Regional Mapping was to pave the way for formulating, in WP3, inter-regionally integrated strategies for the OWS sector based on smart specialisation..

The major deliverables of WP2 were the mapping of the regions and the SWOT analysis in all clusters. The ECOWindS project has focused on the Offshore Wind Servicing Sector (OWS) and not the full value chain of Offshore Wind Energy. A formal definition of OWS was also developed at the beginning of the project in WP2.

WP3 “Regional Complementarities and Synergies” built on the regional mapping to formulate smart specialisation strategies to integrate the regional agendas on OWS at an interregional level.

It has built on and further developed individual regional research agendas to assess systematically the possibilities of synergies and opportunities for mutual learning and exchange of best practices between the regional actors involved in the regional RDCs.

Via a process of Strategic Orientation (SOR) analysis examining the strengths and weaknesses of the RDCs to help seize opportunities and defeat threats, WP3 formulated strategic objectives that were important, relevant and possible for the four regions involved. The objectives were aggregated and compared at consortium level to create the interregional OWS strategy.

The methodology followed, and the experiences gained, in developing the regional and joint strategies were presented in a smart specialisation toolkit. This project output supports the ECOWindS regions in maintaining their smart specialisation strategies in the future, and aid other regions in their efforts to coordinate their smart specialisation across borders.

WP3 also produced an International Cooperation Strategy which provided a clear identification of clusters from Europe and third countries and detailed cooperation possibilities in RTD and innovation

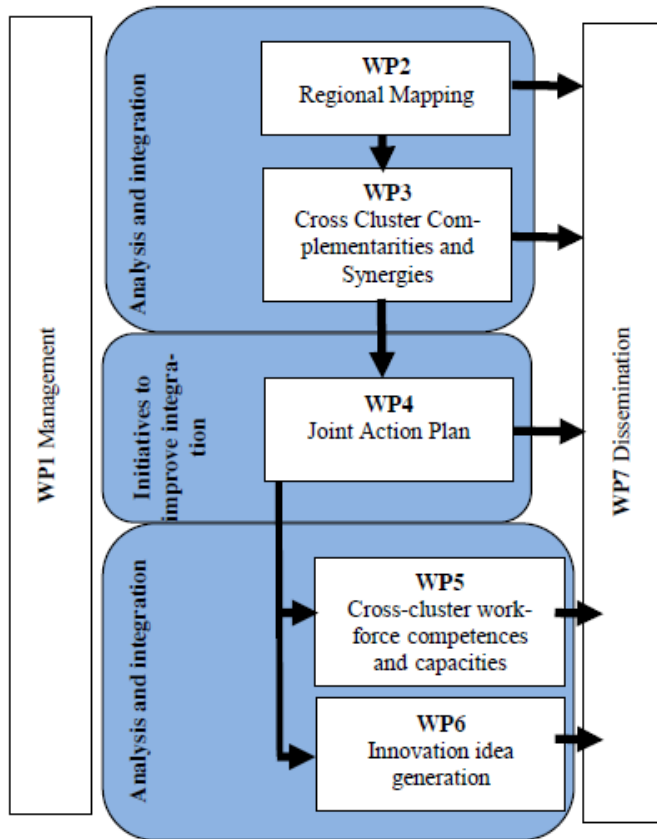


Figure 2 Interplay between the ECOWindS Work Packages

support services with a special focus on business opportunities.

Phase Two:

The objective for WP4, the “Joint Action Plan (JAP)” was to develop and present a trans-regional action plan or a roadmap that translates research and innovation priorities to drive economic development in OWS to concrete actions. The action plan puts the strategies developed in WP2 and WP3 into action, including activities to be taken at both regional and cross regional levels. Hence, the aim of WP4 was to define and prioritise actions to achieve the objectives of the smart specialisation strategy outlined in WP3, outlining them as projects or programs.

The methodology to define the action plan combined elements of road mapping and interactive Delphi-survey. The main steps of the process were:

1. An inter-regional workshop involving representatives from all ECOWindS clusters to identify actions that take offshore wind and OWS closer to the industry goals.
2. An analysis of the workshop results and development of draft actions based on this.
3. The proposed actions or measures are disseminated to the partners and stakeholders for feedback and improvement via an iterative Delphi process

After the iteration, the final action plan was accepted by the Project Steering Group.

The major deliverables of WP4 were the JAP itself, alongside a set of guidelines for its implementation, and a defined method for its evaluation and continuous future adaption over time.

Phase Three:

A key aim of the ECOWindS project is to contribute to improved qualification capacities in the RDCs to secure a capable workforce that meets and responds to the needs of the OWS sector. Achieving this will improve the efficiency and reliability of offshore wind servicing operations, reduce costs, and contribute to increased competitiveness of the industry. In addition there will be an increase in the provision of high quality training schemes and facilities to support the development of the growing workforce that is required by the industry as it develops.

The goal of ECOWindS WP5, “cross cluster workforce competences and capabilities” is to contribute to measures that strengthen interregional training and learning with a view to the implementation of the JAP. Its key objective is to describe and demonstrate a training and learning platform that will support the implementation of the JAP actions with regard to meeting the expected huge demand for highly skilled people within the OWS sector in the coming decades.

To this end the WP has outlined and developed a cross-regional 3D learning and training platform for offshore wind deployment, support and services based on virtual simulation technology. This tool is used in the offshore oil and gas industry active in the North Sea where experience has shown it can be effective as a practical and effective training tool.

The work package first outlined and described the operation and competency challenges for selected tasks in OWS, and recommended corresponding learning concepts, approaches and training scenarios for personnel training in these activities. The training and learning platform was then demonstrated through the development of a model, presented in existing simulation infrastructure, demonstrating how training simulation can be used to replicate a crane lifting operation. The purpose of this demonstration has been to illustrate the suggested simulation platform functionality and the training platform.

WP5 also developed an implementation plan detailing recommendations to further develop the training and learning platform. This includes recommendations for the cross regional implementation and exploitation of the ECOWindS training and learning platform.

WP6 “Research and Innovation Ideas Generation” aims to support the implementation of the JAP, outlining a second level of interregional actions.

The ECOWindS consortium engaged and involved regional stakeholders in the work, to stimulate and support them in contributing future joint OWS RTD project concepts for national and international funding. The stakeholder workshops and consultations in WP6 also represented the first practical steps in strengthening international cooperation and promoting new business opportunities.

The overall objective and major deliverable of WP6 was the creation of an ECOWindS Innovation Catalogue that presents a list of early stage innovation concepts or research ideas, aimed at solving specific challenges within OWS and implementing specific measures from the JAP.

The innovation concepts within the catalogue have been developed in conjunction with stakeholders, and reviewed and validated by industry experts to ensure their relevance in supporting efficiency and cost reduction in the sector. The concepts within the catalogue were also presented alongside potential project partners, and funding sources to support stakeholders in developing and implementing these research ideas.

Management and Dissemination:

From the project outset WP1 ensured the proper management and focus of the project, ensuring effective and timely delivery of the project objectives and milestones. Regular project steering group meetings were a valuable tool to achieve this, including a kick-off meeting at project initiation, a midway conference, and a final conference.

Dissemination and Exploitation has also been a key work package for ECOWindS which has been active throughout the duration of the project.

Its objective was to continuously raise awareness and publicity for the project, informing about its background and goals. Dissemination activity was vital in reaching and involving the target groups of stakeholders who contributed at all stages of the work in order to make ECOWindS a successful and sustainable project. Furthermore it was the objective to communicate the results of the project and to facilitate networking and co-operation between industry and science.

4.1.3 A description of the main S & T results/foregrounds.

Defining Offshore Wind Servicing

The ECOWindS project has specially focused on the Offshore Wind Servicing Sector (OWS). From the outset of the project it was important to agree a definition for this subsector in order to define a clear scope for the ECOWindS project and to provide the basis for the further development of a rather young sub-sector.

According to the definition developed during the project, Offshore Wind Servicing includes the activities/processes of assembly, installation, operation and maintenance of offshore wind farms (Figures 3 and 4).

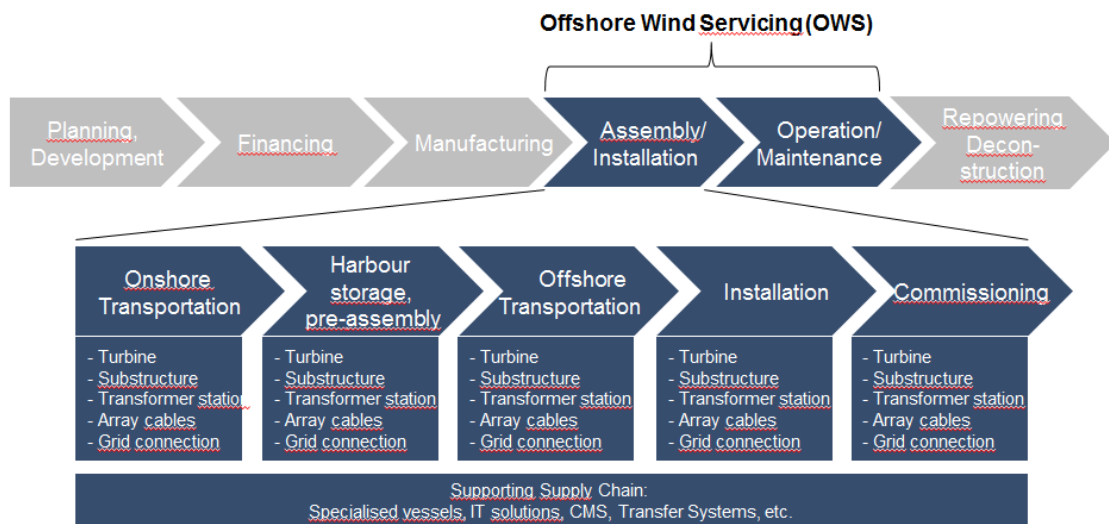


Figure 3 Detailed definition of the activities within assembly and installation of offshore wind farms

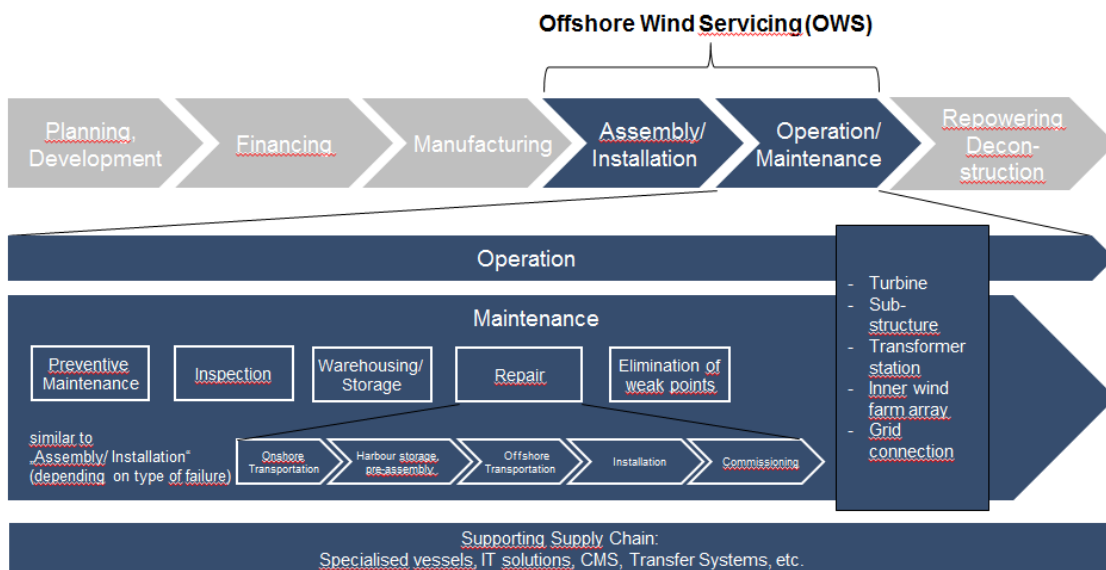


Figure 4 Detailed definition of the activities and services within operations and maintenance of an offshore wind farm

Following this definition, it has been beyond the scope of the ECOWindS project to address other areas of the value chain such as design or manufacturing of components. However it was acknowledged that those phases also have a substantial impact on cost reduction in OWS and that the outcomes of the project may have future implications for these other elements of the full offshore wind value chain.

The development of the offshore wind industry across Europe is driven by the push for increased renewable energy generation capacity. As a result of the ever increasing offshore wind capacity, the OWS subsector is growing in significance and volume.

ECOWindS Partner DTU have calculated the prognoses if the future of the OWS market. The following table presents an estimate of OWS spending and market size between 2015-2020, based on an analysis of current published estimates of capacity growth, and OWS spending for a generic profile current generation offshore wind farm (Cronin 2015). If installed offshore wind capacity continues to grow at projected rates following the SET-Plan and national strategies, OWS will become a major industry branch by 2020 requiring investment of €3,200M in installation and O&M.

New capacity to be installed 2015-2020 (EWEA/Navigant)	19	GW
Total capital spend on offshore projects 2015-2020	69 000	M€
Total capital spend on installation phases 2015-2020	14 000	M€
Total annual spend on O&M in 2020	1995	M€/yr
Potential spending on service providers, installation 2015-2020	1900	M€/yr
Potential spend on service providers, O&M in 2020	1300	M€/yr

Table 1 Market size estimate for Offshore Wind Services 2015-2020 [Cronin 2015]

OWS is a heterogenic sector, drawing on experience and capabilities of several relevant neighboring industry branches;

- Offshore industry; offshore marine service industry and offshore support vessels, including crane vessels, anchor handling towing and supply vessels, jack-up barges and platform/multi-purpose support vessels
- Electro-mechanical installations, operations & maintenance service industry
- Civil engineering, marine construction, cable laying

OWS lays in the intersection of offshore wind energy, neighboring sectors and offshore service industries. The offshore industry learns from the experience of the offshore Oil and Gas industry, however may in the short term actually compete with offshore wind for OWS resources and capable staff (Figure 4).

WP2: Analytical Framework and the Regional Mapping of ECOWindS Research Driven Clusters

Regional mapping of the four participating research driven clusters was carried out on the basis of a comprehensive Analytical Framework designed by the Work Package Leader germanwind. The framework was designed as a questionnaire to capture the individual distinctiveness of each of the involved RDCs with respect of their competences and capacities within OWS, and portfolio of supporting infrastructure enabling them to support innovation in the subsector.

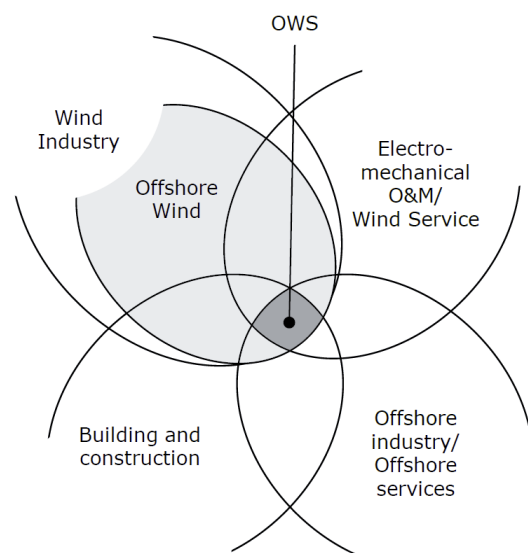


Figure 5 OWS position in the interface between neighbouring industry branches

The Analytical Framework is based on a classical SWOT analysis (assessing both internal and external factors), and includes elements of STEPLED (social, technological, economic, political, legal, environmental, educational and demographic aspects) analysis and TIS (Technological Innovation System) analysis. (Figure 6).

Being a self-assessment tool, the Analytical Framework is valuable beyond the ECOWindS project and is suitable for other clusters looking to evaluate the strengths and challenges of their offshore wind and/or OWS industries.

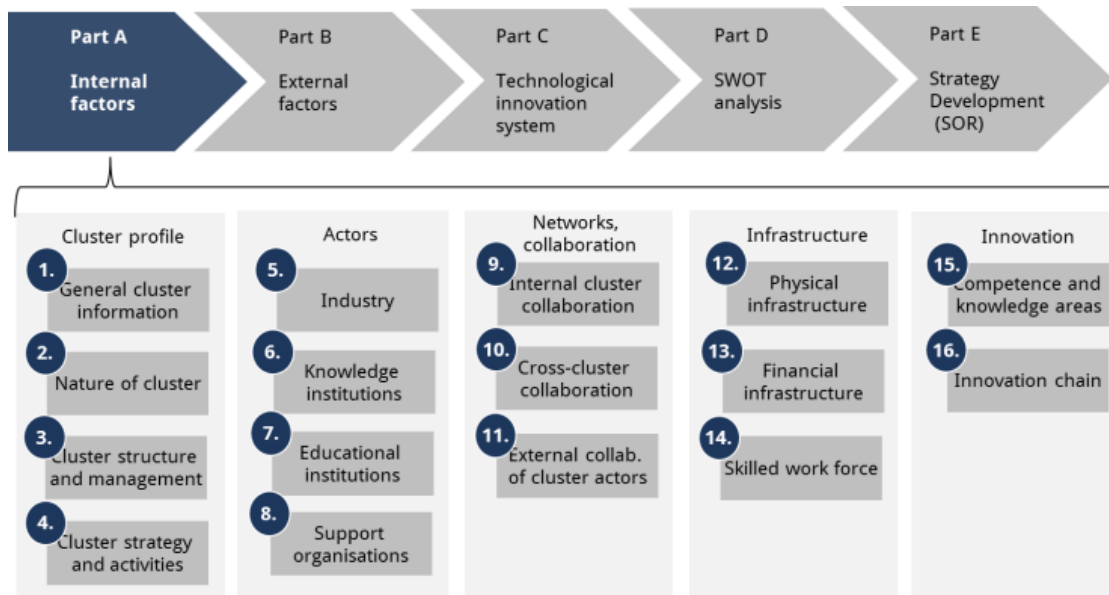


Figure 6 Analytical Framework for Regional Mapping – Overview of “Part A Internal Factors”

The regional mapping set the baseline for the project and allowed the respective offshore wind clusters to identify their particular strengths and weaknesses as well as opportunities and threats for the industry. The regional mapping involved data collection and analysis by review of statistics, literature and expert interviews as well as stakeholder involvement who represent the triple helix and (representatives from administration, industry, science sectors) participated in the mapping workshops.

All participating offshore wind clusters showed different characteristics in terms of market size and market development as well as particular competencies and strengths of cluster actors:

- **South Denmark** is an offshore wind pioneer and covers the full supply chain, including the world leading OEMs on offshore wind turbines. The cluster benefits from a strong RTD & innovation environment and the relevant infrastructure (Harbors, test sites etc.).
- **North West Germany** is the center of the offshore wind sector in Germany. Due to environmental conditions, the cluster has established itself as far shore pioneer and covers the full value chain of OW and OWS. The industry can benefit from a strong science sector and cross-sectoral expertise. The German offshore wind market is expected to be the largest in Europe.
- The offshore wind cluster in the **East of England** has great experiences in the installation, operation and maintenance of offshore wind farms. It is located in close proximity to the existing European market, and as a cluster has the largest installed offshore wind capacity worldwide. However, most of the parts used for this wind park have been imported. The UK content of parts however is rather low.
- **Norway** does not have a home market for offshore wind, however the Region Møre in West Norway has a world class maritime and offshore cluster. It offers excellent expertise in advanced maritime operations and many transferrable competencies and technologies.

When comparing the characteristics of the participating RDC’s, the coverage of the clusters’ offshore wind supply chains is quite different. Being the first to develop their offshore wind markets, Denmark

and the UK have particularly strong OWS capabilities (Figure 7).

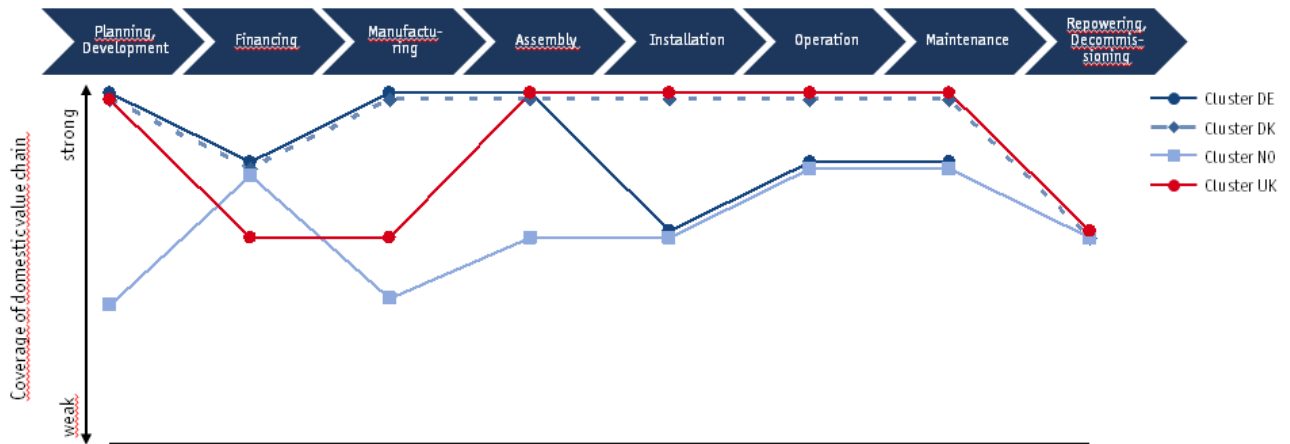


Figure 7 Coverage of competencies in the offshore wind value chain within each RDC’s domestic supply chains

The clusters also show significant differences with respect to their expertise in complimentary industries, which can be highly relevant to the OWS sector and should be utilized for fostering innovation in the OWS sector (Figure 8). As an example, the Norwegian cluster has significant experiences in offshore oil and gas, electrical engineering and robotics, whereas Germany has a long tradition in onshore wind energy.

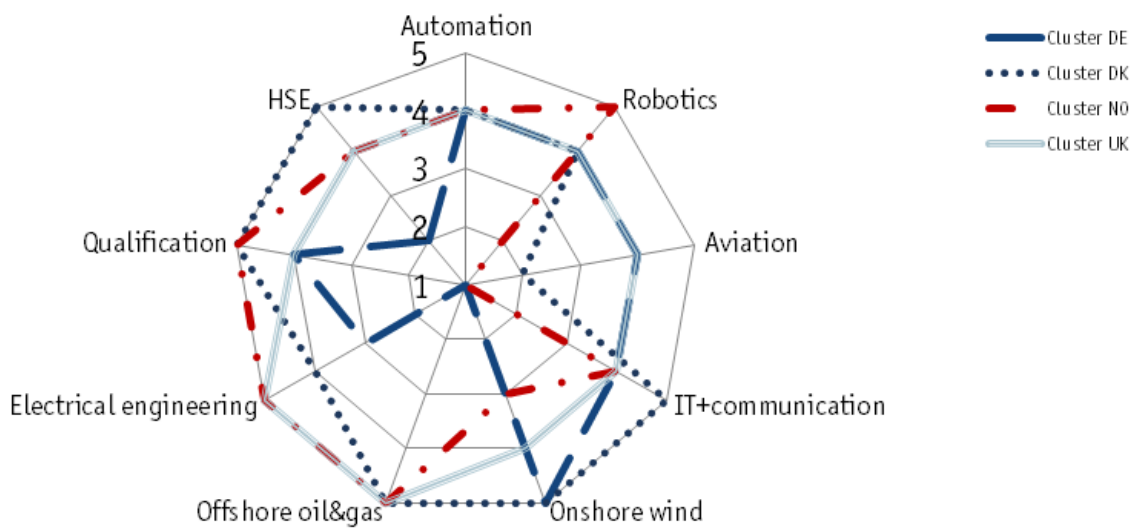


Figure 8 Coverage of technical competencies in complementary industries within each RDC’s domestic supply chains [scored 1 (no competencies available) – 5 (significant competencies available)]

As a consequence of the different market conditions and strengths, the ECOWindS clusters and cluster actors have the opportunity to greatly benefit from cooperation, learning from each others experiences and competences and jointly making use of lessons learned. For example, the German cluster can learn from the more advanced OWS markets in Denmark and the UK and can benefit from their experience gained from the oil and gas industry. All offshore wind clusters can learn from the advanced Norwegian maritime expertise, e.g. shipbuilding, offshore operations and deep water competences. The Danish and British clusters can learn from the pioneer experience of German actors regarding far shore wind applications. Last but not least the Norwegian cluster can expand their expertise, commitment and industry activities towards entering the offshore wind business.

Despite the individual differences of the clusters, regional mapping revealed that offshore wind and in

particular the OWS sub-sector faces many similar challenges in all clusters:

- The need for significant cost reduction in offshore wind and OWS, to safeguard continued investment, political support and public acceptance
- Limited cooperation between companies
- Isolation of manufacturers towards operators and science sector
- Lack of sharing of knowledge & experience in OWS
- Limited industrial collaboration involving SMEs
- Highly competitive entry for SME into the supply chain
- Low proportion of new entrants within the regional supply chains
- Limited cross-sectoral collaboration (e.g. maritime industry, aviation, etc.)
- Limited cooperation between academic institutions and the industrial actors
- Insufficient availability of highly skilled workforce in engineering and managerial roles
- Low levels of standardization in the industry
- No sufficiently alignment of knowledge development and the needs of top tier industries
- Poor clarity of funding available for innovation, and how to access it
- Levels of engagement of regional cluster participants in national and EU level RTD projects can be improved/optimized
- Limited transparency and understanding of innovation demands
- Limited transparency and understanding of the research landscape (competences)
- Some gaps in research landscape (competences) and testing facilities.

The regional mapping has allowed for the comparison of cluster characteristics at cross-cluster level to be carried out. This was used to identify similarities as well as complementarities between the clusters. The regional mapping also created a sound basis for the development of regional research agendas, smart specialization strategies and the Joint Action Plan, identifying cross-cluster cooperation measures which will bring the European OWS sector forward.

WP3: Cross Cluster Complementarities and Capacities

The focus of WP3 “Regional Complementarities and Synergies” was to establish research priorities based on the needs of the OWS sector, as revealed and documented in the regional mapping stage. The methodology to achieve this utilized four key stages:

- Formulation of Strategic Objectives via a process of strategic orientation (SOR)
- Brainstorming of potential research options or delivery measures to achieve these strategic objectives
- Appraisal and selection of options using a comprehensive scoring framework; creating the smart specialisation strategy
- Assessment of possibilities for international cooperation; the development of an international cooperation strategy

The first element of WP3 was the planning and delivery of strategic orientation workshops in which strategic objectives for the development and progression of the OWS subsector were established. Workshops were held in each of the ECOWindS RDCs. Participants from industry, research organisations and policy making or administrative bodies were involved in the workshops in which the SWOT analysis completed in WP2 was used as a basis to identify strategy objectives.

Deliverable 3.1 presents the strategic objectives developed during the four regional workshops and from these identifies a number of common strategic themes. The grouping of the strategic objectives into 10 strategic themes allowed a cross cluster comparison to be completed.

The 10 strategic themes were as follows:

- Knowledge sharing and exchange of best practice
- Standardisation and industrialisation
- Qualifications and skilled workforce
- Innovation and R&D

- Funding
- Business collaboration
- Political support and Industry regulation
- Strengthening the market position
- Infrastructure
- Data management

Having identified Strategic Objectives and documented these in deliverable report D3.1, the ECOWindS Consortium set about brainstorming innovation and research options to enable the RDCs, and the consortium as a whole, to deliver these strategic objectives.

The development of these strategy delivery measures first utilised a brainstorming exercise completed at strategy development workshops held in each ECOWindS RDC. Regional industry, research and administration stakeholders were involved in identifying a large number of possible research or innovative activities. These were then analysed and prioritised according to a comprehensive scoring framework developed by WP leaders Nwes.

This process and the resulting OWS strategy was presented in deliverable report D3.2.. The key result was the creation of a prioritised list of delivery measures. The top 20 delivery measures as scored by the ECOWindS are detailed in the Figure 9.

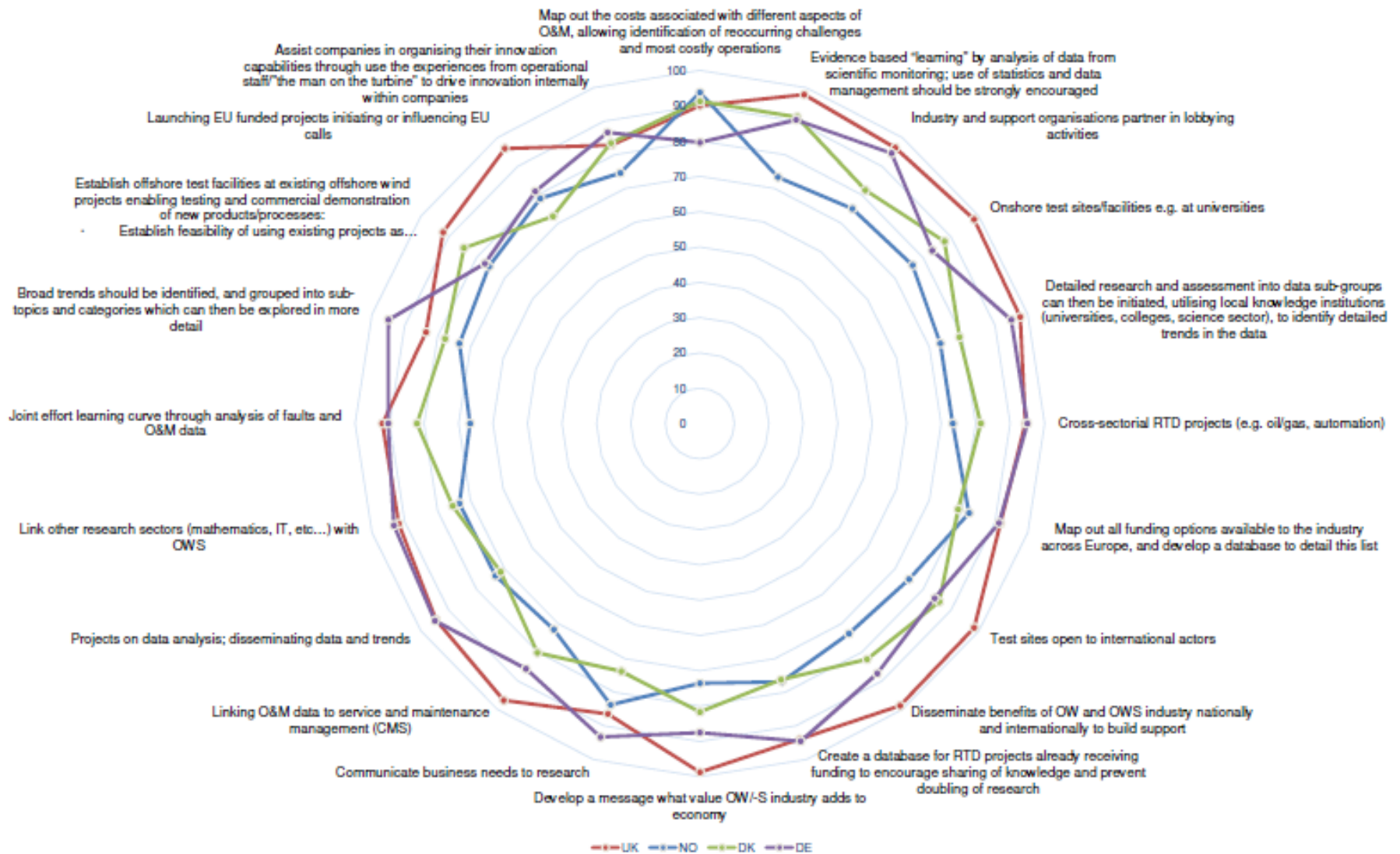


Figure 9 Highest prioritised 20 OWS Strategy Deliver Measures as assessed by ECOWindS Consortium

Taken together the key activities involved in WP2s Regional Mapping and WP3s development of strategies for the development and progression of the OWS industry represent the steps in the process of Smart Specialisation. This concept recognises that industry is best placed to lead in the identification of opportunities for improved efficiency and growth in rapidly developing industrial sectors and economies. It recognises also that innovating firms need to work closely with universities, other centres of research, Government delivery partners and with wider groups representing civil society to best deliver industrial growth.

Smart specialization offers a strategic tool to facilitate and guide the strategy setting process for industries, national bodies, regions or RDCs such as those assembled in the ECOWindS process. The process of Smart Specilisation itself, and the tools developed and used to implement the process during the ECOWindS process have been documented in the Deliverable D3.2, the ECOWindS Smart Specilisation Toolkit. This report represents a comprehensive guidance document for clusters, regions or nations who wish to replicate the smart specilisation strategy setting process.

The final key result from WP3 was the creation of the ECOWindS International Cooperation Strategy (Deliverable 3.3). This strategy identified countries and corresponding regional clusters in the rest of Europe and globally where offshore wind and OWS markets are present or emerging. The purpose of this report was to identify countries and clusters, beyond the ECOWindS regions, with which knowledge sharing and cooperative R&D activities in the field of OWS could be mutually beneficial.

The ECOWindS International Cooperation Strategy identified the development phase of each of the international countries/clusters referenced, and presented a high level SWOT analysis assessing their domestic OWS sectors strengths, weaknesses, opportunities and threats. The full results are presented in Table 2.

The clusters/countries that were reviewed were:

United Kingdom, Germany, Denmark, Norway, France, Belgium, Netherlands, Sweden, Finland, Ireland, Poland, Latvia, Estonia, Lithuania, China, USA, India, Canada, Japan, South Korea and Brazil.

Country	Strengths & Opportunities	Weaknesses & Threats	Development Phase
ECOWindS countries			
United Kingdom	<ul style="list-style-type: none"> ✓ Major growth opportunities ✓ Strong historical political support ✓ Excellent wind resource ✓ Established market (world leader) ✓ Onshore wind marginal and increasingly difficult to consent 	<ul style="list-style-type: none"> ✗ Continuing uncertainties in incentive mechanisms post 2017 ✗ Current political uncertainty ✗ Potential long planning delays ✗ Potential supply constraints (grid, ports, supply chain) ✗ Many deep, far offshore projects ✗ Blocking objections from other stakeholders e.g. RSPB 	Acceleration
Germany	<ul style="list-style-type: none"> ✓ Strong supply chain ✓ Good port facilities ✓ Pioneer for farshore installations ✓ Strong government support and regulative framework conditions ✓ Government policy to decommission nuclear generation 	<ul style="list-style-type: none"> ✗ TSO has been unable to cope with the technological and financial challenges of the grid connection ✗ Project finance uncertainty ✗ Multiple project delays ✗ No competencies from the offshore oil and gas sector. 	Acceleration
Denmark	<ul style="list-style-type: none"> ✓ Government support for fossil fuel independence ✓ Extensive offshore experience ✓ Strong supply chain ✓ Good port facilities 	<ul style="list-style-type: none"> ✗ Government investment in PV development may delay a number of offshore projects. ✗ No agreement in offshore wind planning post 2020, this may result in uncertainty depending on when an agreement is reached. 	Acceleration
Norway	<ul style="list-style-type: none"> ✓ High wind capacity 	<ul style="list-style-type: none"> ✗ Poor incentives ✗ Harsh condition including deep waters and sea ice ✗ Limited supply chain ✗ Capacity not required to meet national renewable energy targets. 	Development

Country	Strengths & Opportunities	Weaknesses & Threats	Development Phase
European Countries			
France	✓ Political policy support – need to reduce nuclear dependence before 2025	× Potential delays of six years for grid connection × Planning delays × Supply chain process may slow development	Pre-Development
Belgium	✓ Good political ambition ✓ Sector specific financial support ✓ Moderate targets ✓ Established supply chain	× Lack of clarity on future incentives × Lack of progress on offshore grid development	Take-off
Netherlands	✓ Logistically suitable ports for construction and maintenance ✓ Supply chain experience ✓ Support for cost reduction projects	× Postponement of offshore wind development × Government spending on renewables recently restricted × Lack of Government support × Reliance on reduction in costs before further development	Take-off
Sweden	✓ Favourable physical environment	× Replacement of existing Nuclear reactors threatens offshore development × Incentives are not technology specific × Grid application delays × Planning delays × Abundant onshore wind × Ministry of Defence objections	Take-off
Finland	✓ High wind capacity ✓ Shallow waters ✓ Location would be beneficial for grid integration	× Unattractive incentive scheme × Harsh operating conditions × Limited supply chain	Development
Ireland	✓ Continued government support for grid development ✓ Opportunity for energy exportation	× Onshore wind providing sufficient energy supply × Lack of political support for offshore wind × Projects locked in planning issues	Development
Poland	✓ Good resource in the Baltic Sea ✓ Large areas have been identified for development	× Industry uncertainty regarding the role of solar power and shale gas × Planning system may act against investor confidence × Lack of grid connection capacity	Pre-Development
Latvia	✓ Desire for energy self sufficiency	× No legal framework surrounding wind farm construction × Competition from onshore wind	Pre-Development
Estonia	✓ Desire for energy self sufficiency	× Many suitable areas prohibited due environmental factors × Two new shale oil units under construction	Pre-Development
Lithuania	✓ Desire for energy self sufficiency	× Lack of regulatory guidance and policy support × Very limited coast line for project development.	Pre-Development
Rest of the World			
China	✓ Large workforce ✓ Stabled economy to allow project funding ✓ Desire for clean energy ✓ Large installed capacity from testing phase	× Lack of intergovernmental communication × Unique landscape for offshore wind (intertidal areas) × Lack of offshore knowledge	Take-off
USA	✓ Large potential wind resource ✓ Established (onshore) wind sector ✓ Learning from Europe	× Funding difficulties × Offshore wind is viewed as high risk investment	Pre-Development
India	✓ Desire for offshore energy, large coastline, favourable conditions	× New industry, regulation framework only in draft format.	Pre-Development
Canada	✓ Existing wind industry ✓ Near shore development opportunities (Great Lakes)	× Lack of specific offshore regulation × Current projects on hold due to local objection and lack of understanding of lakebed	Pre-Development
Japan	✓ Innovation around deep water floating turbines	× Deep water and difficult conditions × Low feed-in tariff rates	Development
South Korea	✓ Massive potential wind resource ✓ In development of the world's largest wind farm. ✓ Local content allowing demand to be met.	× Little installed capacity so far so limited industry experience	Development
Brazil	✓ Large potential wind resource ✓ Strong onshore wind industry	× No activity taking place with regard to offshore, focus is onshore.	Pre-Development

Table 2 High Level SWOT Analysis for Countries Included in the ECOWindS International Cooperation Strategy

WP4: Developing the Joint Action Plan

The methodology for the development of the ECOWindS JAP combined a roadmap exercise and iterative elements of a Delphi process. DTU has coordinated the JAP process within WP4. Figure 10 illustrates the logical approach to developing the JAP in the context of other WPs within ECOWindS.

The ECOWindS project started out with an analysis of the regional strengths, weaknesses, opportunities and threats (WP2) which culminated in selection of a strategic orientation (SOR) and development of a Smart Specialization toolkit and Internationalisation strategies for the partner regions (WP3). These earlier deliverables set a framework for the JAP that is a time-bound plan that operationalizes the SOR by defining what actions are needed to proceed towards the SOR within the framework of the ECOWindS strategy (see Figure 10 for illustration).

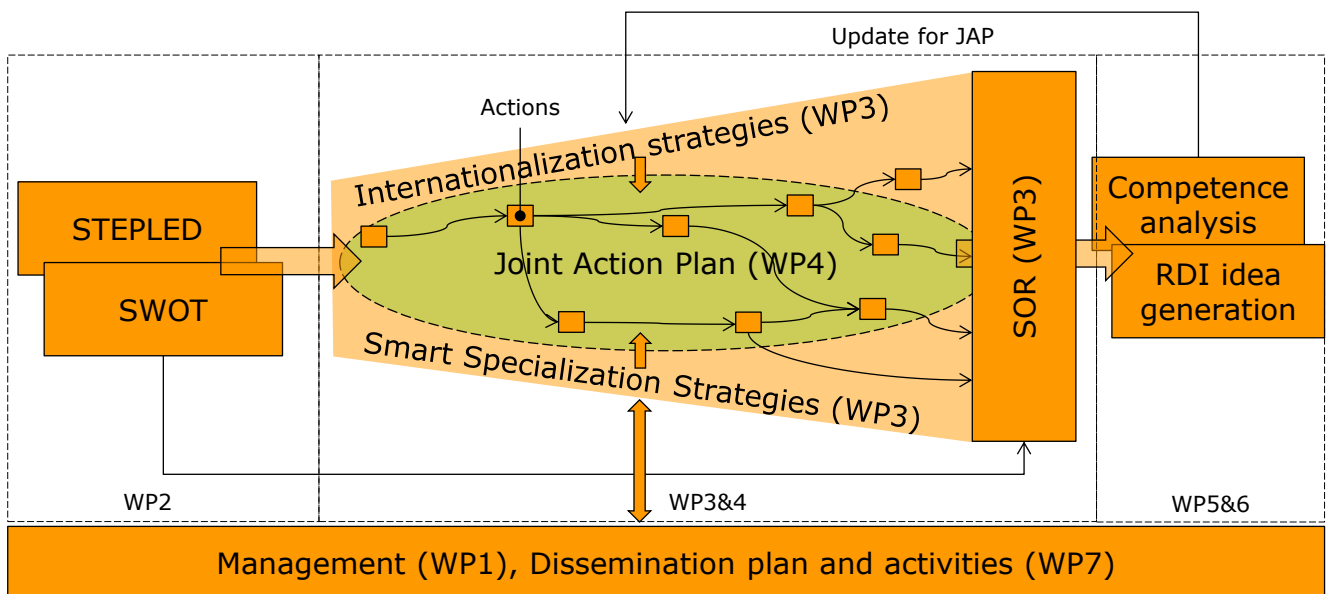


Figure 10 The Joint Action Plan (JAP) within the ECOWindS

Figure 10 illustrates the overall JAP process. As proposed in the Description of Work (DoW), the JAP builds on the analysis of OWS in the four regions. The main line of JAP is based on actions collected in the JAP workshop, which will be further refined through an on-line stakeholder consultation that will provide the basis for finalizing the actions and their dependencies, contributing to the final JAP. Work on task 4.1 and 4.2 (Implementation guidelines) are integrated in the process.

Together with the partners, DTU and Offshoreenergy.dk prepared and delivered the JAP workshop together with the ECOWindS Midway Conference, where a broad group of stakeholders from the industry, research and education institutions as well as policy agencies met to develop action for the future of the OWS industry in a collaborative roadmapping process. The workshop was held at EWEA Annual Event 2014 for maximum engagement and had 31 participants from the four regions. The main result from the JAP workshop were altogether 97 initial ideas for action to develop OWS through research & development and & innovation. The ideas were clustered to 11 main actions, prioritized by the participants and organized to a timeline as an initial roadmap.

After the workshop, the results from the workshop have been analyzed and developed further in parallel with WP3 strategy work, towards becoming concrete actions or new projects in their own right. While analyzing the actions, guidelines for their implementation have been considered as well. The JAP (D4.1) and associated implementation guidelines (D4.2) were delivered in December 2014(D4.2). Side-by-side with the work on the JAP, DTU prepared the guidelines for follow-up, evaluation and updating the JAP

(D4.3). The deliveries were due in latter part of 2014, and were delivered in time, fulfilling the milestone (MS6) of the work package. During 2015 DTU and the partners engaged in stakeholder consultation through a Delphi-type web survey. The stakeholder consultation and feedback from work packages 5-6 contributed to the final Updated JAP (D4.4) which was delivered in time for the Final Conference held in September 2015.

The stakeholder consultation survey was prepared during Q1 and executed during Q2 2015, directly contributing to update of the JAP. The stakeholder consultation was conducted as a web-based survey during April and May 2015. During that time the survey was sent to all stakeholders who had participated in the project workshops and process, and it was advertised through the project newsletter, website and the partners' communication. The number of respondents was 81 altogether, with 19 complete surveys (where >80% of questions, including open-ended fields and identifiers, were filled in). Approximately half of the respondents identified themselves as participants in the process, and half had not participated in the activities. Approximately half of the respondents who identified themselves represent enterprises, a fifth research and education institutions and the rest 'other'.

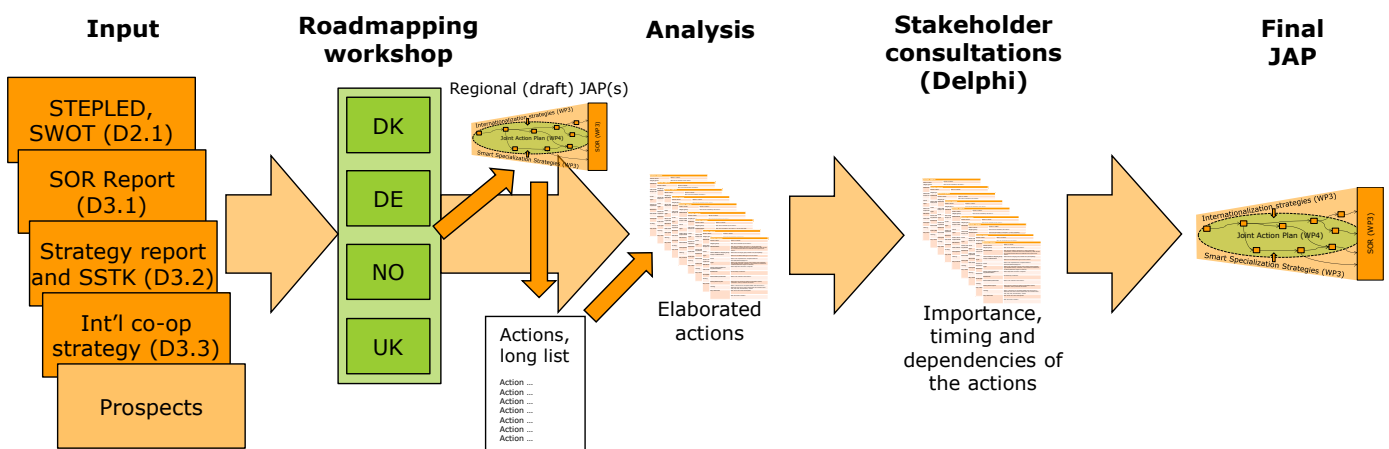


Figure 10: Overview to JAP process

Goals

Setting the goals for the JAP was an important component of the JAP process, that built on WP3 and Strategic Orientation (SOR). The WP3 SOR was discussed in the JAP workshop. As a result of the discussion it was decided that an overarching goal that should steer RDI in OWS industry is to contribute to lowering the cost of energy as measured in levelized cost of energy (LCoE) for offshore wind. The OWS specific goals are, mirroring offshore wind in general, standardisation to support industrialisation of the services. A key intermediary goal is to set up business collaboration and knowledge sharing within OWS and adjacent industries. Achieving these goals hinges in part on certain enablers. Thus it was agreed that attaining the objectives of industry relevant and favourable regulation, access to finance, RDI infrastructure, and qualifications as in qualified human resources, lay a solid platform for reaching the high level goals.

During stakeholder consultation, these goals were seen as important and significant for the OWS industry, with the note that access to finance is likely to lose its importance when the LCoE becomes closer to grid parity, as private investments becomes more lucrative and risk perception likely changes. The only goal that had a lower average significance than the others was political support; however it is conceivable for the moment that political support is quite important as long as the energy price is closer to market price.

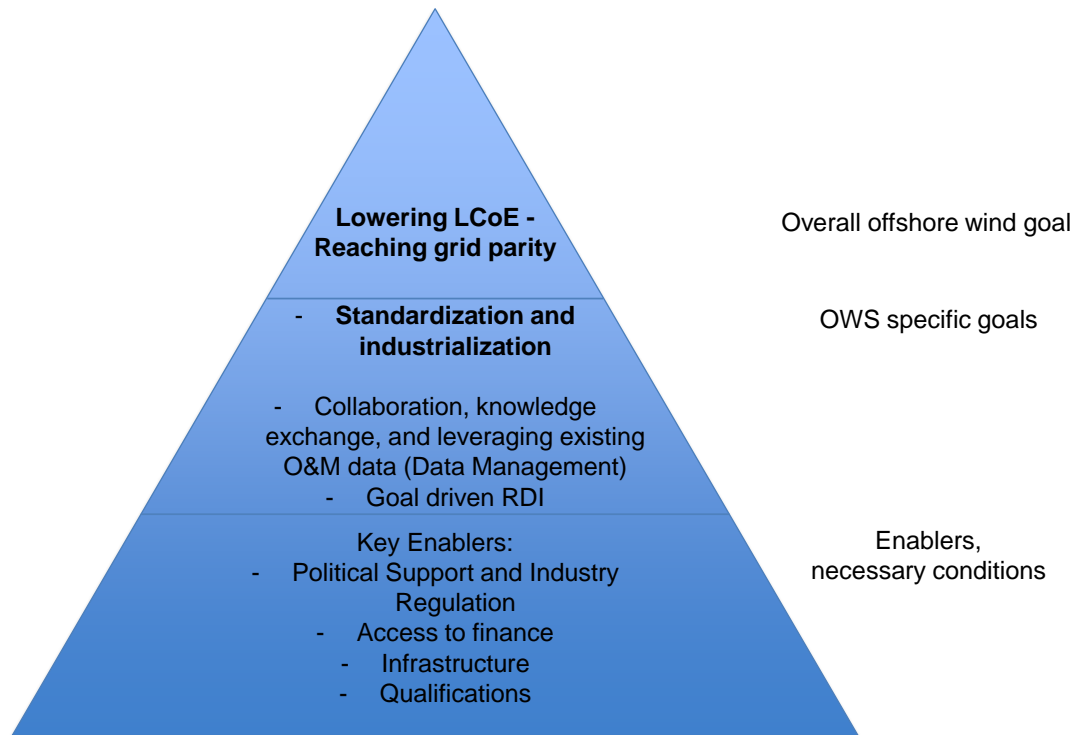


Figure 11: Goals for the OWS industry as agreed in the JAP workshop

Taken altogether, the vision associated with the JAP is:

By the end of the JAP period (2020) OWS is a recognised industry with strong networks around the Globe and especially the North Sea. By that time the installed offshore wind capacity has multiplied, and as a consequence of the industrialisation and purposeful RDI and standardization efforts the key components have been standardised to an extent that enables smooth installation, interoperability between components, and efficient O&M services.

At the heart of this fruitful progress are strong networks and confidential relationships along the value chain that enable optimizing the delivery of value through the whole life cycle of the wind farm from the factory door to end of life. These networks involve the key stakeholders from operators and developers to turbine and grid component manufacturers, load handling and hauling enterprises who handle the components, to the offshore service enterprises who install and maintain the farms when installed. Within the network everyone knows their added value and receives relevant information that enables them to continue to deliver value to the farm.

On top of this strong network lies a program of innovation and continuous improvement that drives all the stakeholders towards interoperability and standardisation on one hand, and bold innovation and experimentation on the other. This purposeful innovation program streamlines installation and O&M of the new farms to an extent that enables delivering cheap clean power reliably. Finally, as always, the success of OWS relies on a skilled and motivated workforce who can deliver value in every aspect of the value chain from research, development, engineering through transport to installation and O&M.

JAP and implementation guidelines

The most significant results from WP4 is the JAP and accompanying implementation guidelines. As a validation of the JAP, the stakeholder survey indicates that the stakeholders hold the objectives as significant and relevant for the OWS industry. Similarly all of the actions are at least moderately relevant, and require some or moderate investment. That indicates that the JAP actions serve the purpose of taking the OWS industry towards the goals.

The objective of the JAP is to be an international, cross-regional, agenda for research, development and innovation specifically for Offshore Wind Services. The JAP is a complement to other research agendas

on wind power presented or under development by other organizations by approaching the challenges of offshore wind from the *service perspective*.

This Joint Action Plan is a portfolio that comprises 8 proposed actions, which can be divided into four parallel work streams - 'coordination actions', 'research, development and innovation', 'harmonisation and standardisation', and 'skills and qualifications' - which are support each other. The action themselves can be viewed as projects or programmes that make up a portfolio of OWS development. In the following overview, the actions are presented quite briefly. Each of the four work streams contributes to one or more sub goals set for the JAP, which together take OWS and offshore wind closer to the overall target of lowering the LCoE 40% by 2020 (from 2014 level).

Figure 12 illustrates the actions in relation to the goals set for OWS and their suggested implementation timeline. Especially the actions 3 and 5 benefit from collaboration between WP4, 5 and 6. The underlying logic of the JAP is that the OWS enterprises gain complementary capabilities and are able to deliver new and improved services for the operators through development of inter-regional interconnections and collaboration (see D2.1 and D3.1). Networking and forging of collaborations creates closer business relations enables quicker and more candid feedback within the whole offshore wind ecosystem that enables standardization of components, processes and practices, which lays foundations for the continuous improvement of the OWS service delivery.

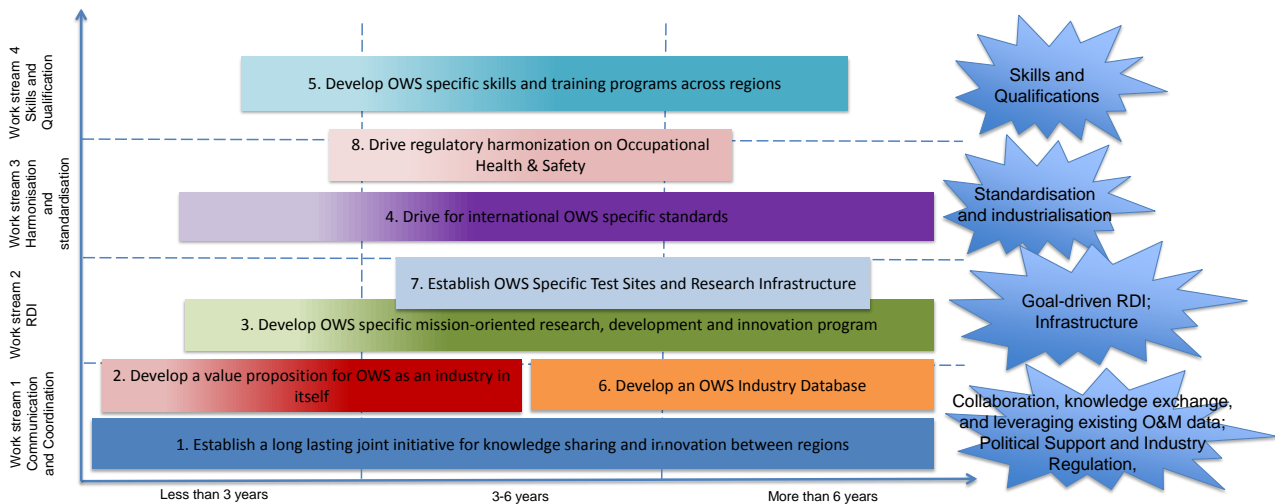


Figure 12: ECOWindS JAP summarized

Following this logical framework, the first work stream of the proposed actions include three 'coordination' actions that build the necessary networks and social capital that is needed to achieve the major actions. The coordination work stream creates a basis for arguing the importance of, and driving support for OWS. It also serves to build the collaborative relations and consortia needed for effective goal-driven RDI that in itself contributes to the goal of establishing RDI to develop cost-reducing innovations.

Building on the foundation of coordination the second work stream is 'Research, Development and Innovation (RDI)'. The core of this stream is a research program for OWS. The key underlying theme within OWS specific RDI is the development of specific research topics that complement the existing RDI that goes on in wind power and between the components of a wind farm and the service equipment.

The third work stream is 'harmonisation and standardisation'. This builds on the previous ones and contributes both to technical standardisation and harmonisation of skills and qualifications. Last but not least, the fourth work stream directly contributes to skilled and qualified work force for OWS. The core action in this work stream is drive for OWS specific technical standards (Action 4) together with key original equipment manufacturers (OEMs). There are serious on-going efforts for standardization, not least the IEC TC88 on wind turbines and components. The objective of this action is not to supersede or replace existing efforts but to complement, provide added drive and introduce OWS specific topics

and viewpoints to existing standards committees and processes, and secondarily set up new standards initiatives within existing frameworks as needed.

The fourth work stream is 'skills and qualifications' that relates strongly to harmonisation action on skills and training (Action 8). The aim of the skill work stream is to ensure that there is a skilled and qualified workforce to ensure efficient operation of offshore farms and by extension reliable delivery of power.

The key to successful implementation of the JAP is to bridge existing national knowledge bases together and find complementary partnerships that are stronger together. The role of the ECOWindS project and consortium is to lay a foundation on certain actions and to act as a facilitator to form appropriate consortia to implement the actions. In general the assumption is that the JAP is managed by a post-ECOWindS collaboration, which will facilitate initiation of the actions and consortium building. The consortium members depend on the action. However, a general recommendation is to involve stakeholders along the value chain from OWS contractors, and suppliers through OEMs to operators. Incidentally these actions also serve as a platform for further collaboration towards the goals of the JAP and industry.

The general condition is to build a strong consortium for each action with the ability to implement it effectively and with the interest to drive it forwards. The latter essentially mean that from the start the consortium members for each action should be aligned in their interest towards the action. A key running theme in the JAP and the actions within it is that they aim to bridge national interests together, to enable cross border collaboration starting particularly around the North Sea and extending overseas as the industry goes. The rationale is to leverage the best capabilities to enable mutual learning across European regions. Further, international scope of the projects enables attracting a wider base of funding, as well as an impact.

Taking the actions together then, the bulk of the actions lay a strong foundation for the industry to push towards the goals. Thus the recommended and logical implementation order is:

- Starting from Actions 1 and 2, building a critical mass of interested stakeholders and to gather a momentum for the following actions
- Proceeding to ramp up a commonly agreed RDI program (Action 3) built on the JAP and ECOWindS WP6
- through to training programs (Action 5)
- and building up to OWS specific standardisation efforts (Action 4)
- Creating a database for OWS (Action 6), driving for occupational health and safety harmonisation (Action 8) and research infrastructures (Action 7) are important foundations for success of the other action in the long run.

WP5: Cross-Cluster Workforce Competencies and Capabilities

One of the key outcomes of ECOWindS is to learn from other sectors and use that knowledge to support the Offshore Wind Servicing sector. This includes sectors such as aerospace for innovations in blade design, maritime for new ship designs and specifications and Oil and Gas for standardisation, simulation training and offshore operations.

As part of the ECOWindS project the competences of each of the participating clusters has been mapped along with the training infrastructure and experience that each cluster has. By undertaking this mapping it is possible to see what areas need to be addressed in each RDC as well as cross cluster. Training across RDCs needs to be standardised, so that personnel can reuse certificates and diplomas when crossing national borders. Strengthening of the training will secure access of skilled personnel and will be an arena for innovation initiatives in the industry.

In its work on cross cluster workforce competencies and capacities, the ECOWindS project sets out to create a training and learning platform that is based on creating a virtual simulation based training tool. This has been achieved by firstly researching the requirement for such a training simulator, and then creating the outline for the simulator for further development and use beyond the end of the ECOWindS project.

In the process of listing learning objectives we have to take into account the overall goals for the ECOWindS project. The main objectives are threefold; contribution to cost reduction, competitiveness of the OWS sector, and increase regional growth and job creation.

We have a strong belief that the use of a real-time simulation platform would make contributions to all of the main objectives if the methodology is introduced and used in parallel with other measures.

It is widely recognised across a number of industries that simulation training is an established part of the training process, alongside practical experience and traditional training. In some areas where practical experience was once the only accepted means of proving competence, simulator training has now been added as an alternative. This has helped to achieve the fast tracking of candidates to fill a skill shortage.

In accordance with the main objectives learning and training objectives will group as follows:

Relevance for cost reduction and competitiveness:

- Well trained crews work more efficient and have less accidents
- Feasibility study of the operation.
- Verification and optimisation of work procedures
- Simulator training is better structured and more efficient as opposed to learning on the job.
- Simulator can be used to try out and study difficult or extraordinary operations, in single mode (single person training on skills) or in team mode.
- Simulation of operations under different weather conditions
- Emergency training, due to malfunction of accidents.
- Try things you never would do in reality
- Preplanning of operation, briefing and debriefing.
- Secure contracts due to customer confidence, risk level and time of operation.

Relevance for innovation and job creation:

- Simulator training is flexible and safe.
- A simulation tool fits perfect into a strategy for improving product quality by multidisciplinary innovation
- Rapid prototyping needs a virtual reality as a test facility in a design phase.
- An efficient way of training a large number of workers in highly specialised work operations.
- Quick adaptation to changing technologies in a training environment.

The Need for Real-Time Simulation Training Within Offshore Wind

OWS involves several costly and challenging marine operations such as heavy lifting, diving, ROV-operation, underwater deployment and maintenance as well as welding under the assistance of

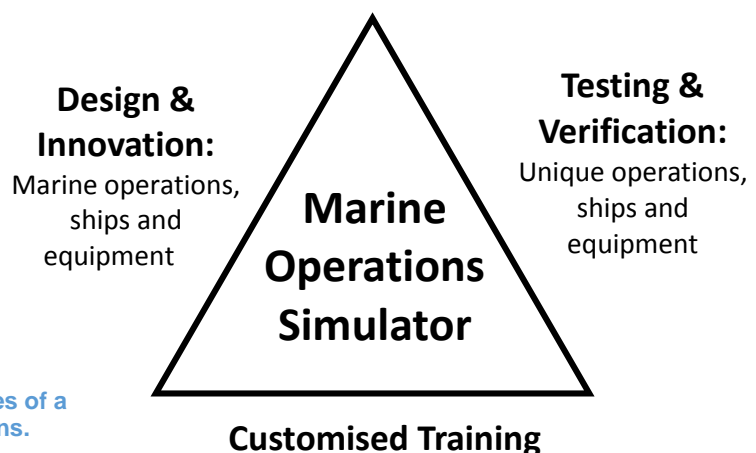


Figure 13: Schematic overview of the interfaces of a Real-Time Simulation tool for marine operations.

competent maneuvering and dynamic positioning of vessel. In addition such operations regularly may need coordinated effort of highly skilled professionals using specialised equipment operating from several vessels simultaneously. The full potential of OWS can only be realised if it ensures that the work force across the regions has the right set-up of competences and is continuously adapted to implement new research-driven innovations at operational level.

In the Oil & Gas industry increasingly more of the training is moved into a virtual reality environment, especially safety and team related activities. This is for several reasons: Firstly, equipment is generally expensive and replicas of installations are too expensive to build. Secondly, critical situations are easily created in a virtual environment, without harming any of the involved personnel. Thirdly, operations are often irreversible, with one chance of success, thus training becomes paramount.

Industry, educators and training providers can harvest experience gained in the offshore Oil & Gas production in the North Sea and transfer elements to the Offshore Wind Industry.

Listed below are the core benefits of using training by simulation in a virtual environment:

- Simulator training is flexible and safe
- Simulator training is better structured and more efficient as opposed to learning on the job
- Simulator can be used to try out and study difficult or extraordinary operations, in single mode (single person training on skills) or in team mode.
- Simulation of operations under different weather conditions
- Emergency training, due to malfunction of accidents.
- Try things you never would do in reality
- Preplanning of operation, briefing and debriefing.
- Secure contracts due to customer confidence, risk level and time of operation.
- Well trained crews work more efficient and have fewer accidents.

Figure 9 shows the potential interfaces that virtual simulation can have with marine operations. It is important to see the virtual training as a supplement to the already ongoing training activity. In addition to an update of the technological profile of the training other issues will be addressed.

Incorporating Findings from the ECOWindS Joint Action Plan

In parallel to the work ECOWindS has been conducting on cross cluster workforce competencies and capacities the project has also been developing a Joint Action Plan. The Joint Action Plan (JAP) is a roadmap designed to support the development of the OWS sector and has been created with input from stakeholders to ensure that it meets the needs of the sector. The JAP has identified actions to meet the industries challenges which can be grouped in 4 categories: R&D, Standardisation, Skills & Training, and Communication. Results from JAP have been taken on board in the development of this work in order to be in line with the project priorities.

Training and Standardisation

Standardisation was the top priority from the JAP, and training and standardisation go hand in hand. When establishing an industry standard the need for training immediately arises, because work practices, technology and procedures must adapt to a new reality. Standardisation removes unnecessary complexity and results in reduced training needs on a basic level, when employees must handle fewer solutions. This opens up for a shift in training from a personal skills level over to an operational and team level. In this way standardisation will force change of behaviour from both individuals to entire organisations.

The effect of a modern training platform is that it will be an excellent venue for marketing the industry standard for all players in the value chain. On the other hand, it will also be a venue for improvement through feedback from participants. In this way, the training platform will be self-reinforcing and not fade over time. The experience from the oil industry shows that the virtual training by simulators play an increasingly important part of the dynamics in the industry in terms of validating best practice standards.

If the industry is succeeding in standardising, the training platform will be essential in the sense that companies and employees are forced to document training as a ticket to participate in the competition for service contracts. Here one can also imagine that the maritime classification societies may be challenged to take a more active role and help to define security parameters and levels of security for the industry.

Training and Innovation

The innovative element in a training platform mustn't necessarily be the platform, it is now expected that training platforms have some sort of simulation environment and possibilities for different online services as well as working alongside existing traditional training.

The discussion will be on the level of a virtual training platform in relation to the content, complexity and scenarios included in the training. There are limits to how many times the employees can repeat the same standardised operation, before losing concentration and motivation. The need to deal with unexpected events, and the opportunity to experiment with alternative solutions set clear requirements for a future learning platform. The benefits from a virtual world computer set-up are unlimited. Disasters can be reviewed in a secure environment and with the obvious advantage of: at any time press the "stop" or "reset" button.

A second innovative element of having good functional description of parts and technology in a virtual environment is that new solutions can be introduced and tested in simulation trials at a low cost. This will benefit innovation initiatives at many levels and give researchers easy access to large scale experiments and support increased levels of innovation.

Training and Communication

When it comes to marketing of highly technical information to decision makers and stakeholders, as well as the public, modern simulation tools proves to be a good alternative.

A virtual world offers spectators a swift way out where the action happens and "live" images is a powerful tool when it comes to marketing. If proper training programs are attached as real-time simulations spectators can step into the critical situations and experience for them-self challenges and industrial possibilities, especially when the environment is safe and the time and cost of demonstration is relatively low, compared to bringing people out to offshore environment.

Selection Criteria for Offshore Wind Servicing Training Scenarios

No all activities are suited for a real-time simulation environment; therefore it is important to be aware of the constraints when building training scenarios.

It takes time to build consistent models with sufficient product functionality and realistic behavior and variation in functionality from different manufacturers may occur, it is therefore a reasonable constraint to exclude OEM training from the simulation environment in a start-up period and focus solely on generic functionality, skill sets and operations.

The benefit of simulators is that you can train staff on how carry out complex operations involving several parties and different equipment, where an obvious potential for increased efficiency and optimisation can be seen.

Examples include:

- Timing issues in hoist and equipment transfer operations.
- Scenarios with the potential of being reused for several training purposes.
- Conflicting procedures when cooperation between parties are required.
- Agreeing practices or updating procedures.
- Transfer of command
- Change of operator crew

- Safe job analysis
- Teams with mixed skills

Hazardous operations where health and safety issues are apparent can also be safely simulated, for example:

- Diving operations
- Emergency training due to malfunction or accidents
- Shortage of time to complete operation (weather, daylight, waves or change of crew)

The individual installation and service operations will be judge against the above on the usefulness of implementation onto a simulation platform.

Modern Wind Farms are highly equipped with sensors for monitoring of the health and stability of the energy production facility. All data collected is transferred to the Wind farm automation system, also known as the SCADA system. This is an important functionality for planning, decision making and fault detection. It would be an outstanding tool and aid in any training device to have a live feed to connect to the real world. However, it will be a major implementation job to interface a SCADA system to a training simulation facility, and connect the two systems together for training purposes.

There is also the possibility to make the simulation platform suitable for research programs. Innovations in the OWS industry would benefit from having a virtual test facility for validation of new initiatives, therefore it is vital that as many different aspects of OWS operations can be modelled.

Core characteristics of a Simulation Platform

The expectation to the quality of a simulator may vary between individuals and previous experience. In a professional setting we often have higher expectation due to the simple fact that we are the experts when it comes down to our own job. As such we need to ensure that simulators mimic real life as much as possible to provide the greatest benefit and buy in.

The following core criteria need to be met by simulators:

- Realistic scenarios
- Realistic look, feel and behaviours
- Presence of other participants and ability to link simulators
- Projection system with wide field of view to create full immersion
- Flexible scenarios tailored to the level of the trainees
- Short familiarisation process
- Full replay functionality for debriefing
- Adjustable for different levels, beginner level, advanced training, emergency level
- Use of high precision mathematical models

Models for a Simulation Environment

There are numerous activities associated with the assembly, installation, commissioning and ongoing operation and maintenance of a wind turbine. As already mentioned simulation is not viable for all operations but there are key aspects that are ideally suited to a virtual simulator, these include:

- Harbour Storage and Offshore Transportation
- Preplanning of complete cargo loading operation
- Loading and unloading the heavy cargo, complete the whole project at port.
- Operation of cranes in single or tandem mode
- Follow proper communication between involved team members.
- Ship to ship operations
- Operation of power and ballast system of vessel in accordance with load
- Lift and assembly of wind turbines by jack-up crane
- Lift of cargo between Jack-up and supply vessel.

- Drive Train Inspection
- Sub-System Inspection
- Underwater Inspection
- Scour assessment
- Marine Growth
- Material Defects

The examples above can be grouped into broad categories and for the ECOWindS simulation we are going to focus on Lifting Simulation.

Lifting and Crane Simulations

The challenges in cargo handling are many. Time issues play an important role in a port operation the high cost of the vessel puts pressure on all personnel involved to perform cost efficiently. At the same time regulations need to be followed. For the cargo transfer multinational crews are involved and the handling of heavy and oversized cargo is difficult even today. The consequence of failing or damaging equipment must also cause stress situations during the lifting operations and as a matter of keeping the insurance cost at an acceptable level it may be worth investing in training and validation of the process.

Documentation of the operation through a training situation may pay off in the long run. Simulators can also be used to study difficult or extraordinary cargo operations in single or tandem mode before starting the real lifting operation as a matter of securing a contract due to confidence of customer.

At an operator level, especially for crane operators, familiarisation with different types of cargo is important. As well as operation under different weather conditions and the ability to reproduce and repeat the very same conditions multiple times to get an optimal team performance. Emergency situations also need to be rehearsed and are well suited for a virtual environment.

An example training sequence would include representatives from the bridge level of the vessel, captain, loading officer, crane drivers, chief engineer and deck crew. On the land side representatives from the port will be: port crew, cargo owner, surveyor, logistics and planning personnel and crane operators if needed. The whole purpose of this exercise is to train the team properly.

The simulator concept will require good crane models based on OEM data, collision models supported by physics, environmental model for wind effects on free hanging load. Models for technical assistance models may also be needed, like load calculator, power management - and tank automation.

The instructor workstation has full and overall control of the training activity. This includes preparation, set-up, briefing of team, loading of simulation recording of exercises and debriefing of team, with proper scoring of performance.

On the deck and on the port, cargo crew and the cargo officer will be assisting the crane operator in switching of crane tools and hooking of cargo. Communication will be with walkie-talkie and agreed hand signals. Especially the loading officer needs to freely move around on different locations (ship and port) to guide the team in logistics plans. By using multiple simulators this can be easily achieved. There would be one area for the vessel bridge crew, one for deck operations and another for the crane element, by having multiple locations all working together it avoids the risk of users feeling like they are playing a computer game, as such the human element and team working are vital to create a realistic feel to the simulation

By using a mix a game engine graphics and real physics it is possible to create a fully immersive environment. As previously mentioned one of the key advantages with simulation of activity is the ability to control all aspects as such this gives the opportunity to set malfunctions, like loss of power, communication failure, alter environmental setting, “playing” with crew members, etc. while at the same time have a steady hand over the progress and a birds view of the overall scenario.

The ability to test crews in sub optimal conditions is vital as it allows trainers to see how they react under

pressure and when the operation does not go as planned. Repeating the same operation in perfect conditions means there is a risk of crews becoming complacent, but with the ability to adjust all conditions it creates a truly realistic environment and an overall better training experience.

WP6: Research and Innovation Ideas Generation

The significant output of **WP6 Research and Innovation Ideas Generation** was the ECOWindS Research and Innovation Catalogue.

The first stage was to review and assess the supply and demand of OWS research and innovation. This was delivered in *ECOWindS Report D6.1 'Supply and Demand of Research and Innovation in Offshore Wind Servicing'* which consisted of a gap analysis and technology innovation needs assessment, the report firstly mapped out the technological solutions currently available (supply) in the RDCs and compared them with demands across the clusters and outside. The second part of report assessed the areas where demand for (technological) solutions are not met by supply at this point, delivering a strategic gap analysis and identifying areas of the OWS which could be strengthened by new technologies or systems.

The next stage built on the results of D6.1, this was done by developing a list of innovation concepts that would eventually form the innovation catalogue. D6.1 presented a list of areas where the needs of the OWS sector are currently not met; this was used to encourage stakeholders to participate in a brainstorming process. Each RDC held their own Innovation Ideas Generation Workshop there was also an international workshop held as a side event to the Renewable UK Annual Conference in November 2014.

The workshops used the SCAMPER model to generate ideas, SCAMPER stands for:

S – Substitute – components, materials, people.

C – Combine – mix, combine with other assemblies or services, integrate.

A – Adapt – alter, change function, use part of another element/material.

M – Modify – increase or reduce in scale, change shape, modify attributes.

P – Put to another use.

E – Eliminate – remove elements, simplify, reduce to core functionality.

R – Reverse – turn inside out or upside down, or use Reversal.

Following the workshops the innovation ideas were collated and 152 concepts had been developed.

Part of the requirements of the catalogue was to map the funding available across the RDCs and Europe to support R&I. The funding streams were then matched to the innovation concepts that formed the Innovation Catalogue.

Following the creation of the long list of concepts the list was reviewed and refined, duplicate and similar entries were merged and ideas grouped to form more substantial concepts. Through several reviews and iterations this reduced the number of concepts to 42.

Having reduced the number of innovation concepts the ideas were then prioritised, this was done based on Cost Reduction Potential, Feasibility and the overall opinion on the idea. The prioritisation process allowed the top 30 ideas to be submitted for review by the ECOWindS Technical Advisory Group.

A Technical Advisory Group assessment was carried out in each RDC. The Advisory Group itself was made up of individuals (mainly from Industry) who had a working (rather than theoretical) knowledge of operations for Offshore Wind Farms, this allowed the ideas that were presented to be critically reviewed and assessed to ensure viability and need for the industry.

Following the Technical Advisory Group review the innovation concepts were given a final revision based on collected feedback which resulted in a final list of 28 ideas that would be progressed to form the

Innovation Catalogue.

As part of the Technical Advisory Group assessment of the innovation concepts the group were also asked which parts of the triple helix should be involved and in what sort of timeframe the ideas should be investigated, this information would also form part of the final catalogue.

The overall output of WP6 was the ECOWindS Innovation Catalogue. The Catalogue lists the refined ideas that were the output of Technical Advisory Groups along with which areas of the triple helix should be involved and potentials timescales for when the ideas should be progressed. The concepts within the catalogue cover all the areas of the OWS value chain.

The ideas are also matched with potential sources of funding sources, thus creating a catalogue of early stage project concepts that can be developed into full projects to support the OWS sector and wider offshore wind industry.

At present the Final Catalogue is not a public document and will be made available for interested parties to review in June 2016.

4.1.4 A description of the potential impact

The definition of the OWS sector has been further refined, which is a prerequisite for the sector to become recognised as a subsector with own needs and constraints.

A novel self–assessment tool, for analysing own strengths, weaknesses, opportunities and threats in the context of cluster development and innovation has been produced and successfully utilised for regional mapping from all four RDCs. It is also available and applicable/transferable to other research driven clusters.

The regional mapping process during ECOWindS has been very valuable for all partners. The offshore wind clusters from DK, UK, NO and DE have increased their knowledge and understanding about their own clusters: their structure, the functioning of their innovation system and their particular strengths and weaknesses, as well as external factors influencing the offshore wind industry. Also the ECOWindS clusters have gained insight into the subsector „OWS Offshore wind servicing“, and have improved their knowledge about its particular needs and demands. Although there had been a good overview of the cluster characteristics before, the systematic mapping process and involvement of stakeholders has provided new insights to the industry and its related science sector. The ECOWindS clusters have learned about their similarities, differences and complementarities on the basis of a cross-cluster comparison. The cooperation with relevant stakeholders during the mapping and workshop has been a good opportunity to further strengthen the relations between the triple helix in the cluster.

Apart from being an important milestone for the project and a sound baseline for the following ECOWindS activities, the regional mapping of all ECOWindS RDCs has been a vital prerequisite for refocussing the strategic cluster management of each cluster. This information is shared during the ECOWindS project with the stakeholders of the cluster, i.e. also administration and agencies of promotion of trade and economy.

The key outputs of **WP3 Regional Complementarities and Synergies** were:

- Strategic Objectives
- International Cooperation Strategy
- Smart Specialisation Toolkit

The Strategic Objectives created a cluster strategy and a set of associated delivery measures for the 4 ECOWindS Clusters that can be adopted to further support the Offshore Wind Servicing Sector.

One of the major results of this was the buy in from industry and allowing stakeholders to support in creating measures to promote cost reduction. In Denmark for example the industry members suggested the creation of networks to allow this type of discussion to happen more regularly and as a direct result the Danish Cost Reduction Forum was launched.

The International Cooperation Strategy was a key output as it identified potential markets where collaboration could be sought; it also detailed in what form this collaboration could take. OrbisEnergy have recently run a series of international virtual events with the purpose of providing and overview into international markets, seizing opportunity and building relationships, the 6 countries that have been the focus of these events (Netherlands, China, Taiwan, Japan, France and the USA) were all identified in the ECOWindS International Cooperation Strategy as being key growth markets for Offshore Wind.

The final result of WP was the creation of the Smart Specialisation Toolkit. This toolkit provides a step by step guide for how the ECOWindS Strategic Objectives and the associated Delivery Measures were created. This is key as it allows other clusters to go through the same processes as the ECOWindS Project and develop their own cluster strategies; this is vital to newer markets as they can then also learn from the outputs of the ECOWindS Clusters and directly compare their results.

These three areas demonstrate the impact the project has had by creating new networks, new series of events allowing other clusters to carry out the same system on analysis which all have positive impacts on the industry.

The main dissemination activities for **WP3 Regional Complementarities and Synergies** were workshops within each clusters to create the strategic objectives, the results were also published on the ECOWindS and partner websites. In addition the WP3 activities were presented as part of a wider ECOWindS presentation at the project midway conference in Barcelona as well as at National Conferences within the UK.

Expected results and impact

The JAP is a major deliverable of the ECOWindS project. The JAP draws on the analysis of the regional strengths, weaknesses, opportunities and threats and directly builds on the ECOWindS strategy toolkit and Strategic Orientation. The JAP sets out to operationalize the strategy for the OWS industry. It is meant to be a call to action and a guiding document for the OWS industry as well as associated researchers, educators and policy agencies, raising the ability for the actors to make a brighter future for the industry. The expected outcome is increased collaboration between stakeholders within and between the partnering regions. Some evidence of this is seen already, e.g. in the Danish offshore wind cost reduction forum, and the enhanced and active communication between the partners in the form of site visits and project prospecting outside the ECOWindS.

The expected impact of the JAP is initiation of some of the activities within the ECOWindS framework, as well as among the stakeholders. It is foreseen that the JAP may also act as a pivot in forming and directing of new partnerships within the OWS industry and its stakeholders. This effect is supported by the collaborative and inclusive process where the stakeholders are engaged in a consensus process that enables harnessing the power to change inherent in the triple helix partnership. It is foreseen that these actions will increase the volume of collaborative RDI as measured by usage of existing test facilities and volume of funding dedicated to OWS-related RDI, within and between the regions, ultimately leading to research driven innovation and creation of intellectual property.

The impact of the JAP hinges on the ECOWindS partners concerted effort to first build the JAP and then to deliver the message to the stakeholders, and keep the JAP current and up-to-date. This mission is supported by the plan for evaluating and updating the JAP, which sets up a framework for keeping the JAP up to speed.

Main dissemination activities and exploitation of the results

The dissemination activities have been described in detail in the dissemination report. The dissemination and exploitation in general is built into the JAP process through the workshops and the survey that was send broadly to stakeholders in the partnering regions. These activities have served to raise awareness of the process and the intermediary results to the stakeholders. One of the main and most successful dissemination activities was the ECOWindS final conference, where the JAP was presented for an audience of stakeholders. The reception for the JAP was very good and it is expected that the partners will continue to pursue the actions together with the stakeholders. Additionally the JAP has been publicized broadly by the project partners, each in their region by personal communication, press releases and websites such as organizations' websites, and LinkedIn.

Within the project, the JAP process and results has contributed to the process of creating new innovation ideas in WP6 and shaping the education platform in WP5. The JAP expresses a vision for the future of offshore wind services, as well as proposed actions. The JAP is a tool for communication to be leveraged by the partners in their future activities in promoting offshore wind and developing the activities in their regions. Examples of external exploitation include the Offshore Wind Cost Reduction Forum in Denmark which is a spin-off from the JAP process and several other prospects in the partnering regions.

The number of jobs in the offshore wind sector is predicted to grow significantly as the operating capacity and build rate increases, increasing the demand for skilled professionals and trained individuals. Feedback from industry is that lack of skills is a significant issue for the sector and reported to be most acute in engineering and technician roles, offshore specialisms and specific offshore wind roles. The industry also reports a high percentage of hard to fill vacancies in managerial and professional roles and must compete directly with other energy industries for the most skilled and experienced employees. Action now will ensure that companies have the skilled staff they need, and minimize the risk for suppliers cannot bid for new contracts because they are unable to recruit.

Among a number of Government and industry-led programs to develop and retain skills, the ECOWindS program has focused on training and skills as an important driver for improving the competitiveness of the OWS industry. The proposed training and learning platform will be highly suited for training of large number of individuals, both on a personal skills level, but also in team training of complex operations.

Cooperation Strategy for Implementation of Real-Time Simulator in OWS

Industry, educators and training providers can harvest experience gained over 4 decades of oil and gas production in the North-Sea. Technology and best practice work standards are easily adapted to the conditions in the offshore wind industry, where solid marine knowledge is very well welcomed. In a low price regime both for electricity and hydrocarbons, both industries faces similar challenges of reducing operating cost.

The oil and gas industry have adopted an open and cooperative approach to many of the problems while working in the North-Sea. This involves safety systems and technology associated with installation and maintenance of offshore facilities and infrastructure. The collective strategy has been to support collaborative research projects and resisting protected technology development. By teaming up with class and regulation companies, this has been an efficient strategy and lead to standards in every sector of the North-Sea. In the Norwegian sector the standard is called NORSOK. The strategy for the implementation of the virtual simulation tool as a learning and training platform should follow the same collaborative strategy.

The implementation of a simulation tool requires adaption to the problems and – scenarios that are of interest. The mathematical models have to be correctly implemented, in order to be useful in every aspect of its purpose. Graphical environment needs to be completed in line with the expectations of OWS infrastructure, both at sea and shore. Also the level of details must be set at a realistic level, especially when it comes to training. An example here will naturally be the level of functionality and details in the nacelle of a turbine. A lot of these issues are not easily funded and a natural response is to team up with innovation and research programs. The reason for this is that the virtual platform will serve as a perfect testbed for skilled researchers in vain of a costly test facility that represent an offshore environment. A perfect match so to say. This idea is also taken from the oil and gas industry where massive cost reduction in testing, both timewise and moneywise, is achieved.

As an implementation strategy, innovation projects must make use of a virtual simulation tool as a test facility for validation of ideas. Once this functionality is in place, a next step will be simulations, combined with rapid prototyping of innovation ideas, as a powerful tool for innovation programs. In return the training facilities will receive updated and increasingly advanced graphical environment for training purpose. A sharing strategy of tools is of essence in keeping cost at an acceptable level, and combined with mechanisms for protecting sensitive company information, this will benefit the whole offshore wind industry.

A part of the ECOWindS program has been to identify training facilities in each region that either has the capabilities for virtual training by use of simulators, or has the ambition to do so. Every region has that capability and during the project we have not meet any closed door. Most of these centres are doing training for marine navigation or oil and gas related training. To adapt the training courses to the needs of the OWS, is of great interest for them and similarities in the training needs are easy to see, especially between OWS and Oil and Gas industries. However, training facilities cannot lift the investment needed to adapt to a new segment on its own. The call for cooperation is unanimously.

Standardisation was the top priority from the JAP, and training and standardisation go hand in hand. A cooperative strategy for establishing a simulation tool for training will be a giant step in the direction of standardisation in the OWS industry.

Competitive Strategy for Implementation of Real-Time Simulator in OWS

The most effective method to reduce cost is by increasing the competition in the market. OWS market is dominated by a relatively small number of industrial companies and often regulatory barriers play a significant role when crossing borders. A joint training platform will stimulate competition and make borders more invisible. One can also imagine that the maritime classification societies may be challenged to take a more active role to structure and regulate the OWS business.

Many of the simulator centres used in the oils and gas industry could be utilized by the offshore wind industry as well. The need of duplicating training facilities is not present. In a period with lower investments in the oil and gas industry in the North-Sea, and increase in offshore wind projects, one can argue that vacant resources can be directed from oil and gas towards offshore wind in relatively short period of time to fulfil training needs.

Competitive advantages to be achieved by use of simulators in training

- Scalability of the simulation tool
- Large number of people can be trained at a low cost on basic skills
- Same setup facilitates team training of complex operations
- Validation of procedures
- Responsiveness with respect to change in technology.

Presentation of Real-time Simulations in OWS.

As part of the ECOWindS consortium final conference in Lowestoft, UK, a side event was held at the Lowestoft College on the topic of skills and training. Two presentations on real-time simulation were given on the topic. Firstly, a presentation of the findings from work carried out by the ECOWindS consortium, WP5 skills and training. Secondly, a presentation by OSC, held by Joel Mills CEO of OSC, on the commercial training activity in the oil & gas industry by use of real-time simulators and opportunities that OWS represent.

The purpose of the side event was to showcase the work that had been carried out by ECOWindS in researching and developing a set of training scenarios to be used in virtual training for offshore wind servicing.

In **WP6 Research and Innovation Ideas Generation** there have been two areas where the project results have had an impact; the first is in the generation of new ideas. By bringing together different organisations and encouraging them to explore the areas where the Offshore Industry needs innovation we have made companies think about things in a different way and helped to foster new collaborations and new ways of thinking.

The major output of WP6 will be the innovation catalogue itself. The catalogue presents a series of early stage concepts that are designed to support the Offshore Wind Servicing Sector and assist it in achieving cost reduction.

The impact of the catalogue was not felt during the projects duration however it will have a great impact once published as it will allow organisations to explore the ideas it contains and allow new consortiums to be formed and new projects to be launched.

The results of WP6 have been disseminated within the ideas generation and technical advisory group workshops. Example concepts from the Innovation Catalogue were also presented at the ECOWindS Final Conference as part of the Innovation Exhibition.

A wide range of dissemination activities have been carried out throughout the project.

A **project website** (www.ecowinds.eu) has been set up at the start of the project and has been operated and updated since. It provides information about the project and its background, introduced the Consortium and offers all produced documents (i.e. Deliverables and reports, newsletters, flyers etc.) for download. The website has successfully contributed to reaching the target groups. Until October 2015 the following visitor statistics have been recorded (PIWIK):

- 6,357 visitors from 99 countries have been recorded on the website (figure 14)
- More than 842 downloads from the website have been recorded.
- 2,095 visitors have been found the website through search engines.

The website will be operated until two years after the project ends, until October 2017.

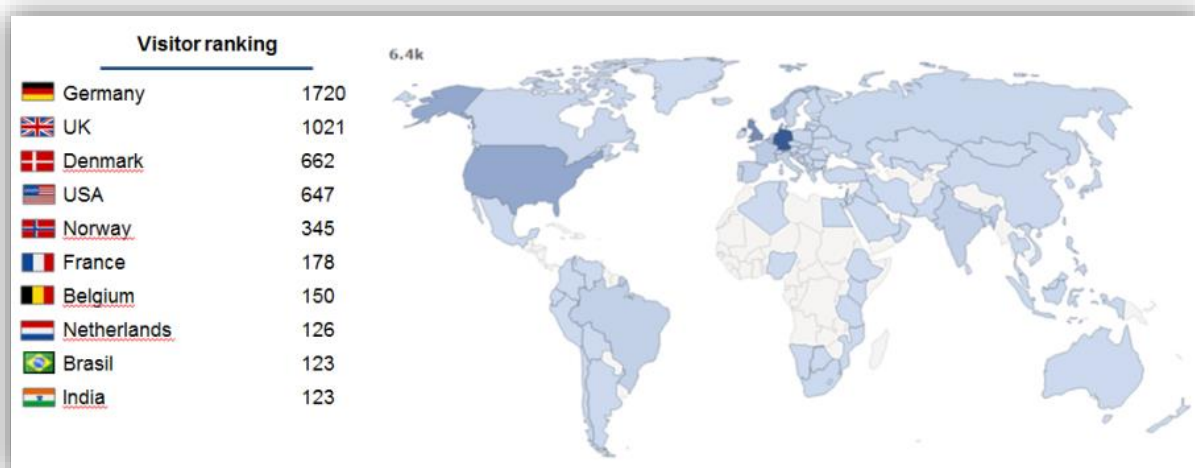


Figure 14 - The ECOWindS website was visited from 99 countries.

Three project flyers have been produced to introduce ECOWindS and to create interest with the stakeholders to find out more about the project. The first flyer has been developed at the start of the project, which was updated at midterm. A final flyer has been produced at the end of the project in the format of a brochure. It gives an overview of the results of ECOWindS and will be a useful reference for all partners beyond ECOWindS, when initiating further initiatives which built on ECOWindS. All flyers have been printed (in total 10,000 prints) and have been distributed widely to stakeholders (industry, research, administration, education) in each of the four clusters. To reach as many stakeholders as possible, opportunities like conferences, trade fairs, workshops and meetings have been used to distribute flyers. The flyers were also downloaded from the project website (164 downloads, until October 2015).

In total **six issues of the ECOWindS-newsletter** have been produced throughout the project, to regularly inform the interested offshore wind community and cluster members about the project's activities and outcomes. They all have been distributed to the subscribers (89 ECOWindS newsletter subscribers) and to the mailing lists from each cluster partner (in total 3766 recipients in all four clusters).

ECOWindS has been presented at **specific ECOWindS events** to directly reach and involve the stakeholders:

- four “ECOWindS Regional Mapping Workshops”, carried out in each cluster (Oct-Dec 2013)
- one “ECOWindS Midway Conference and JAP Workshop”, carried out in Barcelona as a side event of the EWEA (March 2014)
- four “ECOWindS Innovation Idea Generation Workshops” carried out in each cluster (Nov/Dec 2014)
- one “ECOWindS International Workshop on Innovation Ideas Generation”, Manchester, side event of RenewableUK, Dec. 2014, UK
- One “ECOWindS Final Conference”, 28-29. September 2015, Lowestoft, UK.

All partners of the consortium have been involved in informing the target audience about ECOWinds at numerous occasions: presentations at conferences, working groups, workshops and other suitable events. Around **170 presentations, reports or short updates on the project** have been recorded during the project. For example:

- Presentation at the Sea Work Conference, 12. June 2014, Holden, Southampton, UK, "Reducing costs in Offshore Wind Servicing" by Sarah Niddrie-Webb and Matthew Holden, NA/Nwes, Orbis Energy
- Presentation at "Spitzentreffen Windenergie" (Meeting with High Level Regional Administration of Bremen and Niedersachsen), 2.October 2014, Bremen, Germany, by Ronny Meyer, germanwind
- Poster at EWEA Offshore 2015, March 2015, Copenhagen, Denmark by Kalle Piirainen, DTU.

In total **11 press releases** have been produced in the clusters, which have been sent to the press distribution lists from each clusters and to the cluster members. As an example, the WAB/germanwind press release "Markt für Offshore-Windserviceleistungen in Milliardenhöhe" has been sent to 1231 professionals of the WAB's "press distribution lists" and additionally has been send to all WAB members. The press releases have found a large media echo – resulting for example in numerous online articles on ECOWindS.

All partners contributed to disseminating results and news on ECOWindS by writing **articles for printed and digital media**, specialized magazines, cluster newsletters and partner homepages. The consortium has recorded 3 articles published and printed in the popular press. 48 articles have been published by the specialized press of which 11 have been printed and 37 have been made available online in the digital media.

Some examples:

- 05/2014, „Küste profitiert von Offshore Service“, Hansa Magazin- International Maritime Journal:, page 18- 22
- 06/2014, "Smart Specialization and Capabilities for Offshore Wind Services around the North Sea", Piirainen, Kalle A.; Tanner, Anne Nygaard; Alkærsg, Lars; Andersen, Per Dannemand , Published in: Proceedings of 25th ISPIM Conference – Innovation for Sustainable Economy and Society
- 02/2015, „DTU International Energy Report“ 2014 p.49-50
- 05/2015 „The ECOWindS Project“, Wind Energy Network Magazine, p 60-61
- 11/2015, „ECOWindS shows the way to cost reduction“ OWI Magazine, p.48-49/09/2015:
- 09/2015: WAB Newsletter 3/2015: "Kostenreduktion durch Innovation im Offshore-Windservicebereich – Abschlusskonferenz für EU-Projekt ECOWINDS in Lowestoft, UK im September"
- 05/2015 Orbis Energy Website "ECOWindS Project publishes its Joint Action Plan and call for Stakeholder Feedback"
- 03/2015: ORE Catapult Website "ORE Catapult joints ECOWindS Project as Associate Partner"

ECOWindS team members spread information about the project via all major **social media** channels. The partners have used Twitter, Facebook, Google+, LinkedIn, DTU Orbit research information system and Xing. In addition, the social media platform for the Wind community "experts.WAB" has been utilized to inform stakeholders. During the whole project 99 posts have been submitted.

In Summary: A wide range of dissemination activities have been carried out during the project, including newsletters, distribution of flyers, press releases, website etc. Particular emphases has been laid on directly talking to stakeholders and communicating the message and results of ECOWindS, e.g. at working groups, workshops and Conference.

The project ECOWindS has been made public in all four clusters. The content and message of ECOWindS have been brought across to many stakeholders. All stakeholder groups (administration,

science, industry, press), in all four clusters, have been reached by ECOWindS dissemination activities. It can be well assumed, that the dissemination activities of ECOWindS have reached a large proportion of the relevant professionals in the Offshore Wind Servicing sector, the decision-makers as well as the project managers involved in Offshore Wind Servicing and Innovation. The targeted use of existing communication channels towards the cluster members and the additional use of general communication channels towards the overall offshore wind community in each cluster, in Europe and to some extent worldwide guaranteed a far spread of the ECOWindS results.

The dissemination activities have created interests with many stakeholders, who have actively approached ECOWindS partners, to become involved and/or to receive results. There have been good media responses on press releases (articles).

Impact of ECOWindS in the offshore wind Cluster of Northwest Germany

ECOWindS has made an impact in the Offshore Wind Cluster of Northwest Germany. germanwind and WAB have used the knowledge, ideas and findings gained in ECOWindS for developing projects, initiatives and other cluster activities during the project's lifetime. For example:

- **Germanwind/WAB “Initiative: Cost reduction”,**
Germanwind and WAB has started the development of the “Initiative: Cost reduction” in Spring 2014, in cooperation with the Fraunhofer IWES. The target of the initiative is to re-organize the structure of offshore wind funding in Germany, inspired by the funding structure in Denmark and the UK. The offshore wind industry, operators etc., shall become much more involved in defining research needs and funded projects. The initiative has been well received by the German Ministry of Economy and Energy, who are in charge of funding renewables. However, the initiative is still on the way to agree with other relevant stakeholders on a joint concept.
- **Germanwind/WAB contribution for “Strategy-Meeting” of the German Ministry of Environment and the German Ministry of Economy and Energy**
germanwind/WAB were invited in 2013 and 2015 to the “Strategy-Meetings”, which are held every two years, to define research areas which will be funded in the next years. Germanwind/WAB had the chance to provide input in this discussion, contributing by summing up the view of the industry. Among other aspects, ECOWindS results could thus be communicated to national administration .
- **New WAB-Working group “Costums”**
Based on the findings of regional mapping and the Regional Mapping Workshop, the WAB has initiated a new working group on “Costums”. It provides a platform for cluster members to exchange on the cost problems and to work together on joint solutions. The working group “Costums” has started its work in spring 2015 and meets regularly (once every 1-2 months).
- **Joint proposal from ECOWindS Partners: “Inn2Power” – EC, Interreg Northsea Programme**
The partners of three out of four ECOWindS clusters (OEDK, WAB, NA/Nwes) have been involved in developing a joint proposal “Inn2Power” which builds on ECOWindS and its results. The proposal has been rejected at the 1st call. As the EC recommends to re-apply, the Consortium has decided to rework parts of the proposal and submit at the next deadline (March 2016).
- **Joint proposal from ECOWindS Partners: Proposal „PROWIND Cluster“ – EC COSME – Programme (Call for Proposal “Cluster Excellence Programme”**
The partners of three out of four ECOWindS clusters (OEDK, WAB, NA/Nwes) have jointly applied for funding to professionalize their cluster organizations and to increase focus on SME support. Unfortunately this proposal has not been selected for funding.
- **Joint development of project idea by complete ECOWindS Consortium “Virtual Prototype Testing for Cost Reduction”**
Based on ECOWindS results, specifically WP 5, the ECOWindS Consortium agreed to jointly develop a project idea and proposal on “Virtual Prototype Testing for Cost Reduction”. It is planned to integrated

partners from industry as main partners, whereas the cluster management organization will coordinate the action in their clusters. Currently the Consortium looks for suitable funding options. The project ideas have been suggested by the Norwegian Partners/Project leaders WP 5.

- **“Innovation-Trips” to UK and China from Germanwind**

Germanwind has organized two delegation trips for representatives of industry, research and authorities of the offshore wind cluster in the Northwest of Germany, to visit companies, test-facilities etc. and to facilitate and exchange between the clusters

- October 2013: Visit of China
- September 2014: Visit of the offshore wind clusters in East of England (ECOWindS Partners OrbisEnergy, NA, Nwes) and Humber and Hull

- **Go-Cluster Label “Bronze” and “Silver” of WAB**

Based on the exchange with Offshoreenergy.dk, WAB (and germanwind as subsidiary) have professionalized its cluster management and successfully applied for “Bronze” (awarded 2013 and 2015) and subsequently for “Silver” (2015). WAB heads for “Gold” now.

4.2 Use and dissemination of foreground

A plan for use and dissemination of foreground (including socio-economic impact and target groups for the results of the research) shall be established at the end of the project. It should, where appropriate, be an update of the initial plan in Annex I for use and dissemination of foreground and be consistent with the report on societal implications on the use and dissemination of foreground (section 4.3 – H).

The plan should consist of:

- Section A

This section should describe the dissemination measures, including any scientific publications relating to foreground. **Its content will be made available in the public domain** thus demonstrating the added-value and positive impact of the project on the European Union.

- Section B

This section should specify the exploitable foreground and provide the plans for exploitation. All these data can be public or confidential; the report must clearly mark non-publishable (confidential) parts that will be treated as such by the Commission. Information under Section B that is not marked as confidential **will be made available in the public domain** thus demonstrating the added-value and positive impact of the project on the European Union.

A 2: LIST OF DISSEMINATION ACTIVITIES								
NO	Type of activity	Main leader	Title/Content	Date/Period	Place	Type of audience	Size of audience	Countries addressed
1	article published in the popular press	ASP	reg.Paper:"Vestlandsnytt"	2015-05-29	printed	regional business community	3000	Norway
2	article published in the popular press	GW, WAB	Sonntagsjournal (Nordsee-Zeitung):"Das Ziel: Kostensenkung um die Hälfte"	2013-01-12	printed	readers of the Nordsee Zeitung	111430	Germany
3	article published in the popular press	GW, WAB	Nordsee-Zeitung:"EU-Projekt zu Betrieb und Wartung"	2012-11-12	printed	readers of the Nordsee Zeitung	55000	Germany
4	conference	all partners	EWEA 2014, Barcelona	2014-03-14	Barcelona	participants of exhibition		Spain
5	conference	OE, NA, NWES	Official side event for "RUK annual conference 2014" with links to the project on their website	2014-10-01	Liverpool	conference participants		UK
6	conference	all partners	ECOWindS Midway Conference at EWEA, Barcelona	10-03-2014	Barcelona	ECOWindS stakeholders	40	EU
7	conference	OE, NA, NWES	All Energy Conference - Session Chair: Cost reduction through innovation in OW & insights from the ECOWindS Project: Offshore Wind2: "Innovation in technology and thought leads to cost cutting"	06-05-2015	Glasgow	8250 delegates, 450 exhibitors	82	EU
8	conference	all partners	ECOWindS Final Conference: Drinks Reception	2015-09-28	Lowestoft	participants	78	EU
9	conference	all partners	ECOWindS Final Conference	2015-09-29	Lowestoft	participants	108	EU

10	conference	OE, NA, NWES	Global Offshore Wind 2015: The Catapult Conference - "Cost Reduction from Parallel Sector experience"	2015-06-24	London	All target groups		EU
11	conference	ASP	Nor-Shipping Forum: Panel debate Offshore Wind	2015-06-04	Lillestrøm	nor-shipping seminar visitors		EU
12	ECOWindS Newsletter	ASP	ECOWindS Newsletter 2	2013-09-03	digital	Website visitors, newsletter subscriber, Facebook follower	2995	EU
13	ECOWindS Newsletter	ASP	ECOWindS Newsletter 4	2014-11-01	digital	website visitors	2500	EU
14	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 1	2013-02-28	digital	WAB Members	710	Germany
15	ECOWindS Newsletter	ASP	ECOWindS Newsletter 5	2015-03-25	digital	website visitors	2500	EU
16	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 2	2013-09-06	digital	WAB Members	710	Germany
17	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 3	2014-03-01	digital	WAB Members	710	Germany
18	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 4	2014-10-06	digital	WAB Members	710	Germany
19	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 4	2014-10-06	digital	LinkedIn contacts		EU
20	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 5	2015-03-01	digital	WAB Members	710	Germany
21	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 6	2015-10-30	digital	WAB Members	710	Germany
22	ECOWindS Newsletter	OE, NA, NWES	ECOWindS Newsletter 2	2013-09-06	digital	Visitors, tenants and virtual tenants of OrbisEnergy	80	UK
23	ECOWindS Newsletter	OE, NA, NWES	ECOWindS Newsletter 2	2013-09-06	digital	website visitors		UK
24	ECOWindS Newsletter	OE, NA, NWES	ECOWindS Newsletter 3	2014-04-01	digital	OrbisEnergy, Nautilus Associates, NWES		UK

25	ECOWindS Newsletter	OE, NA, NWES	ECOWindS Newsletter 4	2014-10-01	digital	website visitors, newsletter subscribers	700	UK
26	ECOWindS Newsletter	OE, NA, NWES	ECOWindS Newsletter 5	2015-02-03	digital	Visitors, tenants and virtual tenants of OrbisEnergy	116	UK
27	ECOWindS Newsletter	OEDK	ECOWindS Newsletter 1	2013-03-04	digital	Wind-members, Wind networks groups	267	EU
28	ECOWindS Newsletter	OEDK	ECOWindS Newsletter 4	2014-10-06	digital	LinkedIn Connections	500	EU
29	ECOWindS Newsletter	ASP	ECOWindS Newsletter 1	2013-03-04	digital	Newsletter subscribers	2700	EU
30	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 1	2013-02-28	digital	Newsletter subscribers	116	EU
31	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 2	2013-09-06	digital	Newsletter subscribers	89	EU
32	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 3	2014-03-01	digital	Newsletter subscribers	89	EU
33	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 4	2014-10-06	digital	Newsletter subscribers	89	EU
34	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 5	2015-03-01	digital	Newsletter subscribers	89	EU
35	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 6	2015-10-30	digital	Newsletter subscribers	89	EU
36	ECOWindS Newsletter	GW, WAB	ECOWindS Newsletter 1	2013-03-28	digital	Twitter followers	178	EU
37	exhibition	OE, NA, NWES	Conference exhibition: ECOWindS took exhibition space at EEEGRs annual SNS Conference	2015-03-04	Norfolk	participants conference	400	EU
38	exhibition	OE, NA, NWES	ECOWindS Event at Final Conference	2015-09-25	Lowestoft	participants of side event	35	UK
39	exhibition	OE, NA, NWES	ECOWindS Final Conference, Side Event - Innovation Exhibition	2015-09-30	Lowestoft	participants of side event	65	UK
40	exhibition	OE, NA, NWES	ECOWindS Final Conference, Side Event - Lowestoft College	2015-09-30	Lowestoft	participants of side event	30	UK

41	exhibition	OE, NA, NWES	ECOWindS Final Conference, Side Event - Port Tour	2015-09-30	Lowestoft	participants of side event	12	UK
42	flyer	all partner s	Flyer No 1	2013-02-01	printed&digita l	conference visitors, office visitors, exhibition visitors, workshop visitors, website visitors, newsletter subscriber, companies, etc.	4000	EU
43	flyer	all partner s	Flyer No 2	2014-09-28	printed&digita l	conference visitors, office visitors, exhibition visitors, workshop visitors, website visitors, newsletter subscriber, companies, etc.	4000	EU
44	flyer	all partner s	Flyer No 3	2015-09-15	printed&digita l	conference visitors, office visitors, exhibition visitors, workshop visitors, website visitors, newsletter subscriber, companies, etc.	2000	EU
45	other stakeholder contact	DTU	Smart Specialization and Capabilities for Offshore Wind Services around the North Sea - 25th ISPIM Conference, 2014	2014-06-10	printed	Offshore wind stakeholders, particularly around the Baltic Sea	30	EU
46	other stakeholder contact	GW, WAB	Email to WAB members: ECOWindS-Aktionsplan für die Offshore-Windservicesektor steht zur Evaluierung durch die Branche bereit	2015-05-18	digital	WAB Distribution List	708	Germany

47	other stakeholder contact	GW, WAB	Email to WAB members: Invitation of to the WAB Stammtisch, to meet ECOWindS Consortium	2014-04-29	Bremerhaven	psg meeting participants	800	Germany
48	other stakeholder contact	GW, WAB	Email to WAB members: Invitation of to the WAB Stammtisch, to meet ECOWindS Consortium	2014-05-01	Bremerhaven	psg meeting participants	800	Germany
49	other stakeholder contact	GW, WAB	Email to WAB members: Invitation of to the WAB Stammtisch, to meet ECOWindS Consortium	2014-05-14	Bremerhaven	psg meeting participants	800	Germany
50	other stakeholder contact	OE, NA, NWES	Invitation: Contribution to Europe Wide Agenda for Research & Innovation in Offshore Wind Servicing	2014-10-23	Lowestoft	Triple helix stakeholders of the OWES sector in the East of England	35	UK
51	other stakeholder contact	OE, NA, NWES	Invitation: Contribution to Offshore Wind Servicing Industry Development and Innovation Research	2014-10-28	Lowestoft	Triple helix stakeholders in OWS sector and neighbouring sectors from across Europe and International locations	10000	UK
52	other stakeholder contact	GW, WAB	Opening WindMW: Informing participants about the ECOWindS project	2014-11-10	Bremerhaven	WindMW dedication participants		Germany
53	other stakeholder contact	GW, WAB	Maritime-Cluster Meeting: Informing participants about the ECOWindS project	2014-11-14	Bremerhaven	Maritime cluster meeting participants		Germany
54	other stakeholder contact	GW, WAB	WfB event: Informing participants about the ECOWindS project	2014-11-27	Bremen	WfB event participants		Germany

55	other stakeholder contact	GW, WAB	Zukunftsenergien Nordwest: Informing participants about the ECOWindS project	2014-12-15	Bremen	Zukunftsenergien Nordwest participants		Germany
56	other stakeholder contact	GW, WAB	Meeting with administration/politicians of State of Bremen (Senator für Umwelt)	2015-01-26	Bremen	Politicians	1	Germany
57	other stakeholder contact	GW, WAB	IWES Chinesischer Frühling: conversations with participants about the ECOWindS project	2015-02-12	Bremerhaven	IWES Chinesischer Frühling participants		Germany
58	other stakeholder contact	OE, NA, NWES	Email: ECOWindS project publishes its joint action plan and call for stakeholder feedback	2015-04-13	digital	Regional Advisory Group stakeholders already engaged with the ECOWindS Project	10	UK
59	other stakeholder contact	OE, NA, NWES	Email: ECOWindS project publishes its joint action plan and call for stakeholder feedback	2015-04-13	digital	All target groups	125	UK
60	other stakeholder contact	OE, NA, NWES	Email: ECOWindS project publishes its joint action plan and call for stakeholder feedback	2015-04-13	digital	Regional Advisory Group stakeholders already engaged with the ECOWindS Project	10	UK
61	other stakeholder contact	OE, NA, NWES	Email: ECOWindS project publishes its joint action plan and call for stakeholder feedback	2015-04-21	digital	Visitors, tenants and virtual tenants of OrbisEnergy	116	UK
62	other stakeholder contact	GW, WAB	WHV-Event: Informing participants about the ECOWindS project	2015-04-28	Wilhelmshaven	WHV-Event Participants		Germany
63	other stakeholder contact	GW, WAB	Windpark Dan Tysk opening: conversations with participants about the ECOWindS project	2015-04-30	North Sea	Dan Tysk opening participants		EU

64	other stakeholder contact	OE, NA, NWES	Final Conference 29th September "Save the Date"	2015-05-01	digital	All target groups	9500	EU
65	other stakeholder contact	GW, WAB	RWE: talking to RWE employees about the ECOWindS project	2015-05-19	-	RWE employees		Germany
66	other stakeholder contact	OE, NA, NWES	Email: Sign up now for ECOWindS Project's final conference	2015-05-21	digital	Visitors, tenants and virtual tenants of OrbisEnergy	116	UK
67	other stakeholder contact	GW, WAB	BMU/BMWi Strategie-Gespräche Berlin (Definition research agenda): Informing participants about the ECOWindS project, results	2015-06-17	Berlin	National Administration, Research, industry		Germany
68	other stakeholder contact	GW, WAB	WAB Working Group "Customs": short ECOWindS project status report	2015-07-02	Düsseldorf	Branchentag Düsseldorf participants	10	Germany
69	other stakeholder contact	OE, NA, NWES	Register FREE for a place at the ECOWindS Final Conference: Increasing Innovations in Offshore Wind Servicing	07-08-2015	digital	All target groups	26000	EU
70	other stakeholder contact	OE, NA, NWES	ECOWindS Final Conference: Increasing Innovation in the Offshore Wind Servicing Sector	09-08-2015	digital	All target groups	26000	EU
71	other stakeholder contact	GW, WAB	Email to WAB distribution list: "ECOWindS-Aktionsplan für den Offshore Windservicesektor steht zur Evaluierung bereit"	2015-05-18	digital	All target groups	500	Germany
72	other stakeholder contact	GW, WAB	Email to WAB distribution list: "Jetzt anmelden: ECOWindS Abschlusskonferenz"	2015-09-09	digital	All target groups	500	Germany
73	other stakeholder contact	OE, NA, NWES	Registration now open: Final Conference	27-08-2015	digital	All target groups	5800	EU

74	other stakeholder contact	OE, NA, NWES	Email: Tickets now live for ECOWindS Final Conference Side Events and Conference Dinner	2015-08-28	digital	Final Conference Attendees	57	EU
75	other stakeholder contact	OE, NA, NWES	Upcoming Events at OrbisEnergy	2015-09-02	digital	All target groups	70	UK
76	other stakeholder contact	OE, NA, NWES	E-Shot: "ECOWindS Final Conference 2 Weeks to go!"	2015-09-15	digital	All target groups	868	UK
77	other stakeholder contact	OE, NA, NWES	ECOWindS Event Next Week	2015-09-24	digital	All target groups	70	UK
78	other stakeholder contact	OE, NA, NWES	Email: ECOWindS Final Conference	2015-09-28	digital	Final Conference Attendees	116	EU
79	other stakeholder contact	OE, NA, NWES	Email: ECOWindS Final Conference	2015-09-28	digital	Final Conference Attendees	116	UK
80	other stakeholder contact	OE, NA, NWES	Email: Thank you from the ECOWindS Project	2015-10-08	digital	Final Conference Attendees	118	UK
81	other stakeholder contact	GW, WAB	Dynalab Opening: conversations with participants about the ECOWindS project	2015-10-20	Bremerhaven	Dynalab opening participants		Germany
82	other stakeholder contact	GW, WAB	Meeting with Claude Turmes (Member of the European Parliament, Green Party) about the ECOWindS project	2015-10-22	Bremerhaven	Politicians	1	EU
83	other stakeholder contact	GW, WAB	WAB Windforce Conference 2015: conversations with participants about the ECOWindS project	10.-11.6.2015	Bremerhaven	Windforce participants		EU
84	other stakeholder contact	GW, WAB	Husum Wind Conference: Informing visitors about the ECOWindS project	15.-17.9.2015	Husum	Husum Wind visitors		International
85	other stakeholder contact	GW, WAB	Dolwin Beta opening: conversations with participants about the ECOWindS project	19-21.11.2014	Haugesund	Dolwin Beta participants		EU

86	other stakeholder contact	GW, WAB	Fair "Zukunftsenergien Nordwest 2015":conversations with participants about the ECOWindS project	20.-21.3.2015	Bremen	Zukunftsenergien Nordwest participants		Germany
87	other stakeholder contact	GW, WAB	WAB Conference "Windforce - Baltic Sea 2015":conversations with participants about the ECOWindS project	4.-5.2.2015	Bremen	Windforce participants		Germany
88	other stakeholder contact	OEDK	Erfa Group for coordinators	-	Esbjerg	Network coordinators	10	UK
89	other stakeholder contact	DTU	link to the website; Link to Ramboll Management Consulting Finland	2013-05-20	digital	RMC employees	30	Denmark
90	poster	all partners	ECOWindS Poster at EWEA Offshore 2015: Project introduction/Outline	10.-11.3.2015	Copenhagen	Visitors of EWEA Offshore 2015		International
91	poster	GW, WAB	ECOWindS Rollup/Stand: Showing the ECOWindS project at WAB Stammtisch	2014-05-14	Bremen	participants WAB Stammtisch	300	Germany
92	poster	OE, NA, NWES	Poster at the SeaWork Conference: ECOWindS/Cost reduction	2014-06-12	Southampton	participants of SeaWork Conference		UK
93	poster	GW, WAB	ECOWindS Poster at Windforce 2014: Project introduction/outline	2014-06-17	Bremerhaven	participants of Windforce 2014 conference	5000	Germany
94	poster	GW, WAB	ECOWindS Rollup/Stand: Showing the ECOWindS project at WAB Stammtisch	2014-07-16	Bremen	participants WAB Stammtisch	170	Germany
95	poster	GW, WAB	ECOWindS Rollup/Stand: Showing the ECOWindS project at WAB Stammtisch	2014-10-15	Bremen	participants WAB Stammtisch	300	Germany

			poster at 5th EU Future-Oriented Technology Analysis Conference					
96	poster	DTU		2014-11-27	Brussels	Conference participants	350	EU
97	poster	OE, NA, NWES	5 ECOWINDS Poster at Final Conference	2015-09-28	Lowestoft	Participants of the final conference	150	UK
98	poster	OE, NA, NWES	2x ECOWindS pop-up banners: Project introduction/outline	Ongoing	Lowestoft	Attendees to industry events		UK
99	poster	GW, WAB	Poster on permanent display in WAB/germanwind Office	Ongoing	Bremerhaven	Visitors WAB/GW office		Germany
100	poster	OEDK	Danish / German Business day, Flensburg	2014-04-03	Flensburg	participating companies	300	Denmark, Germany
101	presentation	ASP	Project presentation of ECOWindS	2013-09-05	Ålesund	Delegation from North Norway	40	Norway
102	presentation	ASP	Project meeting	2013-11-05	Ålesund	Industry contacts	8	Norway
103	presentation	ASP	Short project presentation of ECOWindS	2014-12-04	Ålesund	Industry contacts	50	Norway
104	presentation	ASP	Short project presentation of ECOWindS	2014-12-04	Ålesund	Industry contacts	50	Norway
105	presentation	ASP	Project presentation of ECOWindS	2014-07-09	Ålesund	Industry contacts	2	Norway
106	presentation	OE, NA, NWES	Presentation title 'Reducing Costs in Offshore Wind Servicing'	2014-06-12	Southampton	Attendees to the largest international commercial maritime and workboat exhibition in Europe, attracting international visitors from offshore wind and related sectors	7000	UK
107	presentation	OEDK	Baltic Wind 2013, Presentation of ECOWindS	2013-09-09	Stockholm	Wind-members, Wind networks groups, journalists, media, industry	79	EU

108	presentation	GW, WAB	Conference O&M Windenergie: Presentation: "ECOWindS – Stärkung der Innovationsfähigkeit des Offshore-Servicemarktes durch die Vernetzung europäischer Cluster"	2013-10-09	Berlin	Industry, Scientists	200	Germany
109	presentation	OE, NA, NWES	Conference Title 'Technology & Innovation in Offshore Renewables'; Presentation slides titled ECOWindS Project	2014-02-18	Lowestoft	members of the industry association for energy in the East of England	60	UK
110	presentation	DTU	Cost drivers and challenges for OWS and opportunities	2015-02-16	Lyngby	-		
111	presentation	GW, WAB	Delegates from China (Goldwind) visit German Cluster: Informing delegates about the ECOWindS Project	2013-06-20	Bremerhaven	Delegations from China (Goldwind)	10	China
112	presentation	GW, WAB	Delegation of EWEA Copenhagen: Short introduction of ECOWindS project	10.-11.3.2015	Copenhagen	EWEA Copenhagen visitors	12	International
113	presentation	DTU	Distributed flyer; discussion on project and recent findings	2014-09-30	Lyngby	Offshore wind stakeholders, particularly around the Baltic Sea	30	Baltic Sea
114	presentation	DTU	ECOWindS – The European Clusters for Offshore Wind Servicing	2013-10-29	Lyngby	Danish companies		Denmark
115	presentation	DTU	ECOWindS – The European Clusters for Offshore Wind Servicing	2013-10-17	Lyngby	foresight experts	2	Denmark
116	presentation	DTU	ECOWindS Joint Action Plan	30-09-2015	-	Strategic Network on Energy Innovation Systems and Their Dynamics	18	Denmark

117	presentation	OEDK	DTU Vind Institutdag: ECOWindS Presentation	2013-08-22	Lyngby	Wind-members, Wind networks groups, journalists, media, industry	130	Denmark
118	presentation	ASP	Education Fair: Project presentation	2014-09-24	Ålesund	Presence at edu-fair in Ålesund. Roll up and flyer. Industry and young people	4000	Norway
119	presentation	ASP	Education Fair: Project presentation	2014-09-26	Ålesund	Presence at edu-fair in Ålesund. Roll up and flyer. Industry and young people	4000	Norway
120	presentation	OEDK	Offshore wind and intro of OEDK/EW: "Future Wind"	2013-06-03	Esbjerg	Wind-members, Wind networks groups, journalists, media, industry	200	Denmark
121	presentation	OEDK	Hans A Pedersen: ECOWindS ppt	2014-02-05	Esbjerg	Entrepreneurs	120	Denmark
122	presentation	OEDK	Hans A Pedersen: ECOWindS ppt and network	2014-05-09	Esbjerg	Offshore wind students and PhD	40	Denmark
123	presentation	OEDK	ReCOE Seminar: Innovation in the OWS industry.	2015-05-29	Esbjerg	Universities incl. Ph.D. students	20	Denmark
124	presentation	OE, NA, NWES	International Links - ECOWindS'; within presentation titled 'OrbisEnergy - a hub for offshore renewables'	2013-06-10	Lowestoft	Business delegates visiting OrbisEnergy as part of national Wind Week	20	UK
125	presentation	OE, NA, NWES	International Links - ECOWindS'; within presentation titled 'OrbisEnergy - a hub for offshore renewables'	2013-06-14	Lowestoft	Delegation of government and business officials from Chinese province Jiangsu visiting OrbisEnergy	13	UK
126	presentation	OE, NA, NWES	International Links - ECOWindS'; within presentation titled 'OrbisEnergy - a hub for offshore renewables'	2013-07-01	Lowestoft	Presentation to newly elected council members and local government representatives	11	UK
127	presentation	OEDK	Learning Workshop O & M	-	Esbjerg	Offshore companies	25	Denmark
128	presentation	OEDK	O & M at Vattenfall	-	-	Offshore companies	60	Denmark

129	presentation	OEDK	Offshore network - Police Network	2013-09-25	Esbjerg	Police manager	9	Denmark
130	presentation	OEDK	Offshore wind and intro of OEDK/EW: Energy Europe	2013-05-24	Esbjerg	Wind-members, Wind networks groups, journalists, media, industry	50	EU
131	presentation	OEDK	Offshore wind and intro of OEDK/EW: Future Offshore Focus Conference	2013-10-09	Esbjerg	Wind-members, Wind networks groups, journalists, media, industry	75	EU
132	presentation	OEDK	Offshore wind and intro of OEDK/EW: Kick-off Energy Campus AAU	2013-05-29	Aalborg	Wind-members, Wind networks groups, journalists, media, industry	75	EU
133	presentation	OEDK	Offshore wind and intro of OEDK/EW: OBMC 2013	2013-09-24	Husum	Wind-members, Wind networks groups, journalists, media, industry	85	EU
134	presentation	OEDK	Offshore wind and intro of OEDK/EW: Offshore Wind France	2013-10-02	Esbjerg	Wind-members, Wind networks groups, journalists, media, industry	30	EU
135	presentation	OEDK	Offshore Wind, Virginia	-	-	Offshore wind companies	200	Denmark, USA
136	presentation	GW, WAB	Open Day in Brussels: ECOWindS project presentation	7.-9.10.2013	Brussels	Open Days in Brussels, EC, national/regional administration, cluster organisations	300	EU
137	presentation	OE, NA, NWES	Overview of ECOWindS	2014-11-27	Lowestoft	Normandy delegation visiting East of England	15	UK
138	presentation	OE, NA, NWES	Overview of the East of England, ECOWindS (Delegation trip)	2014-09-15	Lowestoft	WAB/GW delegation	20	Germany
139	presentation	OE, NA, NWES	Presentation at the Sea Work Conference: "Reducing Costs in Offshore Wind Servicing"	2014-06-12	Southampton	Visitors of SeaWork Conference		UK

140	presentation	external	Presentation by Alastair Dutton at the ECOWindS Final Conference: "Cost Reduction and EU Collaboration"	29-09-2015	Lowestoft	Final Conference Attendees	150	EU
141	presentation	OE	Presentation by Hans A. Pedersen at the ECOWindS Final Conference: "The ECOWindS Project and its key results"	29-08-2015	Lowestoft	Final Conference Attendees	150	EU
142	presentation	DTU	Presentation by Kalle A. Piirainen at the ECOWindS Final Conference: "The Joint Action Plan"	29-09-2015	Lowestoft	Final Conference Attendees	150	EU
143	presentation	OE, NA, NWES	Presentation by Matthew Holden at the ECOWindS Final Conference	2015-08-27	Lowestoft	All target groups	20	UK
144	presentation	DTU	Presentation of ECOWindS at Workshop „Offshore-Windenergie – Potenziale für interregionale Projekte“, Representation of the German State of Lower Saxony, Brussels	03./04.07.2015	Brussels	Authority, Research		EU
145	presentation	GW, WAB	Short introduction of the ECOWindS Project at "Spitzentreffen Windenergie - "Meeting with High Level Regional Administration of Bremen and Niedersachsen	2014-10-02	Bremen	Administration Bremen, Lower Saxony	12	Germany

14 6	presentation	DTU	Professor Per Dannemand Andersen: ECOWindS: The European Clusters for Offshore Wind Servicing	2014-03-10	-	Students of Technical University Denmark		EU
14 7	presentation	ASP	Short project presentation of ECOWindS	2013-04-09	Ålesund	Russian Shipbuilding Group	10	Norway
14 8	presentation	ASP	Project presentation of ECOWindS	2013-04-22	Ålesund	International journalists (UK, Hol, Ger, USA, Swe.)	12	Norway
14 9	presentation	AUC	Høgskolen i Ålesund: Project presentation of ECOWindS	2013-05-01	Ålesund	wide		Norway
15 0	presentation	ASP	Project presentation of ECOWindS	2013-05-02	Ålesund	Administration	5	Norway
15 1	presentation	ASP	Project presentation of ECOWindS	2013-05-10	Ålesund	Innovation meeting. Business leaders	6	Norway
15 2	presentation	ASP	Project presentation of ECOWindS	2013-05-10	Ålesund	NOR members of Parliament	4	Norway
15 3	presentation	ASP	Project presentation of ECOWindS	2013-05-15	Ålesund	NOR labour union and national business organisation	8	Norway
15 4	presentation	ASP	Project presentation of ECOWindS	2013-05-16	Ålesund	High school students	10	Norway
15 5	presentation	ASP	Project presentation of ECOWindS	2013-05-16	Ålesund	Teachers. Maritime Education	10	Norway
15 6	presentation	ASP	Project presentation of ECOWindS	2013-05-21	Ålesund	ECOWindS participants	8	Norway
15 7	presentation	ASP	Project presentation of ECOWindS	2013-05-27	Ålesund	Norwegian Research Council	4	Norway
15 8	presentation	ASP	Project presentation of ECOWindS	2013-05-28	Ålesund	SECO Tools. Swedish industrial representatives	12	Norway

159	presentation	OEDK	Offshore wind and intro of OEDK and ECOWindS	2013-05-30	Esbjerg	Maryland Delegation, Wind-members, Wind networks groups, journalists, media, industry	5	Denmark, USA
160	presentation	ASP	Project presentation of ECOWindS	2013-05-30	Ålesund	Indian delegation. Shipbuilders and politicians	8	Norway
161	presentation	ASP	Project presentation of ECOWindS	2013-06-04	Ålesund	FIN - Oslo participants	8	Norway
162	presentation	ASP	Project presentation of ECOWindS	2013-06-07	Ålesund	Chinese attaché	4	Norway
163	presentation	ASP	Project presentation of ECOWindS	2013-06-10	Ålesund	Japanese delegation. Jap ship machinery cons.	20	Norway
164	presentation	ASP	Project presentation of ECOWindS	2013-06-11	Ålesund	Sunnmøre Regional Council	12	Norway
165	presentation	OEDK	Offshore wind and intro of OEDK and ECOWindS	2013-06-13	Esbjerg	Start Vækst Lemvig Kommune, Wind-members, Wind networks groups, journalists, media, industry	8	Denmark
166	presentation	ASP	Project presentation of ECOWindS	2013-06-13	Ålesund	Fosnavåg conference. Regional maritime conference	150	Norway
167	presentation	ASP	Project presentation of ECOWindS	2013-06-19	Ålesund	EU-members of parliament. Transport committee	6	Norway
168	presentation	ASP	Project presentation of ECOWindS	2013-06-19	Ålesund	presentation for EU parliament member, transportation committee	6	Norway
169	presentation	ASP	Project presentation of ECOWindS	2013-06-25	Ålesund	University of Bergen	4	Norway

170	presentation	ASP	Project presentation of ECOWindS	2013-06-27	Ålesund	ZYNK Oslo	4	Norway
171	presentation	ASP	Project presentation of ECOWindS	2013-07-02	Ålesund	Erna Solberg. Incoming new Prime minister	6	Norway
172	presentation	ASP	Project presentation of ECOWindS	2013-07-03	Ålesund	Sunnmøre Regional Council	10	Norway
173	presentation	ASP	Project presentation of ECOWindS	2013-07-04	Ålesund	Delegation from Sandefjord	10	Norway
174	presentation	ASP	Project presentation of ECOWindS	2013-08-06	Ålesund	VRI Molde	8	Norway
175	presentation	ASP	Project presentation of ECOWindS	2013-08-13	Ålesund	iKuben Molde. Innovation studio	12	Norway
176	presentation	ASP	Project presentation of ECOWindS	2013-08-15	Ålesund	members of parliament representing our region	20	Norway
177	presentation	ASP	Project presentation of ECOWindS	2013-08-21	Ålesund	Istanbul. Shipbuilders etc.	30	Norway
178	presentation	ASP	Project presentation of ECOWindS	2013-08-21	Ålesund	Journalists from Poland	4	Norway
179	presentation	ASP	Project presentation of ECOWindS	2013-08-22	Ålesund	Istanbul. Shipbuilders etc.	10	Norway
180	presentation	ASP	Project presentation of ECOWindS	2013-08-23	Ålesund	Erna Solberg. Incoming new Prime minister	20	Norway
181	presentation	ASP	Project presentation of ECOWindS	2013-08-28	Ålesund	University college of Volda. Students	30	Norway
182	presentation	ASP	Project presentation of ECOWindS	2013-09-04	Ålesund	Sea authority	10	Norway
183	presentation	ASP	Project presentation of ECOWindS	2013-09-06	Ålesund	Authority	10	Norway
184	presentation	ASP	Project presentation of ECOWindS	2013-09-17	Ålesund	journalists, financial paper	2	Norway
185	presentation	OEDK	Project presentation of ECOWindS	2013-10-02	Esbjerg	OEDK members and participants at our events.	1000	Denmark

186	presentation	ASP	Project presentation of ECOWindS	2014-03-25	Ålesund	40 engineering students from Trondheim, NTNU	40	Norway
187	presentation	ASP	Project presentation of ECOWindS	2014-07-01	Ålesund	Young people from Scandinavian friendship cities	100	Norway
188	presentation	ASP	Project presentation of ECOWindS	2014-09-04	Ålesund	Ger-Nor trade forum. Bureaucrats from Nor and Ger trade- and foreign ministries	20	Norway, Germany
189	presentation	ASP	Project presentation of ECOWindS	2014-10-08	Bremen	participants at meeting	5	EU
190	presentation	ASP	Project presentation of ECOWindS	2014-10-08	Bremen	participants at meeting	5	EU
191	presentation	ASP	Project presentation of ECOWindS	2015-02-10	Ålesund	Market seminar	40	Norway
192	presentation	OE, NA, NWES	Renewable UK Business Showcase on the ECOWinds project, outputs to date, future activities and how stakeholders can get involved: Reducing costs in Offshore Wind Servicing	2014-11-12	Manchester	Delegates attending the Renewable UK annual conference	4000	UK
193	presentation	ASP	Results of ECOWindS WP 5	2015-09-30	Lowestoft	Presentation of wp5 for stakeholders/industry Lowestoft UK	50	UK
194	presentation	ASP	Short project presentation of ECOWindS	2014-03-18	Ålesund	Politicians	10	Norway
195	presentation	ASP	Short project presentation of ECOWindS	2014-05-27	Ålesund	Industry, association delegation from Istanbul	6	Turkey, Denmark
196	presentation	ASP	Short project presentation of ECOWindS	2014-10-16	Oslo	Presentation Uni of Oslo	25	Norway
197	presentation	ASP	Short project presentation of ECOWindS	2014-12-03	Ålesund	Politicians	10	Norway

198	presentation	ASP	Short project presentation of ECOWindS	2014-12-03	Ålesund	Politicians	10	Norway
199	presentation	ASP	Short project presentation of ECOWindS	2015-06-08	Ålesund	South African Maritime Safety Authority	6	South Africa
200	presentation	ASP	Short project presentation of ECOWindS	2015-06-23	Ålesund	Blue Press tour. Visiting international maritime journalists	10	International
201	presentation	ASP	Short project presentation of ECOWindS	2015-08-07	Ålesund	Visiting Industrial delegation from LO - labour union	6	Norway
202	presentation	ASP	Short project presentation of ECOWindS	2015-10-05	Ålesund	Russian delegation. Ship-owners from Vladivostok	8	Russia
203	presentation	GW, WAB	Short update on ECOWindS Project	2015-10-06	Bremen	Participants of the WAB Stammtsich	140	Germany
204	presentation	OE, NA, NWES	Smart specialisation in the East of England; lessons learned form the ECOWindS project	2014-02-01	Lowestoft	Local administration (Ic)	20	UK
205	presentation	DTU	Smart Specialization and Capabilities for Offshore Wind Services around the North Sea	2014-06-10	Lyngby	Offshore wind stakeholders, particularly around the Baltic Sea	30	Denmark
206	presentation	DTU	EWEA: Towards a Joint Action Plan for Research and Development in the Offshore Wind Service Industry	2015-03-10	Lyngby	Offshore wind professionals, ECOWindS Stakeholders	100	Denmark
207	presentation	GW, WAB	WAB "Beginner Workshop": Short ECOWindS project overview/status report	2015-03-18	Bremen	WAB Einsteigerseminar participants	20	Germany
208	presentation	GW, WAB	WAB Mitgliederversammlung: Short Report on ECOWindS project status	2014-12-10	Bremen	WAB Members	120	Germany
209	presentation	GW, WAB	WAB Stammtisch: short Report on ECOWindS project status	2012-11-14	Bremen	participants WAB Stammtisch	442	Germany

210	presentation	GW, WAB	WAB Stammtisch: short Report on ECOWindS project status	2013-01-16	Bremen	participants WAB Stammtisch	371	Germany
211	presentation	GW, WAB	WAB Stammtisch: short Report on ECOWindS project status	2013-03-13	Bremen	participants WAB Stammtisch	353	Germany
212	presentation	GW, WAB	WAB Stammtisch: Short ECOWindS project status report	2015-03-18	Bremen	WAB Members	250	Germany
213	presentation	GW, WAB	WAB Working Group "Corrosion control": Short ECOWindS project status report	2015-06-01	Bremen	WAB Members	15	Germany
214	presentation	GW, WAB	WAB Working Group "Corrosion control": Short ECOWindS project status report	2015-09-09	Bremen	WAB Members	15	Germany
215	presentation	GW, WAB	WAB Working Group "Customs": Short ECOWindS project status report	2015-05-21	Bremen	WAB Members	15	Germany
216	presentation	GW, WAB	WAB Working Group "Customs": Short ECOWindS project status report	2015-10-05	Bremen	WAB Members	15	Germany
217	presentation	GW, WAB	WAB Working Group "Foundation Structures": Short ECOWindS project status report	2015-02-26	Bremen	WAB Members	15	Germany
218	presentation	GW, WAB	WAB Working Group "Foundation Structures": Short ECOWindS project status report	2015-05-18	Bremen	WAB Members	15	Germany
219	presentation	GW, WAB	WAB Working Group "Foundation Structures": Short ECOWindS project status report	2015-06-18	Bremen	WAB Members	15	Germany
220	presentation	GW, WAB	WAB Working Group "Foundation Structures": Short ECOWindS project status report	2015-10-29	Bremen	WAB Members	15	Germany

22 1	presentation	GW, WAB	WAB Working Group "Installation": Short ECOWindS project status report	2015-09-04	Bremen	WAB Members	15	Germany
22 2	presentation	GW, WAB	WAB Working Group "Legal Aspects": Short report on ECOWindS project status	2014-11-13	Bremen	WAB Members	15	Germany
22 3	presentation	GW, WAB	WAB Working Group "Requirements & Logistics": Short ECOWindS project status report	2015-03-03	Bremen	WAB Members	15	Germany
22 4	presentation	GW, WAB	WAB Working Group "Requirements & Logistics": Short ECOWindS project status report	2015-04-24	Bremen	WAB Members	15	Germany
22 5	presentation	GW, WAB	WAB Working Group "Service & Maintenance": Short ECOWindS project status report	2015-04-23	Bremen	WAB Members	15	Germany
22 6	presentation	GW, WAB	WAB Working Group "Service & Maintenance": Short ECOWindS project status report	2015-07-09	Bremen	WAB Members	15	Germany
22 7	presentation	GW, WAB	WAB Working Group "Service & Maintenance": Short ECOWindS project status report	2015-10-15	Bremen	WAB Members	15	Germany
22 8	presentation	GW, WAB	WAB Working Group "Service & Maintenance": Short Report on ECOWindS project status	2015-01-22	Bremen	WAB Members	15	Germany
22 9	presentation	GW, WAB	WAB Working Group "Service & Maintenance": Short Report on ECOWindS project status	2013-12-11	Bremerhaven	Industry, Scientists	20	Germany
23 0	presentation	GW, WAB	WAB Working Group "Technics": Short ECOWindS project status report	2015-08-24	Bremen	WAB Members	10	Germany

23 1	presentation	GW, WAB	WAB Working Group "Technics": Short ECOWindS project status report	2015-10-06	Bremen	WAB Members	15	Germany
23 2	presentation	OEDK	Søfartens fremme: Working Offshore	2013-09-19	Esbjerg	navigator, pilot, harbour captain	16	Denmark
23 3	presentation	ASP	Yearly Conference: Project presentation of ECOWindS	2013-09-27	Ålesund	business leaders, organisations, politicians. Yearly conference	200	Norway
23 4	presentation	OE, NA, NWES	Exploring Cost Reduction Through Innovation	2014-11-13	Gent	Presentation and distribution of project flyer at Interreg meeting in Gent	15	EU
23 5	presentation	GW, WAB	Interreg-Meeting Proposal: Short introduction of ECOWindS	2014-09-16	Gent	Presentation and distribution of project flyer at Interreg meeting in Gent	16	EU
23 6	press release	OE, NA, NWES	ECOWindS project publishes its joint action plan and call for stakeholder feedback	2015-04-13	digital	Distribution list of industry contacts	125	UK
23 7	press release	OE, NA, NWES	Sign up now for ECOWindS Project's final conference	2015-05-21	digital	Industry contacts	125	UK
23 8	press release	ASP	Ålesund Kunnskapsark og NCE Maritime. Operation and maintenance of offshore windpark.	-	digital	website visitors, newsletter subscribers	2830	EU
23 9	press release	GW, WAB	germanwind und WAB starten EU-Projekt zur Kostenreduktion im Offshore-Service-Sektor	2012-11-09	digital	journalists subscribers/multipliers daily media external contacts	8130	Germany

240	press release	GW, WAB	Markt für Offshore-Windserviceleistungen in Milliardenhöhe – Europas führende Offshore-Windcluster veröffentlichen gemeinsam Aktionsplan für Offshore-Windservicesektor	2015-04-28	digital	selected WAB distribution list and visitors to the WAB.net website	1331	Germany
241	press release	GW, WAB	Fahrplan für Innovation und Kostenreduktion im Offshore-Windservicesektor veröffentlicht – EU-Projekt ECOWindS erfolgreich abgeschlossen	2015-11-30	digital	website visitors, newsletter subscribers		Germany
242	press release	OE, NA, NWES	International Initiative to Strengthen East of England Offshore Wind Sector	2012-11-13	digital	journalists, subscribers, multipliers, daily media, external contacts		UK
243	press release	OE, NA, NWES	Offshore Renewable Energy Catapult Join ECOWindS Project as Associate Partners	2015-03-12	digital	website visitors, newsletter subscribers		UK
244	press release	OE, NA, NWES	ECOWindS Final Conference brings together over 150 European speakers and delegates to explore innovative and collaborative working.	2015-10-05	digital	All target groups		UK
245	press release	OEDK	International initiative to strengthen Danish offshore wind sector	2012-11-05	digital	journalists, external contacts, companies, 12 Papers/Magazines	274	EU
246	publication in specialised press, article in newsletter etc.	GW, WAB	Erneuerbare Energien - Das Magazin: "Großbaustelle Seewind-Kosten"	2012-11-13	digital	readers of the Erneuerbare Energien magazine		Germany

24 7	publication in specialised press, article in newsletter etc.	OEDK	ON/OFF 2014, Q3 - Renewables: "ECOWindS Project"	2014-09-08	digital	industry contacts		EU
24 8	publication in specialised press, article in newsletter etc.	GW, WAB	WAB Newsletter 6 - 2012 (German): germanwind startet EU-Projekt ECOWindS	2012-10-18	digital	Newsletter subscribers	4000	Germany
24 9	publication in specialised press, article in newsletter etc.	GW, WAB	WAB Newsletter 6 - 2012 (English): germanwind starts EU-project ECOWindS	2012-10-23	digital	Newsletter subscribers	1000	EU
25 0	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 1 - 2013 (German): EU-Projekt ECOWindS nimmt Arbeit auf	2013-02-06	digital	Newsletter subscribers	4000	Germany
25 1	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 1 - 2013 (English) EU-Project ECOWindS starts working	2013-02-06	digital	Newsletter subscribers	1000	EU
25 2	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 3 - 2013 (German): EU-Projekt ECOWindS läuft auf Hochtouren	2013-06-01	digital	Newsletter subscribers	4000	Germany
25 3	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 3 - 2013 (English): EU project ECOWindS well under way	2013-06-01	digital	Newsletter subscribers	1000	EU
25 4	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 4 - 2013 (German): ECOWindS legt Patentanalyse zur Offshore-Windenergie vor	2013-10-01	digital	Newsletter subscribers	4000	Germany
25 5	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 4 - 2013 (English) ECOWindS presents patent analysis for offshore wind energy	2013-10-01	digital	Newsletter subscribers	1000	EU

25 6	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 5 - 2013 (German): Workshop zur Marktposition der Offshore-Branche in Bremerhaven	2013-12-01	digital	Newsletter subscribers	4000	Germany
25 7	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 5 - 2013 (English): Workshop on the market position of the	2013-12-01	digital	Newsletter subscribers	1000	EU
25 8	publication in specialised press, article in newsletter etc.	OE, NA, NWES	The Wind Energy Network Article: "The ECOWindS Project" http://www.windenergynetwork.co.uk/wp-content/uploads/2015/05/WEN_Issue27_WEB1.pdf	2015-05-01	digital	magazine readers	9500	EU
25 9	publication in specialised press, article in newsletter etc.	ASP	Regional Business Paper: "Nett.no"	2015-05-29	printed	regional business community	1500	Norway
26 0	publication in specialised press, article in newsletter etc.	DTU	Proceedings of 25th ISPIM Conference – Innovation for Sustainable Economy and Society: "Smart Specialization and Capabilities for Offshore Wind Services around the North Sea", Piirainen, Kalle A.; Tanner, Anne Nygaard; Alkærsig, Lars; Andersen, Per Dannemand , Published	2014-06-10	printed	Offshore wind stakeholders, particularly around the Baltic Sea	30	Denmark
26 1	publication in specialised press, article in newsletter etc.	DTU	DTU International Energy Report 2014, p. 49-50: "cost drivers and challenges for OWS and opportunities"	2015-02-16	printed	Offshore wind stakeholders, particularly around the Baltic Sea		Denmark

26 2	publication in specialised press, article in newsletter etc.	DTU	Renewable Energy Reviews:"Road mapping in Offshore Wind Services"	01-12-2015	digital	researchers, professionals	1000	Denmark
26 3	publication in specialised press, article in newsletter etc.	external	potential study by wind:research: "Kostensenkungspotenziale in der Offshore-Windenergie"	2013-09-17	printed	readers of the wind:research/trend:research study		Germany
26 4	publication in specialised press, article in newsletter etc.	GW, WAB	Hansa Magazin - International Maritime Journal, p. 18-20 : "Küste profitiert von Offshore-Service"	2015-03-01	printed	Hansa magazine Readers	7200	Germany
26 5	publication in specialised press, article in newsletter etc.	GW, WAB	OWI Magazine, p. 48-49: "ECOWindS shows the way to cost reduction",	2015-11-05	printed	Readers of OWI magazine	5000	Europe, United States
26 6	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 4 - 2014 (German):Halbzeit beim EU-Project ECOWindS	2014-07-01	digital	Newsletter subscribers	4000	Germany
26 7	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 4 - 2014 (English): Half-time at the European Union ECOWindS project	2014-07-01	digital	Newsletter subscribers	1000	EU
26 8	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 5 - 2014 (German): Save the date: Forschungsideen für DK Offshore-Windservicesektor	2014-09-01	digital	Newsletter subscribers	4000	Germany
26 9	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 5 - 2014 (English) Save the date: research ideas for the offshore wind service sector	2014-09-01	digital	Newsletter subscribers	1000	EU

270	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 2 - 2015 (German) Save the Date: Konferenz „Increasing innovations in the European Offshore Wind Servicing sector“ in Großbritannien	2015-05-01	digital	Newsletter subscribers	4000	Germany
271	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 2 - 2015 (English): Save the Date: Conference in the UK on “Increasing innovations in the European Offshore Wind Servicing Sector”	2015-05-12	digital	Newsletter subscribers	1000	EU
272	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 3 - 2015 (German): Kostenreduktion durch Innovationen im Offshore-Windservicebereich: Abschlusskonferenz für EU-Projekt ECOWindS in Lowestoft, UK im September	2015-09-03	digital	Newsletter subscribers	4000	Germany
273	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 3 - 2015 (English): Cost reduction through innovations in offshore wind industry services	2015-09-10	digital	Newsletter subscribers	1000	EU
274	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 4 - 2015 (English) ECOWindS project ends with final conference	2015-11-01	digital	Newsletter subscribers	1000	EU
275	publication in specialised press, article in newsletter etc.	GW, WAB	Wab Newsletter 4 - 2015 (German): EU-Projekt „ECOWindS“ endet mit Abschlusskonferenz	2015-11-10	digital	Newsletter subscribers	5000	Germany

27 6	publication in specialised press, article in newsletter etc.	OE, NA, NWES	"Increasing Innovation in the Offshore Wind Servicing Sector", Wind Energy Network, p.	2015-11	printed	researchers, professionals		UK
27 7	publication in specialised press, article in newsletter etc.	OE, NA, NWES	Article on the OrbisEnergy Website: ECOWindS Project introduction/outline	2012-11-01	digital	Visitors to the OrbisEnergy website		EU
27 8	publication in specialised press, article in newsletter etc.	OE, NA, NWES	Article on the OrbisEnergy Website: "International Initiative to Strengthen East of England Offshore Wind Sector"	2012-11-12	digital	Visitors to the OrbisEnergy website		EU
27 9	publication in specialised press, article in newsletter etc.	OE, NA, NWES	Wind Beneath Their Wings	2014-06-18	digital	website visitors, Twitter followers and Facebook friends		EU
28 0	publication in specialised press, article in newsletter etc.	OE, NA, NWES	Orbis Energy Website: "ECOWindS Final Conference brings together over 150 European speakers and delegates to explore innovative and collaborative working."	2015-10-06	digital	All target groups		EU
28 1	publication in specialised press, article in newsletter etc.	OEDK	Børsen: "Internationale Offshore Wind Projekter"	2013-10-02	digital	Danish companies, politicians, business oriented persons.	8000	Denmark
28 2	publication in specialised press, article in newsletter etc.	OEDK	Børsen / Time2Media: "Internationale Offshore Wind Projekter"	2013-10-02	digital	Universities, Maskinmeaterskoler etc.	1000	Denmark
28 3	publication in specialised press, article in newsletter etc.	OEDK	Børsen / Time2Media: "Internationale Offshore Wind Projekter"	2013-10-02	digital	AMU- skoler: Offshore educations	1000	Denmark

284	publication in specialised press, article in newsletter etc.	OEDK	Børsen / Time2Media: "Internationale Offshore Wind Projekter"	2013-10-16	digital	Distribution at meetings, Work shops, Fairs, OEDK events, etc.	1500	Denmark
285	publication in specialised press, article in newsletter etc.	OEDK	Børsen / Time2Media: "Internationale Offshore Wind Projekter"	2013-10-16	digital	Companies, universities etc.	500	Denmark
286	publication in specialised press, article in newsletter etc.	OEDK	OEDK Yearbook: "Development across borders" http://www.offshoreenergy.dk/Files/billeder/On-Off/Yearbook2014/yearbook2014_renewables.pdf	2014-03-01	printed&digital	Offshore industry	4000	Denmark
287	publication in specialised press, article in newsletter etc.	OEDK	ON/OFF 2014,Q3: "Idea catalogue help to reduce cost"	2014-09-01	printed	Offshore industry	2500	Denmark
288	publication in specialised press, article in newsletter etc.	OEDK	Offshore Wind Magazine: "EU reaches 100GW wind power milestone"	2012-08-01	digital	readers of Offshore Wind magazine		EU
289	publication in specialised press, article in newsletter etc.	OEDK	Offshoreenergy.dk: "Offshore wind sector breaks down barriers"	2013-07-01	digital	Offshore renewables companies, institutions, politicians etc.	3000	EU
290	publication in specialised press, article in newsletter etc.	OEDK	Offshoreenergy.dk: Feature on ECOWindS and link to newsletter in Offshoreenergy.dk news mail	2013-09-11	digital	Offshoreenergy.dk members	266	Denmark
291	publication in specialised press, article in newsletter etc.	OE, NA, NWES	Wind Energy Network (Issue 19), p. 22-23: "A European Focus for the Innovation and Research in Offshore Wind through ECOWindS"	2013-10-15	printed	Wind Energy Network subscribers	10700	UK

29 2	publication in specialised press, article in newsletter etc.	OE, NA, NWES	Wind Energy Network: "Project Introduction and progress"	2013-10-01	printed	Wind Energy Network subscribers		UK
29 3	publication in specialised press, article in newsletter etc.	GW, WAB	Schiff&Hafen: ECOWindS soll europäische Offshore-Industrie stärken	2014-01-14	printed & digital	Schiff&Hafen readers	6.500	Germany
29 4	social media entry	OE, NA, NWES	Twitter post: Kick Off Meeting	2012-11-14	digital	Twitter followers	5631	
29 5	social media entry	GW, WAB	Twitter post: ECOWindS newsletter - project news	2013-09-03	digital	Twitter followers	178	EU
29 6	social media entry	OE, NA, NWES	Twitter post: ECOWindS Newsletter	2013-09-06	digital	Twitter followers	1770	
29 7	social media entry	DTU	Introduction to project	2013-05-18	digital	personal network	273	
29 8	social media entry	DTU	Technological competence mapping in the North Sea region	2013-08-28	digital	DTU stakeholders		
29 9	social media entry	DTU	ECOWindS newsletter	2013-08-28	digital	personal network	273	
30 0	social media entry	DTU	ECOWindS newsletter	2013-08-28	digital	LTU Technology Management Faculty	63	Worldwide
30 1	social media entry	GW, WAB	ECOWindS newsletter - project news	2013-09-03	digital	expert.wab	270	Germany
30 2	social media entry	GW, WAB	ECOWindS newsletter - project news	2013-09-03	digital	google+ account	2	Worldwide
30 3	social media entry	GW, WAB	ECOWindS newsletter - project news	2013-09-03	digital	Facebook friends	2000	Worldwide
30 4	social media entry	GW, WAB	ECOWindS newsletter - project news	2013-09-03	digital	LinkedIn Connections	200	EU
30 5	social media entry	OE, NA, NWES	Twitter post: ECOWindS Newsletter	2013-09-06	digital	Twitter followers	226	
30 6	social media entry	OE, NA, NWES	Twitter post: ECOWindS Newsletter	2013-09-06	digital	Twitter followers	1418	

307	social media entry	OE, NA, NWES	Twitter post: ECOWindS Newsletter	2013-09-06	digital	Twitter followers	1048	
308	social media entry	OE, NA, NWES	Twitter post: Regional Workshop	2013-11-26	digital	Twitter followers	2981	
309	social media entry	OE, NA, NWES	Download the latest ECOWindS newsletter	2013-09-06	digital	Visitors to OrbisEnergy Facebook page	78	
310	social media entry	OE, NA, NWES	Twitter post: Midway Conference	2014-03-10	digital	Twitter followers	3594	
311	social media entry	GW, WAB	Link Xing Wind energy group	2013-09-17	digital	All target groups	4500	EU
312	social media entry	OE, NA, NWES	Twitter post: Midway Conference	2014-03-10	digital	Twitter followers	2340	
313	social media entry	OE, NA, NWES	Twitter post: PSG 4	2014-05-13	digital	Twitter followers	3180	
314	social media entry	OE, NA, NWES	Twitter post: PSG 4 Tour	2014-05-15	digital	Twitter followers	15899	
315	social media entry	OE, NA, NWES	Twitter post: PSG 4 Tour	2014-05-15	digital	Twitter followers	2417	
316	social media entry	OE, NA, NWES	Twitter post: SeaWork Presentation	2014-06-12	digital	Twitter followers	4089	
317	social media entry	OE, NA, NWES	Twitter post: SeaWork Presentation	2014-06-12	digital	Twitter followers	6699	
318	social media entry	OE, NA, NWES	Twitter post: SeaWork Presentation	2014-06-12	digital	Twitter followers	6072	
319	social media entry	OE, NA, NWES	Twitter post: Business Showcase	2014-11-12	digital	Twitter followers	1755	
320	social media entry	external	Twitter post: Business Showcase	2014-11-12	digital	Twitter followers	17100	
321	social media entry	OE, NA, NWES	Twitter and Facebook post: RUK Workshop	2014-11-11	digital	Twitter and Facebook followers	1755	
322	social media entry	OE, NA, NWES	Twitter post: Business Showcase	2014-11-12	digital	Twitter followers	1755	

323	social media entry	external	Twitter post: Business Showcase	2014-11-12	digital	Twitter followers	17100	
324	social media entry	OE, NA, NWES	Twitter post: Final Conference	2015-05-21	digital	Twitter followers	4609	
325	social media entry	OE, NA, NWES	Twitter post: Final Conference	2015-05-23	digital	Twitter followers	3000	
326	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS JAP Survey	2015-04-10	digital	Twitter and Facebook followers	1755	
327	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Final Conference (Article)	2015-04-13	digital	Twitter and Facebook followers	1755	
328	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Final Conference (Event)	2015-04-13	digital	Twitter and Facebook followers	1755	
329	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Networking (Event)	2015-04-13	digital	Twitter and Facebook followers	1755	
330	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Side Events (Event)	2015-04-13	digital	Twitter and Facebook followers	1755	
331	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Final Conference (Event)	2015-04-14	digital	Twitter and Facebook followers	5123	
332	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS JAP Survey	2015-04-14	digital	Twitter and Facebook followers	5123	
333	social media entry	OE, NA, NWES	Blog post: ECOWindS JAP Survey	2015-04-14	digital	WordPress Blog follower		
334	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Networking (Event)	2015-04-14	digital	Twitter and Facebook followers	5123	
335	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Side Events (Event)	2015-04-14	digital	Twitter and Facebook followers	5123	
336	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS Final Conference	2015-04-16	digital	Twitter and Facebook followers	1755	

337	social media entry	GW, WAB	Twitter and/or Facebook post: #WAB – Markt für #Offshore-Windserviceleistungen in Milliardenhöhe	2015-04-18	digital	Facebook friends	267	
338	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS JAP Survey	2015-04-21	digital	Twitter and Facebook followers	5123	
339	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS JAP Survey	2015-04-21	digital	Twitter and Facebook followers	1755	
340	social media entry	OE, NA, NWES	Twitter and/or Facebook post: ECOWindS JAP Survey	2015-04-21	digital	Twitter and Facebook followers	5123	
341	social media entry	OE, NA, NWES	Twitter post: PSG Attendance	2015-05-26	digital	Twitter followers	3000	
342	social media entry	OE, NA, NWES	Twitter post: PSG Meeting Simulator Trial	2015-05-27	digital	Twitter followers	3000	
343	social media entry	OE, NA, NWES	Twitter post: PSG Meeting	2015-05-28	digital	Twitter followers	3000	
344	social media entry	OE, NA, NWES	Twitter post: Shipyard Tour	2015-05-28	digital	Twitter followers	3000	
345	social media entry	GW, WAB	ECOWindS Jetzt anmelden für Abschlusskonferenz ECOWindS	2015-05-27	digital	User of the social media platform	270	
346	social media entry	GW, WAB	Twitter and/or Facebook post: ECOWindS Aktionsplan für Offshore-Windservicesektor bereit für Evaluierung	2015-05-27	digital	Twitter and Facebook followers	599	
347	social media entry	OE, NA, NWES	Twitter post: ECOWindS at GoW	2015-06-24	digital	Twitter followers	3000	

348	social media entry	external	Twitter post: We're delighted to support @OrbisEnergy and #ECOWindS project to reduce costs in offshore wind solutions #Innovation http://bit.ly/OrbisEnergy_OWS	2015-08-25	digital	Twitter followers	2092	
349	social media entry	OE, NA, NWES	Twitter post: Final Conference Join us on September 29th and 30th for the #ECOWindS Project Final Conference. Book your tickets now.	2015-08-25	digital	Twitter followers	8596	
350	social media entry	OE, NA, NWES	Twitter post: Join me at @OrbisEnergy on September 29th - 30th for the #ECOWindS Project Final Conference. Book your tickets now.	2015-08-25	digital	Twitter followers	3936	
351	social media entry	OE, NA, NWES	Twitter post: 4 weeks to go until the #ECOWindS Final Conference - Book your place now! http://www.orbisenergy.co.uk/ecowinds/ecowinds-final-conference/ ...	2015-09-01	digital	Twitter followers	6839	
352	social media entry	OE, NA, NWES	Twitter post: Final Conference post on Facebook	2015-09-07	digital	Twitter followers	195	
353	social media entry	OE, NA, NWES	Twitter post: Programme confirmed for ECOWindS Final Conference 'Increasing Innovation in the Offshore	2015-09-07	digital	Twitter followers	3533	

354	social media entry	OE, NA, NWES	Twitter post: We have several fantastic events coming up - have a look at what's happening here http://www.orbisenergy.co.uk/events/ #energy #networking event	2015-09-16	digital	Twitter followers	1973	
355	social media entry	OE, NA, NWES	Twitter post: Tues.29th Sept.@EEEGR evening of networking with ECOWindS European delegates - Join the ECOWindS dinner for just £35 at @IvyHouse_ next week	2015-09-22	digital	Twitter followers	3545	
356	social media entry	OE, NA, NWES	Twitter post: Programme for ECOWindS Final Conference on Tues. 29th to Wed. 30th September 2015 at OrbisEnergy http://ow.ly/SCbr6	2015-09-24	digital	Twitter followers	2232	
357	social media entry	external	Twitter post: The conference will have networking, informal welcome drinks reception & there will be a dinner supported by @EEEGR	2015-09-24	digital	Twitter followers	4259	
358	social media entry	OE, NA, NWES	Facebook post: Final Conference	2015-09-24	digital	Facebook friends	195	
359	social media entry	OE, NA, NWES	Twitter post: Only a few days to go until the #ECOWindS Final Conference. Book now to avoid missing out!	2015-09-24	digital	Twitter followers	3336	

360	social media entry	OE, NA, NWES	Twitter post: The ECOWindS Final Conference takes place next week. Register now to avoid missing this event.	2015-09-24	digital	Twitter followers	1808	
361	social media entry	external	Twitter post: ECOWindS Final Conference Drinks reception @OrbisEnergy	2015-09-28	digital	Twitter followers	5787	
362	social media entry	external	Twitter post: Today, I will be #LT the finale conf. of #FP7 #ECOWindS project: cluster for reducing O&M costs in off. wind sector.	2015-09-29	digital	Twitter followers	17342	
363	social media entry	OE, NA, NWES	Twitter post: A fantastic start to the #ECOWindS conference @OrbisEnergy with an audience from across Europe! Up first, MHI-Vestas	2015-09-29	digital	Twitter followers	15195	
364	social media entry	OE, NA, NWES	Twitter post:Next up, talking about the changes in the O&M market, Paulina Hobbs from @Siemens_Energy @OrbisEnergy #ECOWindS	2015-09-29	digital	Twitter followers	7073	
365	social media entry	external	Twitter post: Anders Anderson presenting on cost reduction at ECOWindS Final Conference @OrbisEnergy	2015-09-29	digital	Twitter followers	9638	
366	social media entry	external	Twitter post: @OrbisEnergy at the @ecowind conference @EEEEGR #renewables @WomenInEnergyUK @nautilus_assoc	2015-09-29	digital	Twitter followers	4178	

367	social media entry	OE, NA, NWES	Twitter post: Some truly excellent presentations at the #ECOWindS conference! Next up is Alastair Dutton from @TheCrownEstate	2015-09-29	digital	Twitter followers	4867	
368	social media entry	external	Twitter post: Great morning at the ECOWindS final conference @OrbisEnergy with @JReynoldsUK @EEEGR and @WomenInEnergyUK	2015-09-29	digital	Twitter followers	5945	
369	social media entry	external	Twitter post: @JReynoldsUK fantastic hosting yet again!	2015-09-29	digital	Twitter followers	5103	
370	social media entry	external	Twitter post: @JReynoldsUK @OrbisEnergy great event so far! #ECOWindS #WindEnergy	2015-09-29	digital	Twitter followers	7748	
371	social media entry	OE, NA, NWES	Twitter post: Session 2 kicks off with Hans Pederson from OffshoreEnergy.Dk and Project Manager for #ECOWindS @OrbisEnergy	2015-09-29	digital	Twitter followers	4247	
372	social media entry	OE, NA, NWES	Twitter post: And our final speaker of Session 1 is John Best from @JamesFisherPLC @OrbisEnergy #ECOWindS	2015-09-29	digital	Twitter followers	7457	
373	social media entry	external	Twitter post: Partners are presenting #ECOWindS finale Joint Action Plan. 8 measures in PR / R&D / harmonization / skills sectors.	2015-09-29	digital	Twitter followers	3577	

374	social media entry	external	Twitter post: Alastair Dutton from The Crown Estate presenting on the importance of EU collaboration @OrbisEnergy #ECOWindS	2015-09-29	digital	Twitter followers	11052	
375	social media entry	external	Twitter post: Which area of the value chain represents the greatest opportunities for cost reduction? 45% in favour of O&M #ECOWindS	2015-09-29	digital	Twitter followers	5768	
376	social media entry	external	Twitter post: Great panel debate #renewables @OrbisEnergy @WomenInEnergyUK @EEEGR @FurtherMore_UK @nautilus_assoc @JReynoldsUK	2015-09-29	digital	Twitter followers	5325	
377	social media entry	OE, NA, NWES	Twitter post: Panel discussion underway at @OrbisEnergy #ECOWindS Conference...1/2	2015-09-29	digital	Twitter followers	3336	
378	social media entry	external	Twitter post: Which area is most important to accelerate cost reduction? harmonization takes the lead with a good 53% #ECOWindS	2015-09-29	digital	Twitter followers	4784	
379	social media entry	external	Twitter post: Interesting debate at the @orbisenergy Eco winds event	2015-09-29	digital	Twitter followers	3828	
380	social media entry	external	Twitter post: S. Pfaffel presents the Offshore-WMEP project with one target: Turning from reactive to preventive #O&M #ECOWindS	2015-09-29	digital	Twitter followers	3577	

38 1	social media entry	external	Twitter post: ECOWindS Conference at Orbis Energy today. I can think of worse views from the conference room! @OrbisEnergy	2015-09-29	digital	Twitter followers	7925	
38 2	social media entry	OE, NA, NWES	Twitter post: Inspirational speakers at the #ECOWindS conference @OrbisEnergy. Next up is Scot Hewitt-Gudgin from @ScottishPower	2015-09-29	digital	Twitter followers	6983	
38 3	social media entry	external	Twitter post: "75% of the content in 15 miles around the project base" As Ford 100 y. ago, J. Best insisting on economies of scale	2015-09-29	digital	Twitter followers	3577	
38 4	social media entry	external	Twitter post: Scot Hewitt-Gudgin @ScottishPower presenting this morning at ECOWindS Final Conference @OrbisEnergy	2015-09-29	digital	Twitter followers	7129	
38 5	social media entry	external	Twitter post: @JReynoldsUK delivering a fantastic innovation finance presentation on day 3!! of ECOWindS @OrbisEnergy	2015-09-30	digital	Twitter followers	4745	
38 6	social media entry	external	Twitter post: Delegates from the ECOWindS Final Conference will be attending before heading home!	2015-09-30	digital	Twitter followers	2955	
38 7	social media entry	external	Twitter post: Going past Orbis	2015-09-30	digital	Twitter followers	15795	

388	social media entry	external	Twitter post: The sea fox pushing onto the turbine at Scroby sands @Enviroserve @OrbisEnergy #ECOWindS	2015-09-30	digital	Twitter followers	25611	
389	social media entry	external	Twitter post: Final day of #ECOWindS at @OrbisEnergy #OffshoreEnergy	2015-09-30	digital	Twitter followers	7099	
390	social media entry	external	Twitter post: Very interesting morning at @lowestoftcoll visiting the workshops and survival tank @OrbisEnergy #ECOWindS	2015-09-30	digital	Twitter followers	7942	
391	social media entry	OE, NA, NWES	Twitter post: ECOWindS Final Conference brings together over 150 European speakers and delegates to... http://www.orbisenergy.co.uk/news/ecowinds-final-conference-brings-together-over-150-european-speakers-and-delegates-to-explore-innovative-and-collaborative-working/ ...	2015-10-06	digital	Twitter followers	1853	
392	social media entry	GW, WAB	Twitter post: Last Newsletter with results of the project is available	2015-11-01	digital	Twitter followers	354	
393	social media entry	OE, NA, NWES	ECOWindS Final Conference brings together over 150 European speakers and delegates to explore innovative and collaborative working.	2015-10-06	digital	Facebook friends	195	

394	social media entry	GW, WAB	Twitter and/or Facebook post: #WAB Windnetwork #ECOWindS Final Conference in September has been a success! Presentations available for download http://www.ecowinds.eu/final-conference	2015-10-12	digital	Facebook friends	306	
395	social media entry	external	LinkedIn post: ECOWindS final conference	11.9.2015	digital	LinkedIn Connections	466	
396	TV Clips	DTU	Presentation of ECOWindS	2013-06-07	Croatia	Croatian public		Croatia
397	videos	GW, WAB	Video Statements on ECOWindS, from all ECOWindS partners (managers)	-	digital	Visitors ECOWindS Homepage		Worldwide
398	website	all partners	ECOWindS website	ongoing	digital	website visitors	6357	Worldwide
399	website	AU	Aalborg University website	ongoing	digital	website visitors	2500	Worldwide
400	website	AUC	Ålesund Uni College website	ongoing	digital	website visitors		Worldwide
401	website	ASP	Ålesund Kunnskapsark website	ongoing	digital	website visitors	30000	Worldwide
402	website	DTU	DTU website	ongoing	digital	website visitors		Worldwide
403	website	GW, WAB	germanwind website	ongoing	digital	website visitors	5080	Worldwide
404	website	OE, NA, NWES	Nautilus website	ongoing	digital	website visitors	760	Worldwide
405	website	OEDK	Offshoreenergy.de website	ongoing	digital	website visitors	73872	Worldwide
406	website	OE, NA, NWES	OrbisEnergy website	ongoing	digital	website visitors	27088	Worldwide
407	website	GW, WAB	WAB website	ongoing	digital	website visitors		Worldwide

408	workshop	GW, WAB	ECOWindS Regional Mapping Workshop, Bremerhaven, DE	2013-10-22	Bremerhaven	Workshop participants	15	Germany
409	workshop	OEDK	ECOWindS Regional Mapping Workshop, Esbjerg, DK	7.-8.11.2013	Esbjerg	Danish companies	30	Denmark
410	workshop	ASP	ECOWindS Regional Mapping Workshop, Møre, Norway	2013-12-03	Ålesund	Workshop participants	12	EU
411	workshop	OE	ECOWindS Regional Mapping Workshop, Lowestoft, UK	25.-26.11.2013	Lowestoft	Workshop participants	10	EU
412	workshop	ASP	ECOWindS Regional Workshop/ Stakeholder interviews on "Innovation ideas generation"	2015-01-19	Ålesund	Workshop participants	9	EU
413	workshop	DTU	ECOWindS Regional Workshop/ Stakeholder interviews on "Innovation ideas generation"	2014-11-20	Kolding	Workshop participants	8	EU
414	workshop	GW, WAB	ECOWindS Regional Workshop/ Stakeholder interviews on "Innovation ideas generation"	2014-11-25	Bremerhaven	Workshop/Interview participants	9	Germany
415	workshop	OE, NA, NWES	ECOWindS Regional Workshop on "Innovation ideas generation"	2014-11-27	Lowestoft	ECOWindS Partners	15	UK
416	workshop	OE, NA, NWES	ECOWindS International Workshop on Innovation Ideas Generation: Exploring Cost Reduction Through Innovation	2014-11-13	Manchester	Delegates attending the Renewable UK annual conference	18	EU
417	workshop	OEDK	Horizon 2020 Kick off	2013-10-29	Esbjerg	Danish companies	1000	Denmark
418	workshop	OEDK	ECOWindS_PPT	2014-01-22	Esbjerg	Danish companies	100	Denmark
419	workshop	DTU	5th International Conference on Future-Oriented Technology Analysis (FTA) : "THE GRIP METHOD FOR COLLABORATIVE ROADMAPPING WORKSHOPS"	2014-10-31	Brussels	Workshop participants		EU

42 0	workshop	ASP	Workshop	2015-01-19	Ålesund	ECOWindS stakeholders	10	Norway
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4.3 Report on societal implications

Replies to the following questions will assist the Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are arranged in a number of key themes. As well as producing certain statistics, the replies will also help identify those projects that have shown a real engagement with wider societal issues, and thereby identify interesting approaches to these issues and best practices. The replies for individual projects will not be made public.

B. Ethics

1. Did your project undergo an Ethics Review (and/or Screening)?

*

Yes

No

If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final reports?

Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 2.2 'Work Progress and Achievements'.

2. Please indicate whether your project involved any of the following issues (tick box) :

RESEARCH ON HUMANS

Did the project involve children?

*

Yes

No

Did the project involve patients?

*

Yes

No

Did the project involve persons not able to give consent?

*

Yes

No

Did the project involve adult healthy volunteers?

*

Yes

No

Did the project involve Human genetic material?

*

Yes

No

Did the project involve Human biological samples?

*

Yes

No

Did the project involve Human data collection?

*

Yes

No

RESEARCH ON HUMAN EMBRYO/FOETUS

Did the project involve Human Embryos?

*

Yes

No

Did the project involve Human Foetal Tissue / Cells?

*

Yes

No

Did the project involve Human Embryonic Stem Cells (hESCs)?

*

Yes

No

Did the project on human Embryonic Stem Cells involve cells in culture?

*

Yes

No

Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?

*

Yes

No

PRIVACY

Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?

*

Yes

No

Did the project involve tracking the location or observation of people?

*

Yes

No

RESEARCH ON ANIMALS

Did the project involve research on animals?

*

Yes

No

Were those animals transgenic small laboratory animals?

*

Yes

No

Were those animals transgenic farm animals?

*

Yes

No

Were those animals cloned farm animals?

*

Yes

No

Were those animals non-human primates?

*

Yes

No

RESEARCH INVOLVING DEVELOPING COUNTRIES

Did the project involve the use of local resources (genetic, animal, plant etc)?

*

Yes

No

Was the project of benefit to local community (capacity building, access to healthcare, education etc)?

*

Yes

No

DUAL USE

Research having direct military use

*

Yes

No

Research having the potential for terrorist abuse

*

Yes

No

C. Workforce Statistics

3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).

Type of Position	Number of Women*	Number of Men*
Scientific Coordinator	<input type="text" value="1"/>	<input type="text" value="3"/>
Work package leaders	<input type="text" value="2"/>	<input type="text" value="2"/>
Experienced researchers (i.e. PhD holders)	<input type="text" value="2"/>	<input type="text" value="6"/>

PhD student	<input type="text" value="0"/>	<input type="text" value="0"/>
Other	<input type="text" value="9"/>	<input type="text" value="11"/>

4. How many additional researchers (in companies and universities) were recruited specifically for this project? *

Of which, indicate the number of men: *

D. Gender Aspects

5. Did you carry out specific Gender Equality Actions under the project ?

*

Yes

No

6. Which of the following actions did you carry out and how effective were they?

Design and implement an equal opportunity policy

*

Not Applicable

Not at all effective

Not effective

Effective

Almost effective

Very effective

Set targets to achieve a gender balance in the workforce

*

Not Applicable

Not at all effective

Not effective

Effective

Almost effective

Very effective

Organise conferences and workshops on gender

*

Not Applicable

Not at all effective

Not effective

Effective

Almost effective

Very effective

Actions to improve work-life balance

*

Not Applicable

Not at all effective

Not effective

Effective

Almost effective

Very effective

Other:

7. Was there a gender dimension associated with the research content - i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?

*

Yes (Specify below)

No

E. Synergies with Science Education

8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?

*

Yes (Specify below)

No

Alesund science park (ASP):

- Masterstudents at University college have provided input
- Participation at yearly “Ocean Talent Camp” at university college. App 2000 pupils attending.
- Presentation of project to visiting schoolchildren and students.

germanwind (GW):

- Students working with germanwind
- One Bachelor Thesis

9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?

*

Yes (Specify below)

No

Technical University of Denmark (DTU): The findings of the project have been used as examples in lectures on innovation management

Alesund science park (ASP):

- A range of booklets

F. Interdisciplinarity

10. Which disciplines (see list below) are involved in your project?

Main discipline

* 2 ENGINEERING AND TECHNOLOGY

Associated discipline:

5.3 Educational sciences

Associated discipline:

G. Engaging with Civil society and policy makers

11a. Did your project engage with societal actors beyond the research community? (if 'No', go to Question 14)

*



Yes



No

11b. If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?

Nautilus Associates (NA) and Nwes property services (Nwes): Yes. Cluster management organisations and sector specific industrial associations such as OrbisEnergy, the East of England Energy Group (EEEGR), and Renewable UK were engaged in the project throughout.

11c. In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?

12. Did you engage with government / public bodies or policy makers (including international organisations)

DTU: WP2 and WP4 workshops involved also policy makers

Nautilus Associates (NA) and Nwes Property Services (Nwes): Yes, . These included bodies such as The Crown Estates, the Department for Business Innovation and Skills (BIS), UK Trade and Investment, regional administration bodies such as local councils, and Local Enterprise Partnerships.

Alesund science park (**ASP**):

Regional authority of Møre and Romsdal have been involved in the project.

13a. Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?

Yes, all partners have contributed to the creation of regional and cross cluster smart specialisation strategies, and the ECOWindS Joint Action Plan (JAP) or roadmap identifying research and collaboration priorities for the European offshore wind industry.

13b. If Yes, in which fields?

Technical University of Denmark (DTU): **Energy and R&D policy**

Nautilus Associates (NA) and Nwes Property Services (Nwes): Offshore renewable energy, specifically Offshore Wind. The outputs also provide guidance on the processes of industrial strategy setting and road mapping, using tools such as smart specialisation, that could be used in different industrial fields.

13c. If Yes, at which level?

Technical University of Denmark (DTU): National and regional levels, as well as European level

Nautilus Associates (NA) and Nwes Property Services (Nwes): European, National (UK and England) and Regional (East of England)

H. Use and dissemination

14. How many Articles were published/accepted for publication in peer-reviewed journals?

Total:0To how many of these is open access provided (4)?0

How many of these are published in open access journals?*

13

How many of these are published in open repositories?*

12

To how many of these is open access not provided?0

Please check all applicable reasons for not providing open access:

publisher's licensing agreement would not permit publishing in a repository

no suitable repository available

no suitable open access journal available

no funds available to publish in an open access journal

lack of time and resources

lack of information on open access

If other - please specify (7)

(7) For instance: classification for security project.

15. How many new patent applications ('priority filings') have been made?

*

0

("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).

16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).

Trademark0Registered design0Other0

17. How many spin-off companies were created / are planned as a direct result of the project?

*

0

Indicate the approximate number of additional jobs in these companies:*

0

18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:

*

- Increase in employment, or
- Safeguard employment, or
- Decrease in employment, or
- Difficult to estimate / not possible to quantify
- In small and medium-sized enterprises
- In large companies
- None of the above / not relevant to the project

19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (FTE = one person working fulltime for a year) jobs:

*

 (Germanwind: 1,5 per year)

Difficult to estimate / not possible to quantify

I. Media and Communication to the general public

20. As part of the project, were any of the beneficiaries professionals in communication or media relations?

*

Yes

No

21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?

*

Yes

No

22. Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?

Press Release

Media briefing

TV coverage / report

Radio coverage / report

Brochures /posters / flyers

DVD /Film /Multimedia

Coverage in specialist press

Coverage in general (non-specialist) press

Coverage in national press

Coverage in international press

Website for the general public / internet

Event targeting general public (festival, conference, exhibition, science café)

23. In which languages are the information products for the general public produced?

Language of the coordinator

Other language(s)

English

References

EERA, 2014. EERA Joint Programme Wind Energy. Available at: <http://www.eera-set.eu/eera-joint-programmes-jps/15-eera-joint-programmes/wind-energy/> [Accessed October 21, 2014].

TPWind, 2014a. Introduction to the European Technology Platform for Wind Energy (TPWind). Available at: <http://www.windplatform.eu/home/> [Accessed October 21, 2014].

TPWind, 2014b. *Strategic Research Agenda / Market Deployment Strategy (SRA/MDS)*,