SET-PLAN IMPLEMENTATION

The Steering Group of the SET-Plan in its last meeting on October 28th, 2010 agreed to speed-up the execution of activities of the Implementation Plans (IPs) of the European Industrial Initiatives (EIIs). It was decided to collectively identify the possibilities for launching joint actions between Member States and/or Member States and the European Commission.

The mapping exercise carried out through this questionnaire builds upon this decision of the Steering Group. It aims to identify topics for leveraging best ongoing efforts with complementary joint actions, as prioritized by the Implementation Plans. In this phase the mapping will focus on projects and activities with a total budget higher than 1 M€.

We trust that you also consider the success of this exercise important for the immediate implementation of the SET-Plan.

MAPPING OF PROJECTS, ACTIVITIES, RESOURCES AND INVESTMENTS

To which EII(s) is your project, activity, resource or investment relevant? (multiple choices are possible)

<table>
<thead>
<tr>
<th>WIND</th>
<th>SOLAR</th>
<th>GRIDS</th>
<th>CCS</th>
<th>NUCLEAR</th>
<th>BIOENERGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A. PROJECTS AND ACTIVITIES

GENERAL INFORMATION

Name of project: High Power, high Reliability offshore wind technology

Acronym: HiPRwind

Location: Test installation in Spain or Norway (t.b.det.)

Project partners: Fraunhofer, Germany
                IDESA, Spain
                NTNU, Norway
                Acciona, Spain
                SINTEF, Norway
HiPRwind is an EU project introducing a new cross-sectoral approach to the development of very large offshore wind turbines. Focused on floating systems, this 5-year pan-European R&D effort will develop and test new solutions for enabling offshore wind technologies at an industrial scale. The project is designed with an "open architecture, shared access" approach in that the consortium of 19 partners will work together, in a collaborative way, to develop enabling structural and component technology solutions for very large wind power installations in medium to deep waters. Results of general interest will be shared within the broader R&D community working on future wind energy solutions.

**PROJECT GOALS & OBJECTIVES**

- to deliver a fully functional floating wind turbine installation at approximately 1:10th scale of future commercial systems, deployed at real sea conditions. This research & testing facility, a world's first, will be used to research new solutions and generate field data.
- address critical issues of offshore wind technology such as
the need for extreme reliability, remote maintenance and grid integration with particular emphasis on floating wind turbines, where economic and technical weight and size limitations of wind turbines and support structures can be overcome.

- Innovative engineering methods to rotor blade designs, structural health monitoring systems, reliable power electronics and control systems.
- Built-in active control features will reduce the dynamic loads on the floater in order to save weight and cost compared to existing designs. HiPRWind will develop and test novel, cost effective approaches to floating offshore wind turbines at a lower 1-MW scale.
- overcome the gap in technology development between small scale tank testing and full scale offshore deployment.
- HiPRwind will significantly reduce the risks and costs of commercialising deep water wind technology.
Achievements so far:
If intermediate results are available, please indicate the current achievements (qualitative and/or quantitative)

The HiPRwind project aims at installing and operating a MW-class floating wind turbine for research purposes. The 19-strong consortium is designing a floating structure to support the planned wind turbine as part of a design, procurement, construction and installation (DPCI) process. 6 month into its lifetime, the design process included:
- Concept screening of the most relevant platform concepts to be considered for this project – including Spar, TLP and Semisubmersible.
- Preliminary selection of basic design approach
- Acquisition and analysis of metocean and soil condition data for the site under investigation
- Definition of a dynamic operation envelope for the floating system
- Definition of critical load cases to be investigated

Currently the design base is being optimized in an iterative design process. As a first consequence, the weight of steel required could be reduced by 30% from the initial design.

In addition to the load calculations a model test in a wave tank will be made. This test will be used to validate some of the design parameters in particular around the hydrodynamic performance of the floating platform.

Next steps will be the structural and sea keeping analysis, detailed specification of the marine operations, detailed engineering of the structure and the construction process.

Difficulties and potential risks:
Indicate briefly problems encountered or to be encountered in the short term (e.g. overall legislative context, public acceptance, permitting, etc.)

One main risk lies in the timely and affordable completion of the site permit for the floating research platform. Although very positive signals were given by the authorities in charge of two pre-selected potential sites, there remains a risk, that permits are delayed or impose constraints on the realisation of the project. A second inherent risk lies in the field test cost, which cannot be predicted with high accuracy beforehand. Unexpected cost items can always put such a project at risk.

FUNDING & BUDGET

Funding programme:
Give the name of funding programme

FP7
Funding public entity:
*Indicate which public entity is in charge of /manages the programme*

<table>
<thead>
<tr>
<th></th>
<th>EC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (public &amp; private) project budget (€):</td>
<td>19,831,587</td>
</tr>
<tr>
<td>Public funding (€):</td>
<td>11,021,621</td>
</tr>
<tr>
<td>Total effort (person-months)</td>
<td>1062</td>
</tr>
</tbody>
</table>

**DISSEMINATION OF PROJECT RESULTS**

Publications, presentations in conferences and workshops, and other dissemination means:
*Give highlights only*

The website [www.hyperwind.eu](http://www.hyperwind.eu) will become a major dissemination tool.
Several presentations were given and will be given in international conferences throughout Europe (currently Norway and Spain)
A poster was presented during the EWEA wind conference and an abstract has been submitted to the European Offshore Wind Conference.
Several interviews and articles in magazines have mentioned and discussed the project.

**TOWARDS COMMERCIALISATION**

Indicate (new) products and/or services expected from the project. Are new business models required for commercialisation of the project results?
*Highlight expected commercialisation benefits, e.g. patents, spin-offs, new products, business partnerships*

Companies involved in HiPRWind look at this project as a major contributor to the overall development of new cost-effective offshore wind solutions. The combination of new offshore energy production technologies tested transparently on a single open source platform is of special interest, since it has the possibility to enable increasing the amount of energy extracted from a specific area and reduce costs. The knowledge, methods and operational procedures developed through the research in HIPRWind will be exploited by energy companies in future expansion of cost-effective offshore energy. The Consortium will establish a co-ordinated commercialisation strategy to protect the intellectual property (foreground) generated as a result of the work, and determine appropriate commercialisation routes for new discoveries. Each partner will carry out a systematic and rigorous evaluation procedure to evaluate the novelty, commercialisation potential, etc., leading to a dedicated commercialisation strategy for the idea itself.

**SYNERGIES WITH THE IMPLEMENTATION PLANS OF THE EUROPEAN INDUSTRIAL INITIATIVES – NETWORKING – KNOWLEDGE SHARING**
Contribution to/Relevance with the IPs: To your opinion, to which activities of the IPs of the EIIs is this project related to? Indicate contributions / complements.

Please note that reference here is made to the activities of the IPs as published in http://setis.ec.europa.eu/activities/implementation-plans

This project is related to the following topics of the current European Industrial Initiative Wind Implementation Plan

- R&D programme focused on new turbine designs, materials and components (1.1.1, 1.1.2)
- Development and testing of new structures (2.1.1)
- Technology transfer from the Oil & Gas sector (2.3.1)

Potential synergies with other projects and activities: Can you identify any other project(s) in your country, another MS or at European level that could be synergetic with this project?

Such projects are:
Eolia, Spanish National Project
Alpha Ventus German National project
EU-projects Upwind, DeepWind, Marina Platform, ORECCA
as well as upcoming EU-Demo projects on floating wind

Networking: Would you be willing to share results with the projects identified above?

Indicate willingness to networking and also potential conditions

There is of course the principal willingness to collaborate with those projects. In some cases results are shared through involvement of the same partners. In most cases the necessary contractual constraints of the CA and NDAs hinder a free exchange of results to protect the commercial interests and IPs of the partners

Knowledge sharing: Would the abovementioned Networking necessitate a formal knowledge sharing agreement? To your view would this be the preferred route?

Without such formal agreements knowledge sharing might not be possible. I see no alternative to formal agreements since significant financial contributions are made by the partners and they want and need to protect their IP.

Future steps: Are there any follow-up activities considered after the completion of your project? Is there a need to scale up activities in this topic at European level?

This is envisaged for the Demo projects which have already been proposed as well as there will be an outreach into NER 300 projects if floating wind farms will be approved for funding.

B. RESOURCES AND INVESTMENTS

RESOURCES AND INVESTMENTS
Describe in short any RD&D infrastructures that your project relies on. Are these available or do they need to be developed?

*The project will be using one out of two available infrastructures in Spain and Norway in order to reduce the permitting process and use an existing offshore cable. This will de-risk the project significantly and save time and money.*

If these are to be developed, what is the corresponding investment required? What is the allocated budget (€) for this investment in your project?

---

**OTHER INFORMATION**

<table>
<thead>
<tr>
<th>Date: when the questionnaire was completed</th>
<th>23 May 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information provider:</td>
<td>Jochen Bard, Fraunhofer IWES</td>
</tr>
<tr>
<td>Give the name and affiliation of the contact person for the questionnaire. If you are the project coordinator, check the box</td>
<td>X</td>
</tr>
</tbody>
</table>

*Please send the completed form to set-plan-secretariat@ec.europa.eu preferably by MAY 15.*

*Thank you for your cooperation!*