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 0.5 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>☒</td>
<td></td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

A. PROJECTS AND ACTIVITIES

GENERAL INFORMATION

Name of project: Nordic Consortium; Optimization and Control of Large Wind Farms

Acronym: Give project acronym, if applicable

Location: Applicable only for demo/pilot project; enter specific location(s) and Member State(s)
### Project partners:

List project partners; name coordinator first. For European & international projects mention the country affiliation of each partner

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proj. Man., Doc. Dan Henningson</td>
<td>Professor, KTH, Sweden</td>
</tr>
<tr>
<td>Assistant Proj. Man. PhD. Stefan Ivanell</td>
<td>Associate Professor, Gotland Univ., Sweden</td>
</tr>
<tr>
<td>Anders Wikström</td>
<td>GE Wind Power, Sweden</td>
</tr>
<tr>
<td>PhD. Marco Hyensjö</td>
<td>GE Wind Power, Sweden</td>
</tr>
<tr>
<td>Doc. Jens Fransson</td>
<td>Associate Professor, KTH, Sweden</td>
</tr>
<tr>
<td>Ingemar Carlén</td>
<td>Teknikgruppen, Sweden</td>
</tr>
<tr>
<td>Jan-Åke Dahlberg</td>
<td>Vattenfall, Sweden</td>
</tr>
<tr>
<td>PhD student, Karl Nilsson</td>
<td>Gotland Univ./KTH</td>
</tr>
<tr>
<td>PhD student, Sasan Sarmast</td>
<td>KTH</td>
</tr>
<tr>
<td>PhD student, Ylva Odemark</td>
<td>KTH</td>
</tr>
<tr>
<td>PhD. Jens Sørensen</td>
<td>Professor, DTU, Denmark</td>
</tr>
<tr>
<td>PhD. Robert Mikkelsen</td>
<td>Associate Professor, DTU, Denmark</td>
</tr>
<tr>
<td>PhD student, Søren H. Andersen</td>
<td>DTU, Denmark</td>
</tr>
<tr>
<td>PhD. Arne R. Gravdahl</td>
<td>CEO, WindSim AS, Norway</td>
</tr>
<tr>
<td>PhD. Erik Berge</td>
<td>Kjeller vindteknik, Norway</td>
</tr>
<tr>
<td>PhD. Espen Åkervik</td>
<td>Kjeller vindteknik, Norway</td>
</tr>
<tr>
<td>Georgio Crasto</td>
<td>WindSim AS, Norway</td>
</tr>
</tbody>
</table>

### Project website:

http://picard.hgo.se/~nordwind/

### Contact details:

Name, affiliation and contact details of the project coordinator

Stefan Ivanell, Gotland University, stefan.ivanell@hgo.se +46 498 299733

### Start date:

mm-yyyy

10-2009
Duration: 39 months

SHORT PROJECT DESCRIPTION

Provide a short abstract of max. 100 words

The Nordic Consortium, Optimization and Control of Wind Farms, was initialized by Professor Dan Henningson and Ass. Professor Stefan Ivanell as a continuation of the PhD work performed by Stefan with Dan as Supervisor.

The main aim is to continue the work on;

1. basic research on wake stability, i.e. to quantify the mechanisms behind the breakdown of the wake structure and thereby to be able to estimate wake lengths etc.
2. development of farm simulation tools to be able to optimize and control large wind farms.

The Swedish part of the project is financed by the Swedish Energy Agency and VindForsk.

PROJECT GOALS & OBJECTIVES

Goals:
Indicate main qualitative goals

- Cost effective utilization of wind power parks
- Increased understanding of wake interaction for improved modeling
- Optimize power generation from each turbine to improve total power
- Optimize lifespan of turbine by minimizing loads from wake interaction

Objectives:
Indicate quantitative objectives (similar to KPIs of the Implementation Plans of the EIs). Also indicate intermediate milestones where applicable.

Increased farm efficiency and reduced loads

Assumed state-of-the-art:
Describe quantitatively the state-of-the-art that the project objectives are based upon

State of the art simulations CFD simulations of large wind farms has been performed.

Achievements so far:
If intermediate results are available, please indicate the current achievements (qualitative and/or quantitative)

Improved simulation methods including wind veer resulting in tools giving production variation in large wind farms. Initial control ideas.

FUNDING & BUDGET
**Funding programme:**
*Give the name of funding programme*

- Swedish Energy Agency
- VindForsk
- Nordic Ministry Council
- Danish Research program
- etc

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

**Total (public & private) project budget (€):**

Swedish part, 1 200 000

**Public funding (€):**

Swedish part, 1 200 000

**Total effort (person months):**

Swedish part, 160

---

**DISSEMINATION OF PROJECT RESULTS**

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

**Invited presentations:**

- Fifth European Conference on Computational Fluid Dynamics, ECCMAS CFD, Lisbon, June, 2010.
- Nationella Vindkraftskonferensen, Kalmar, April, 2010.
- Forskning om vindkraft i fokus, Stockholm, November 2009.

**Publications:**

### 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.*  
1.1.2 and 4. by increasing wind farm efficiency and reducing loads on wind turbines.

### 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*

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?

*OFFWINDTECH, which is a European KIC-Innoenergy project. Prof. Henningson and Ass. Prof. Ivanell are involved in the project.*

*IEA WAKEBENCH, which is an IEA (International Energy Agency) Task investigating wake models.*

*IEA MEXNEXT, which is an IEA Task investigating wake measurements.*

*Ass. Prof. Ivanell represents Sweden in both IEA tasks.*

Networking: Would you be willing to share results with the projects identified above?  
*Indicate willingness to networking and also potential conditions*

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

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?

### 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?

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**

| Date: when the questionnaire was completed | 2011-05-18 |
| Information provider: | Stefan Ivanell, Gotland University, stefan.ivanell@hgo.se +46498299733 |
| Give the name and affiliation of the contact person for the questionnaire. If you are the project coordinator, check the box | |
| project coordinator | |

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

*Thank you for your cooperation!*