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Top-level Research Initiative

Integration of Large-scale Wind Power

Nordic Energy Research, Stensberggt 25, 0170 Oslo, Norway
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Nordic Top-level Research Initiative

Call for user driven research proposals for Integration of Large-scale Wind Power

General introduction to the Top-level Research Initiative

The Top-level Research Initiative is a Nordic initiative to solve the global energy and climate crisis, and strengthen research and innovation in the Nordic Region. The initiative has a budget of approximately NOK 450 million over five years. It is by far the largest research and innovation venture in the field of climate, the environment and energy under the auspices of the Nordic countries. The initiative was conceived at the Nordic Prime Ministers' summit in June 2007 in Punkaharju, Finland.

The research and innovation activities in the Top Level Research Initiative will be organised through six different sub-programmes:

1. Effect studies and adaption to climate change
2. Interaction between climate change and the cryosphere
3. Energy efficiency with nanotechnology
4. Integration of large-scale wind power
5. Sustainable bio-fuels
6. CO₂ – capture and storage

The sub-programme "Integration of large-scale wind power"

In the EU SET-Plan (Energy Technology Plan) wind energy, especially offshore wind energy, is described as the most promising new energy technology in the short hand (up to 2020-2030). Wind energy can contribute to decreased reliance on fossil fuels, improved energy security and decreased CO₂ emissions and simultaneously provide new business and employment opportunities and be a driver in rural and regional development.

In the Nordic context it is envisaged that 15-20% of total electricity production in the future can stem from wind energy.

The objective of this sub-programme is to promote the development of new, innovative and sustainable forms of wind energy and improve the integration of wind power. The programme aims to enhance the development of Nordic R&D institutions and business within the wind energy field and contribute to promoting the Nordic countries in a global context.

Thematic focus of the call

There are several areas that need more research, development and innovation connected to the integration of large-scale wind power in the Nordic region. Some relevant topics are listed below.

Grid aspects

- What grid investments will be necessary to cater for increased wind power including new techniques for monitoring and controlling of power consumption/production?
- Should wind parks be located in special areas due to grid considerations?

- How can the Nordic electricity system function with a large share of wind power connected?
- Inter-connection investments and requirements
- High/low voltage and AC/DC options and possibilities
- Grid connections for offshore wind farms, power exchange between countries and reduction of on-land grid bottlenecks

Power and energy aspects

- How will large scale wind power affect the energy balance locally, regionally and cross-boarders?
- Degree of self sufficiency/security of supply, system security and reliability, system adequacy and accessible wind power production under peak load?
- Forecasting tools
- How will the need for balance power and reserves increase with increasing amounts of wind power, and how to optimise the system?
- Possible direct and indirect storage technologies to help the energy balance of the system with large amounts of wind power
- Optimization of produced power taking into account site conditions (wind climate, water depth, waves, ice etc), maintenance availability and the reliability of the different components in cold climate or offshore conditions.

Energy market aspects

- Large scale wind power's effect on energy markets and energy prices, how are prices and volatility affected?
- How are other electricity producers affected?
- Energy management techniques

Operation and maintenance

- New initiatives and methods for operation and maintenance for decreased life cycle costs and increased availability including offshore and cold climate and component durability.
- Analysis and methodology development for fault statistics e.g. leading to a Nordic database to enable assessing availability, reliability and maintainability of critical components.

Cold climate and offshore wind power – new initiatives and methods

- Scientific monitoring of wind turbines in cold and offshore conditions
- Special requirements for wind power technology in cold climate areas
- Wind resources and production prospects in cold climate and mountainous areas
- Special requirements for wind resources and other environmental challenges offshore and in cold climate and mountainous areas
- Special challenges and requirements for technology due to icing and sea areas that freeze in the winter.

Support scheme

In this call only Nordic research projects with strong user involvement in the knowledge creation and diffusion throughout the project cycle will be funded. The rationale is that effective and efficient knowledge creation, adaptation and diffusion takes place as an integrated interaction and collaboration between users and producers of new technologies and systems.

Nordic user-driven research projects shall promote closer interaction, coordination and cooperation along the knowledge and innovation chain. They shall contribute to establishing platforms for creating new knowledge from strategic research and pre-competitive activities and thereby contribute to transform scientific and societal knowledge into increased Nordic competitiveness. Nordic user-driven research projects can also be linked to other national, Nordic and international activities.

Nordic user-driven research projects may have a duration of up to 5 years. Projects can receive a maximum of 60% funding from the Nordic Top-level Research Initiative.

Funding may be used for:

- Top-level research
- Industry Ph.D and Post.Doc candidates
- Strategic research and innovation

Budget

30 MNOK is allocated to the present call. The budget distribution between the thematic focus areas will not be fixed but dependant on the quality of applications. All projects are requested to have minimum of 40% external contribution, preferably from industry.

Guidelines

Formal requirements

- The proposed project team must have participants from at least three of the five Nordic countries (Denmark, Finland, Iceland, Norway and Sweden)
- Senior researchers/personnel must have leading roles in the projects
- The formal applicant must represent a Nordic organisation (university/institution/company) with a responsible person mentioned by name
- The distribution of tasks/responsibility between the project partners must be appropriate and balanced
- Industry involvement (as active participant and/or in reference group)

Eligible activities

Key activities shall contribute to consolidating and developing the Nordic knowledge base in the area of large-scale integration of wind power.

Activities shall comprise combinations of:

- Research activities by acclaimed senior researchers
- Ph.D. and Post-Doc grants

In addition to the above mentioned activities a proposal could also include combinations of the following activities:

- Mobility grants for mobility between project institutions
- Network building
- Specific PhD competence activities

For details about eligible costs, see annex 1.

Application process and timelines

In this programme there will be a two stage application procedure. Different electronic forms are to be used for application phase I and II. The forms will be available on www.toppforskningsinitiativet.net.

First researchers/business representatives submit a pre-proposal. The pre-proposals will be evaluated by experts in the Nordic countries, and applicants will be notified as to whether their proposals will go to the second stage or not. In the second stage the full proposals will be evaluated by international experts. The timetable for the call is shown in the table below:

| | |
|---|-------------|
| Call opened – invitation for pre-proposals | 15.10.2009 |
| Last date for submitting pre-proposals | 15.12.2009 |
| Selection of pre-proposals to be invited to submit full proposals | 15.02. 2010 |
| Last date for invited full proposals | 15.03.2010 |
| Evaluations of full proposals | 30.04.2010 |
| Projects start | Summer 2010 |

Evaluation criteria

The evaluation criteria for pre-proposals and full proposals are listed below:

For pre-proposals:

- Project plan
- Applicability and degree of scientific innovativeness
- Possible Nordic and Global impact for the energy sector
- Co-financing from energy sector, industry or other users and degree of industrial involvement

Complementary evaluation criteria for full proposals are:

- Scientific quality of research plan
- Quality of consortium and project management
- Relevance to the call and call specific criteria
- Nordic added value/benefit
- Appropriateness of methodology
- International linkages to other relevant projects/activities/networks
- Dissemination plans

Contacts

Further information about the call can be obtained from:

Denmark

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Annex 1 Guidelines

Eligible costs:

Personal costs

Projects personal costs can, at a maximum, be included according to the following:

- "full cost" (i.e. gross salary + social security benefits) + 20 %
- eligible gross salary is normal local salary level for the person involved in the project
- Maximum NOK 1000 per hour
- the responsibility for correct salary level is on the project leader and the leader of the participating organisation

Mobility costs

Grants to support project related mobility according to:

- 10 000 NOK/month in the Nordic region and between the Nordic region
- maximum 6 months/year
- the support is meant to cover extra living costs in an other country than the home country
- other mobility according to case-by-case appraisal

Travel expenses

Expenses for project related travelling may be included as follows:

- direct costs in line with governmental rules of the home country
- travels according to most inexpensive way
- travel expenses are eligible without any extra surplus or overhead

Meeting costs

Direct costs for activities of this type are eligible as follows:

- costs for meetings, seminars and workshops
- real net costs for conferences (i.e. reduced with possible conference fees)
- the costs shall be on a reasonable level and without any extra surplus or overhead

Costs for equipment

Normally "investment" type costs for equipment are not eligible:

- smaller equipment costs may though, by exception, be accepted if the project results are directly linked to them
- these equipment costs shall in that case be clearly specified in the project plan and included in the original project budget and the later following – accounting
- possible costs for equipment are eligible without any extra surplus or overhead

Other costs

Costs in this category (for example costs for dissemination etc.) shall be clearly specified in the project plan, - budget and –accounting.

Calculation of value of own "in kind" financing

Personal

The value of the "in kind" input of the project participants is determined according to the same principles as described in connection to the eligible project costs.

Cash-input

Direct cash-input is noticed without any surplus.

Best regards

Programme Secretary