PO.069

IEA Wind Task 36 Forecasting

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Summary

This poster gives an overview of the IEA Wind Task for Wind Power Forecasting. The Operating Agent is Gregor Giebel of DTU, Co-Operating Agent is Will Shaw of PNNL. Collaboration in the task is solicited from everyone interested in the forecasting business. The second phase of the Task runs for three years, 2019-2021.

The main deliverables are an up-to-date list of current projects and main project results, including datasets which can be used by researchers around the world to improve their own models, and an IEA Recommended Practice on the forecast solution selection and evaluation process and a position paper regarding the use of probabilistic forecasts. Additionally, disemmination of relevant information in both the forecasters and the end-users community is paramount, e.g. through common workshops and webinars.

Participation is open for all organisations in member states of the IEA Annex on Wind Power, see ieawind.org for the up-to-date list.

Activities

NWP Improvements

This WP brings together global leaders in NWP models as applied to the wind industry to exchange information about future research areas. The emphasis is on improvements of the wind-related forecast performance of these models especially in typical rotor heights.

Two lists of up-to-date data are mentioned below (tall met masts and experiments). Additionally, this WP verifies and validates the improvements through a common data set to test model results upon and discuss at IEA Task meetings.

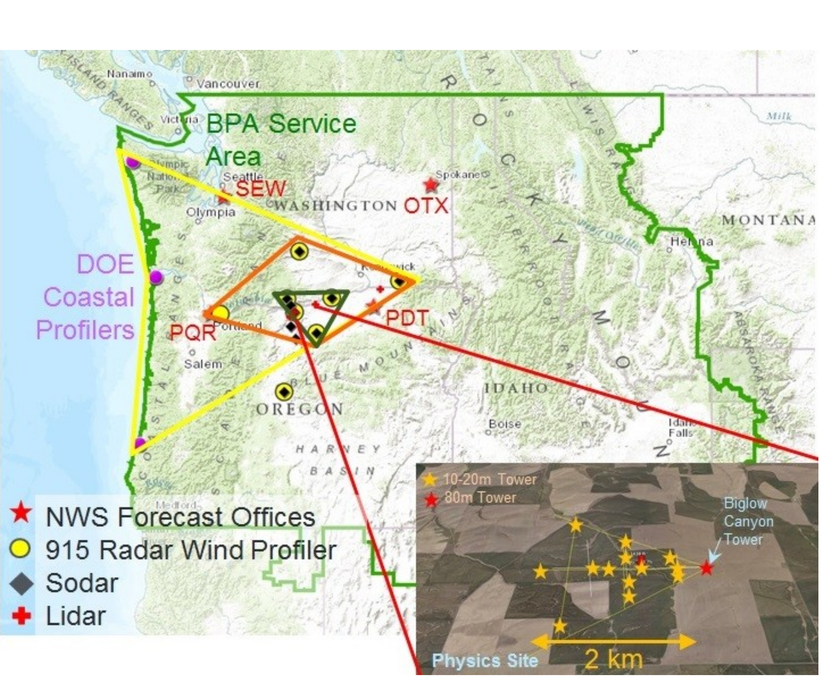

Figure 1: The instrumentation of WFIP2, in the Northwest of the USA. Source: Joel Cline.

Forecast Selection Process

In the second WP a triple series of recommended practices guides (RP) for the selection process of forecasting solutions was developed:
The first part, the "**Forecast Solution Selection Process**" deals with the selection and background information necessary to collect and evaluate when developing or renewing a forecasting solution for the power market.
The second part "**Benchmarks and Trials**", of the series offers recommendation on how to best conduct benchmarks and trials.
The third part "**Forecast Evaluation**", provides information and guidelines regarding effective evaluation of forecasts, forecast solutions and benchmarks and trials.

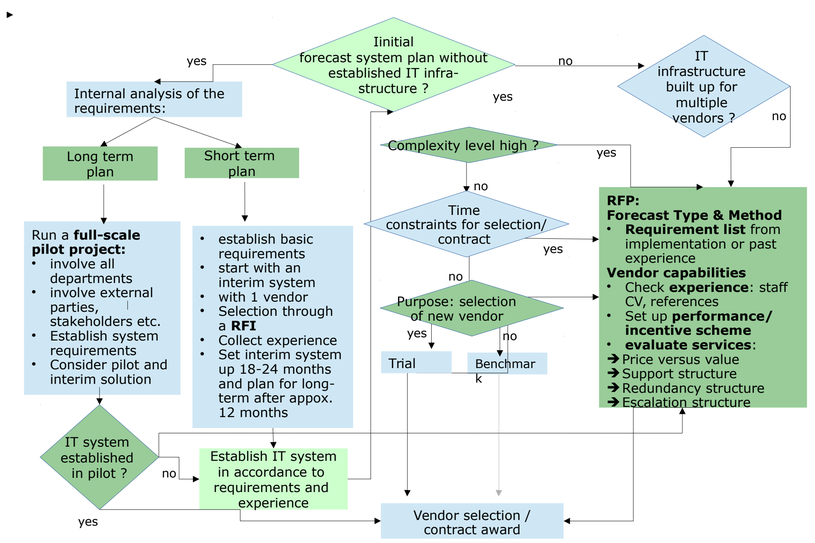

Figure 2:
Overview of a simple decision support scheme illustrating common difficulties when deciding for or against trials or common procurements. Cost, validity and output of trials are often over estimated In their usefulness, because fair evaluation requires a lot of resources, and complex problem solving can often not be verified by simple tests. A guideline for decision making is therefore under preparation by the task.

Benchmarking/Trials & Evaluation

The Part 2 of the Recommended Practices on benchmarks and trials reveals typical pitfalls encountered in trials and benchmarks that lead to non trustworthy results, fail to answer the questions end-user seek to answer. The objective of the RP is therefore to provide guidelines to avoid such pitfalls and to gain the insights sought for when conducting b/t.

Part 3 of the recommended practices deals with the evaluation process of forecasts and forecasr solutions. In this guideline we put specific focus on forecast skill versus forecast value. A forecast has skill, if it predicts the observed conditions well according to some objective or subjective criteria, but it only creates value, if it helps the user to make better decisions.
This first version of the recommended practices guideline focuses on:
1) Impact of forecast accuracy on application
2) Cost-Loss Relationship of forecasts
Evaluation of forecast solutions is a complex task and it is usually neither easy nor recommended to simplify the evaluation process. As a general recommendation, such a process needs to follow the evaluation paradigm with its three principles for an evaluation to be:

- representative
- significant
- relevant

How to setup an evaluation process and achieve these principles is the core of this recommended practices guideline.

Results

Information Portal

A list with masts useful for validation of the forecasts is published, measuring at least 100m. The list currently contains more than a dozen masts on- and offshore.

A list of meteorological experiments going on currently or recently, either to participate or to verify a flow model against. For example the Perdigao experiment of the New European Wind Atlas or the Wind Forecast Improvement Program 2.

A list of current or finished research projects in the field of wind power forecasting.

Also, check out our recorded **webinars** on YouTube!

See IEAwindforecasting.dk.

Workshop Minute Scale Forecasts

In June 2018, IEA Wind Task 32 Lidars and 36 Forecasting held a combined workshop on Very Short Term Forecasting of Wind Power. The main tools employed were lidars, radars and SCADA data. Main results were:

- Forecasts on the minute time scale are getting more important in high-wind-penetration power systems.
- A combination of weather models and instrumentation provide important information when persistence fails, namely at fast changing weather conditions, ramping and high speed wind events.
- Data quality is a major issue, including sensor availability (e.g. for Lidars).

Journal paper is published in Energies 2019: "Minute-Scale Forecasting of Wind Power – Results from the collaborative workshop of IEA Wind Task 32 and 36"

Use of Uncertainty Forecasting

The third WP surveyed the current state of use of forecast uncertainties by the power systems sector and documents and publishes results in a report and publications. This WP also provides outreach to users of forecasts via webinars or other means to enhance their knowledge and ability to use all available information for operations.

The main result of the WP was an Open Access Review journal paper:

48 pages "On the use of uncertainty forecasts in the power industry"

Source: http://www.mdpi.com/1996-1073/10/9/1402/


energies
Review
Towards Improved Understanding of the Applicability of Uncertainty Forecasts in the Electric Power Industry