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IEA Wind Task 51 Forecasting for the Weather Driven Energy System

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IEA Wind Task 51 Forecasting for the Weather Driven Energy System

PO.115



Abstract

| All Work Streams: | WP1 Weather | WP2 Power | WP3 Applications | Deliverable | #_Due | Collaboration |
|--|-------------|-----------|------------------|---|-----------------|--|
| Atmospheric physics and modelling | ★ | | | List of experiments and data | D1.1, Ongoing | WMO, PVPS T16 |
| Airborne Wind Energy Systems | ★ | | | Presentations on workshops | Part of D2.1 | Task 48 Airborne Wind Energy |
| Seasonal forecasting | ★ | | | Workshop / Paper | D1.6 / M19 | Hydro TCP, Hydrogen TCP, Biomass TCP |
| State of the Art for energy system forecasting | | ★ | | Workshop / Paper | D2.1 / M7, M12 | PVPS Task 16, Hydro TCP, Hydrogen TCP, ... |
| Forecasting for underserved areas | | | ★ | ResPlan on Forecast Solution Selection v3 | M2.1 / M36 | WMO |
| Minute scale forecasting | | | ★ | Public dataset | D2.4 / M24 | WMO |
| Uncertainty / probabilistic forecasting | | | ★ | Workshop / Paper | D2.5 / M31, M36 | Wind Tasks 32 Lister, 44 Farm Flow Control and 50 Hydrop |
| Decision making under uncertainty | | | ★ | Uncertainty propagation paper with data | D 2.6 / M42 | PVPS T16 |
| Extreme power system events | | | ★ | ResPlan v3 Training course Games | M48 M12 M18 | |
| Data science and artificial intelligence | | | ★ | Report | D2.3 / M30 | |
| Privacy, data markets and sharing | | | ★ | Workshop / Paper Data format standard | D3.5 / M15 | ESG ESE WG Energy Forecasting |
| Value of forecasting | | | ★ | Paper | D 3.4 / M33 | |
| Forecasting in the design phase | | | ★ | | | Task 26, ESG, IEA SSGM, PVPS T16, G, PST |

Wind and solar are no longer mere additions to the grid, in the future they *are* the grid. They are weather dependent, therefore the entire power and energy system needs to be handled according to the weather. **IEA Wind Task 51 “Forecasting for the Weather Driven Energy System”** takes a much broader approach for all sources, and some mitigation options, of the naturally occurring variability. The Task began in January 2022 and will run until the end of 2025. The work packages reflect the modelling chain: meteorology (WP1), power conversion (WP2) and application of the forecasts (WP3). We have established work streams that reach across areas and are run in collaboration with many other IEA Wind Tasks, IEA Technology Collaboration Programmes and the WMO Energy Study Group.

Selected results

Workshop on State of the Art



Workshop
State of the Art and Research Gaps in Forecasting for the Weather Driven Energy System

September 12/13 2022, University College Dublin

<http://www.iea-wind.org/task51/>

On Sept 12 and 13, 2022, a workshop on the State of the Art and Research Gaps was held in Dublin. The 60 participants discussed a large swath of topics related to the work streams. The workshop material can be accessed here, including a full video of the talks. A journal paper is forthcoming. Talks:

- Gregor Giebel, Operating Agent, DTU: [Introduction to IEA Wind Task 51 “Forecasting for the Weather Driven Energy System”](#)
Keynote by Conor Kavanagh, Eirgrid, on Challenges with running the Irish system securely
Keynote by Eamonn Lannoye, EPRI: [Integrating forecasting into power system operations and planning – current gaps and research needs](#)
- Edward McGarrigle, Galánta Energy: [On Forecasting for Trading](#)
Malte Rieck, Vattenfall: [How are wind forecasts used operationally? A tour of marketing wind energy](#)
Kathryn Fowler, Centrica Energy Trading: [Changing forecast requirements in a trading environment](#)
- Caroline Draxl, co-Operating Agent, NREL: [The WFIP projects 1-3 and Forecasting for Airborne systems](#)
Irene Schicker, ZAMG: [Subseasonal Forecasting](#)
Frédéric Vitart, ECMWF: [Season to Season \(S2S\) forecasts and their relevance for energy](#)
Remco Verzijlbergh, Whiffle: [Very high resolution forecasting using LES on GPUs](#)
- Bradley Eck, IBM: [AI and cloud computing developments towards integrating renewables](#)
Ricardo Bessa, INESC TEC: [Smart4RES collaborative analytics for renewable energy forecasting: federated learning and data markets](#)
Paul Cuffe, UCD: [Prediction markets as forecasting and hedging instruments within the renewable electricity sector](#)
- Kristian Horvath, WMO: [WMO Study Group on Integrated Energy Services](#)
- George Kariniotakis, Mines Paris: [How do the applications influence the forecasting tech evolution?](#)
Juan Sopena, Solute: [People just want numbers - How to fairly compare and interpret forecasts with a benchmarking framework for performance evaluation](#)
Corinna Möhrlen, WEPROG: [Introduction to the probabilistic gaming concept, the games purpose and setup to demonstrate a real-time environment and how to integrate probabilistic forecasts into decision making processes](#)



Collaboration

13 countries are currently members of the Task (AT, CN, DE, DK, ES, FI, FR, IE, NL, PT, SE, UK, US). If you are interested to collaborate or just to be kept up to date, please send a mail to the Operating Agent, Gregor Giebel (grgi@dtu.dk).

IEA Recommended Practice



IEA Wind Recommended Practice for the Implementation of Renewable Energy Forecasting Solutions

Corinna Möhrlen
John W. Zack
Gregor Giebel

A new version of the IEA Wind Recommended Practice now includes solar forecasting and how to effectively gather and utilize meteorological data from wind and solar farm locations. The guideline makes recommendations for how to select and maintain optimal forecasting solutions; it is written both from an end-user and vendor perspective. The main message is to carefully analyze your needs before getting and evaluating a solution.

The book is available as OpenAccess individual chapters or purchasable as book by Elsevier. See Poster 115 for details!

Workshop Seasonal Forecasting



Stakeholders in the electric energy system have expressed a growing interest in sub-seasonal to seasonal (S2S) forecasting information in their applications. Therefore, to facilitate the dissemination of information about S2S forecasting products, skill, applications, issues, and best practices to members of the electric energy community, the team of the International Energy Agency's (IEA) Wind Task 51 (<https://iea-wind.org/task51/>), entitled “Forecasting for the Weather Driven Energy System”, would like to invite you to a S2S forecasting workshop with the goal of gathering information about methods used to produce S2S forecasts, the current state-of-the-art skill in S2S forecasting for variables relevant for energy system applications, current and planned research activities intended to improve the current level of skill, types of public and private sector operational S2S forecasting products, the range of S2S applications in the energy community and the quantified or perceived value obtained from those applications, the sensitivity of user's application performance to variations in forecast skill, and the unmet S2S-forecasting-related needs or desires of the energy user community.

MAY 17–19, 2023 | University of Reading, UK
All times are British Summer Time (UTC+1)

DRAFT AGENDA

We invite you to a workshop on Seasonal Forecasting for the Weather Driven Energy System, May 17/18 in Reading, UK. Please find the invitation and registration here:

| Wednesday, May 17, 2023 | |
|-------------------------|---|
| 12:00 – 13:30 | Welcome and Keynote <ul style="list-style-type: none"> Welcome by workshop organizers and local hosts Keynotes on History, Current Status and Challenges of S2S Forecasting Q&A discussion with input from participants and their expected benefits of this workshop |
| 13:30 – 13:45 | Networking Break |
| 13:45 – 15:15 | Forecasting Techniques <ul style="list-style-type: none"> Presentations by forecast producers or researchers What methods are currently being used to produce S2S forecasts? What is the scientific basis and issues for each approach? Are there characteristic differences in performance among the methods? Are there emerging methods that have not yet been widely used? |
| 15:50 – 15:30 | Networking Break |
| 15:30 – 17:00 | Forecast Evaluation <ul style="list-style-type: none"> Presentations by forecast producers or researchers What are the typical forecast parameters and forecast formats? What metrics are typically used to evaluate forecasts? What are the limitations/issues with the typical metrics? Emerging/Alternative approaches to S2S forecast evaluation |
| 18:30 | Informal dinner gathering |
| Thursday, May 18, 2023 | |
| 8:30 – 10:00 | Public Forecast Providers and Products <ul style="list-style-type: none"> Presentations by public sector providers of S2S forecast products Type of forecasts (e.g., time scales, parameters, resolution) produced What methods are used to produce them? How is skill measured? Who are the known users (especially energy-related)? What feedback has been received from users? What is the view of these providers on future S2S research priorities? |
| 10:00 – 10:15 | Networking Break |
| 10:15 – 11:45 | Commercial Forecast Providers and Products <ul style="list-style-type: none"> Presentations by commercial providers of S2S forecast products Type of forecasts (e.g., time scales, parameters, resolution) produced What methods are used to produce them? What is the relative role of public sector foundational products versus in-house methods? Where is the added value relative to public products (e.g., improved accuracy, customization)? What are the energy-related applications? How is skill measured? What feedback has been received from clients? What is the view of providers on future S2S research priorities? |
| 11:45 – 13:00 | Lunch |
| 13:00 – 14:30 | Forecast User Experiences <ul style="list-style-type: none"> Presentations by energy-sector forecast users: Utilities, TSOs, Energy Traders Description of their applications What are forecast requirements of the applications (e.g., parameters, time scales, temporal and spatial resolution)? What types of forecasts are used? How is forecast performance measured for each application? Has the value been quantified? How? What are the primary unmet needs? |
| 14:30 – 14:45 | Networking Break |
| 14:45 – 16:00 | Open Space Discussion <ul style="list-style-type: none"> Facilitated discussion around the presented topics |
| 16:00 – 16:30 | Networking Break |
| 16:15 – 17:30 | Research Issues and Projects: Current and Envisioned <ul style="list-style-type: none"> Presentations by researchers engaged in current S2S projects What are the high-priority current research issues? Vision for a realistic 10-year S2S forecasting target |
| 17:30 | Workshop Wrap Up and Adjourn |

MEET US AT E-D49 (DTU) or IEA-Wind.org/task51/.



windeurope.org/annual2023

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Watch this presentation



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