

The energy system needs a range of forecast types for its operation in addition to the narrow wind power forecast. Therefore, the group behi former IEA Wind Task 36 Forecasting for Wind Energy (running 6 years, from 2016-2021) has broadened its perspective on forecasting issues in reaching out to other IEA Technology Collaboration Programmes such as the ones for PV, hydropower, system integration, hydrogen etc. The three Work Packages (WPs) on NWP Improvements (WP1), Power and Uncertainty Forecasting (WP2) and optimal use of Forecasting Solutions (WP3) complemented by thirteen work streams in a matrix structure.

The three work packages span three distinct areas of challenge in forecasting for the weather driven energy system. The first area is the continuing effort to improve the representation of physical processes in weather forecast models through both new high performance initializations and tailored parameterizations. The second area is the heterogeneity of the forecasters and end users, the full understanding of the uncertainties throughout the modelling chain and the incorporation of novel data into power forecasting algorithms. A third area is representation, communication, and use of these uncertainties to industry in forms that readily support decision-making in plant operations and electricity markets.





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: Keynote by Conor Kavanagh, Keynote by Eamonn Lannoye, EPRI:
- sting for Trading • Edward McGarrigle, Galánta Energy: Malte Rieck, Vattenfall: 占 <u>-low are wind forecasts used operationally? A tour of marketing wind</u> energy Kathryn Fowler, Centrica Energy Trading: Changing forecast requirements in a trading
- environment • Caroline Draxl, co-Operating Agent, NREL: <u>The WFIP projects 1-3 and Forecasting for</u>
- Irene Schicker, ZAMG: nal Forecasting Frédéric Vitart, ECMWF Season (S2S) forecasts and their relevance for energy ery high resolution forecasting using LES on GPUs Remco Verzijlbergh, Whiffle: Bradlev Eck. IBM: developments towards integrating renewables
- Ricardo Bessa, INESC TEC: Smart4RES collaborative analytics for renewable energy ederated learning and data markets forecasting: f Paul Cuffe, UCD: Prediction markets as forecasting and hedging instruments within the renewable electricity sector
- Kristian Horvath, WMO: Study Group on Integrated Energy Services George Kariniotakis, Mines Paris: low do the applications influence the forecasting tech
- Juan Sopena, Solute: ople just want numbers - How to fairly compare and interpret forecasts with a benchmarking framework for performance evaluation Corinna Möhrlen, WEPROG: gaming concept, the games purpose and setup to demonstrate a real-time environment and how to integrate probabilistic forecasts into decision making processes



Wednesday, May 17, 2023 12:00 – 13:30

Welcome and Keynote

Networking Break

Networking Break

Forecast Evaluation

Informal dinner gathering

Forecasting Techniques

Welcome by workshop organizers and local hosts

Presentations by forecast producers or researchers

Presentations by forecast producers or researchers

Keynotes on History, Current Status and Challenges of S2S Forecasting

What methods are currently being used to produce S2S forecasts?

Are there emerging methods that have not yet been widely used?

What are the typical forecast parameters and forecast formats?

Emerging/Alternative approaches to S2S forecast evaluation

What metrics are typically used to evaluate forecasts?

What are the limitations/issues with the typical metrics?

Are there characteristic differences in performance among the methods?

What is the scientific basis and issues for each approach?

Q&A discussion with input from participants and their expected benefits of this workshop

13:30 -13:45 13:45 –15:15

15:50 -15:30 15:30 - 17:00

18:30



#### Summary

## **Norkshop Seasonal Forecasting**, 17/18 May, Reading (UK)



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)

#### We invite you to a workshop on Seasonal Thursday, May 18, 2023 Forecasting for the Weather Driven Energy System, May 17/18 in Reading, UK. Pleas find the invitation and registration here:



<b>gy</b> ise	8.30 - 10.00	<ul> <li>Presentations by public se</li> <li>Type of forecasts (e.</li> <li>What methods are us</li> <li>How is skill measure</li> <li>Who are the known of</li> <li>What feedback has to</li> <li>What is the view of the</li> </ul>	
	10:00 - 10:15	Networking Break	
	10:15 – 11:45	Commercial Forecas Presentations by commer - Type of forecasts (e. - What methods are us - What is the relative r - Where is the added w - Where is the added w - What are the energy - How is skill measure - What feedback has to - What is the view of p	
	11:45 – 13:00	Lunch	
	13:00 – 14:30	<ul> <li>Forecast User Experi Presentations by energy-s</li> <li>Description of their a</li> <li>What are forecast re- resolution)?</li> <li>What types of forecast How is forecast perforection</li> <li>Has the value been of What are the primary</li> </ul>	
	14:30 – 14:45	Networking Break	
	14:45 – 16:00	Open Space Discussion Facilitated discussion area	
	16:00 - 16:30	Networking Break	
	16:15 – 17:30	Research Issues and Presentations by research - What are the high-po- - Vision for a realistic	
	17:30	Workshop Wrap Up a	

# www.IEA-Wind.org/task51/

# IEA Wind Task 51 Forecasting for the Weather Driven Energy System

Corinna Möhrlen Jethro Browell University of Glasgow WEPROG





George Kariniotakis Mines ParisTech

Ricardo Bessa David Lenaghan UK NationalGrid ESO



### **INESCTEC** nationalgrid

ind the
part by
existing
23), are

#### The work streams:

The work streams span typically several work packages. In many cases, they collaborate with other entities within and outside of the IEA Wind TCP, including IEA PVPS, IEA Hydro and the WMO.

We organize 4 workshops, see below for the first two. The other two are Minute Scale Forecasting summer 2024 (probably in the US) and Extreme Power System Events in 2025.

Work Streams:	WP1 Weather	WP2 Power	WP3 Applications	Deliverable	#, Due	Collaboration
Atmospheric physics and modelling (WP1)	*			List of experiments and data	D1.1, Ongoing	WMO, PVPS T16
Airborne Wind Energy Systems (WP1)	*			Presentations on workshops	Part of D2.1	Task 48 Airborne Wind Energy
Seasonal forecasting (WP1)	*			Workshop / Paper	D1.6 / M19	Hydro TCP, Hydrogen TCP, Biomass TCP
State of the Art for energy system forecasting (WP2)		*		Workshop / Paper RecPract on Forecast Solution Selection v3	D2.1 / M7, M12 M2.1 / M36	PVPS Task 16, Hydro TCP, Hydrogen TCP,
Forecasting for underserved areas (WP2)		*		Public dataset	D2.4 / M24	WMO
Minute scale forecasting (WP2)		*		Workshop / Paper	D2.5 / M31, M36	Wind Tasks 32 Lidar, 44 Farm Flow Control and 50 Hybrids
Uncertainty / probabilistic forecasting (WP3)			*	Uncertainty propagation paper with data RecPract v3	D 2.6 / M42 M48	PVPS T16
Decision making under uncertainty (WP3)			*	Training course Games	M12 M18	
Extreme power system events (WP3)			*	Workshop	D3.6 / M42	Task 25, ESIG, IEA ISGAN, PVPS T16, G-PST
Data science and artificial intelligence (WP3)			*	Report	D2.3 / M30	
Privacy, data markets and sharing (WP3)			*	Workshop / Paper Data format standard	D3.5 / M15	ESIG IEEE WG Energy Forecasting
Value of forecasting (WP3)			*	Paper	D 3.4 / M33	
Forecasting in the design phase (WP3)			*			Task 50 (hybrids), PV T16, hydrogen TCP

DRAFT AGENDA

iders and Products ctor providers of S2S forecast products g., time scales, parameters, resolution) produced sed to produce them? users (especially energy-related)? been received from users? hese providers on future S2S research priorities? t Providers and Products rcial providers of S2S forecast products .g., time scales, parameters, resolution) produced sed to produce them? role of public sector foundational products versus in-house methods? value relative to public products (e.g., improved accuracy, customization)? -related applications? been received from clients? providers on future S2S research priorities? sector forecast users: Utilities, TSOs, Energy Traders applications equirements of the applications (e.g., parameters, time scales, temporal and spatial asts are used? ormance measured for each application? quantified? How? y unmet needs? ound the presented topics

Projects: Current and Envisioned hers engaged in current S2S projects riority current research issues? 10-year S2S forecasting target Workshop Wrap Up and Adjourn

#### A new version of the Wind IEA

Recommended

Practice now includes solar forecasting and to effectively how utilize gather and 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 end-user and perspective. vendor The main message is carefully analyze to before your needs getting and evaluating a solution.

The book is available as OpenAccess individual chapter downloads or purchasable as book by Elsevier.

> **For collaboration in the Task** or just for the newsletter, **please** contact the Operating Agent, Gregor Giebel (grgi@dtu.dk). Current member countries are AT, CN, DE, DK, ES, FI, FR, IE, NL, PT, SE, UK and US.







### IEA Recommended Practice



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



Corinna Möhrlen John W. Zack Gregor Giebel



