IEA Wind Task 51 “Forecasting for the Weather Driven Energy System”

Corinna Möhrlen

G. Giebel, H. Frank, C. Draxl, J. Zack, J. Browell, , G. Kariniotakis, R. Bessa, J. Yan, D. Lenaghan

Photography encouraged

Technology Collaboration Programme
by iea

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International Energy Agency History

The IEA was founded in 1974 to help countries co-ordinate a collective response to major disruptions in the supply of oil.

Image source: dpa

Specific Technology Collaboration Programs (in renewable energy):

- Bioenergy TCP
- Concentrated Solar Power (SolarPACES TCP)
- Geothermal TCP
- Hydrogen TCP
- Hydropower TCP
- Ocean Energy Systems (OES TCP)
- Photovoltaic Power Systems (PVPS TCP)
- Solar Heating and Cooling (SHC TCP)
- **Wind Energy Systems (Wind TCP)**

iea Energy Technology Network

See iea.org!

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IEA Wind TCP Research Tasks

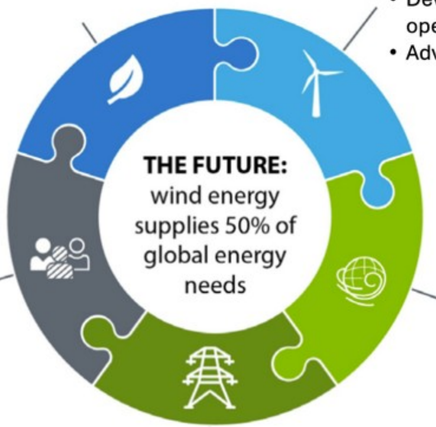
Technology Collaboration Programmes

Environmental Co-Design
- Avoiding, minimising, compensating for environmental impacts
- Incorporating environmental costs, benefits into decisions
- Addressing both immediate concerns, future impacts

Tasks 42, 45, 59 & 60

The Turbine
- Incorporating holistic design
- Developing intelligent controls, operation, maintenance
- Advancing industrialisation

Tasks 44, 49, 52, 54 & 57



Social Science
- Acknowledging the transformational nature of development
- Creating just processes
- Valuating benefits, effects, burdens

Tasks 39, 53 & 62

The Atmosphere
- Increasing atmospheric observations
- Expanding, validating universal predictive capability
- Integration, adopting improved models

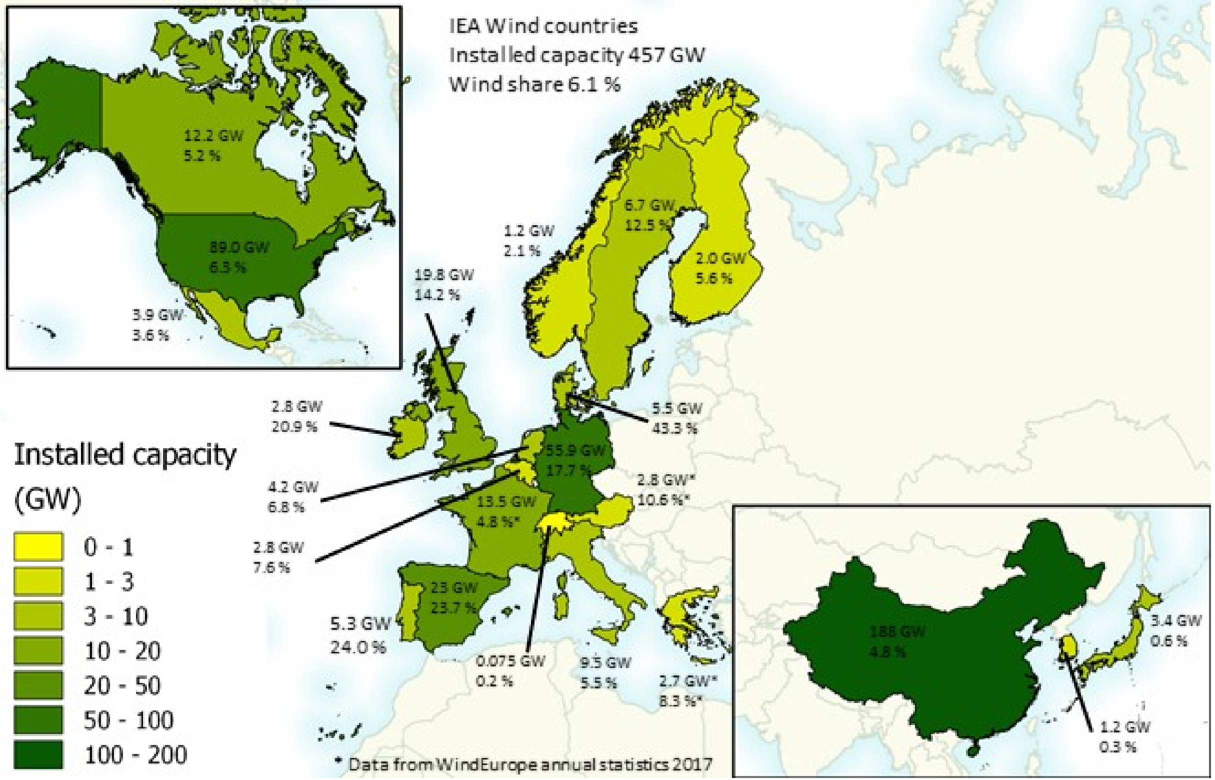
Tasks 43, 46, 47, 48, 49, 51, 56

The Plant and Grid
- Improving modelling
- Optimising plant design for multiple objectives
- Readying wind plants for grid support

Tasks 25, 41, 50, 55, 58 & 61

Capacity

As of 2020, about 85% of the world's wind generating capacity–and nearly all offshore capacity–resides within the participating countries. To learn more about the work of each participating member, please click on any of the countries or sponsors below.

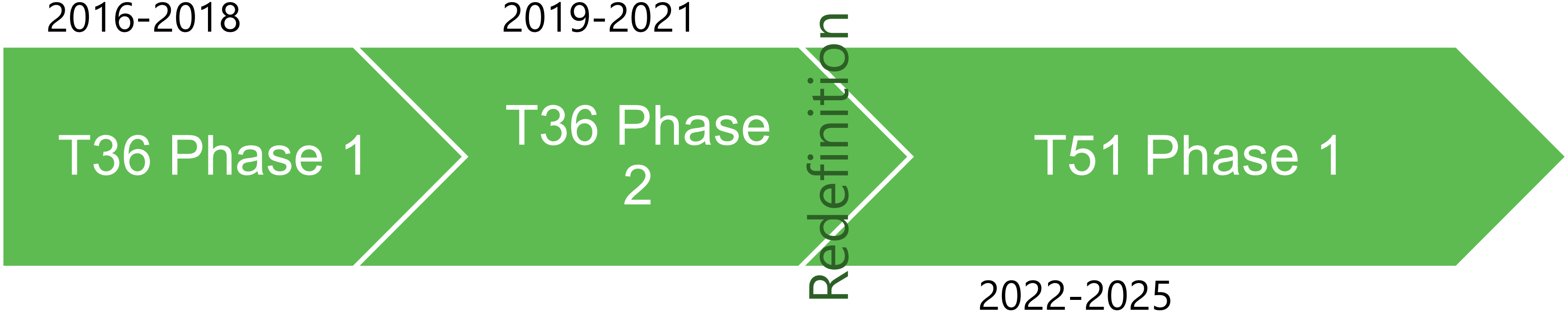


- **Task 51 Members (12)**
- AT, CN, DE, DK, ES, FI, FR, IE, PT, SE, UK, US

Forecasting for Wind Energy

2016-2018

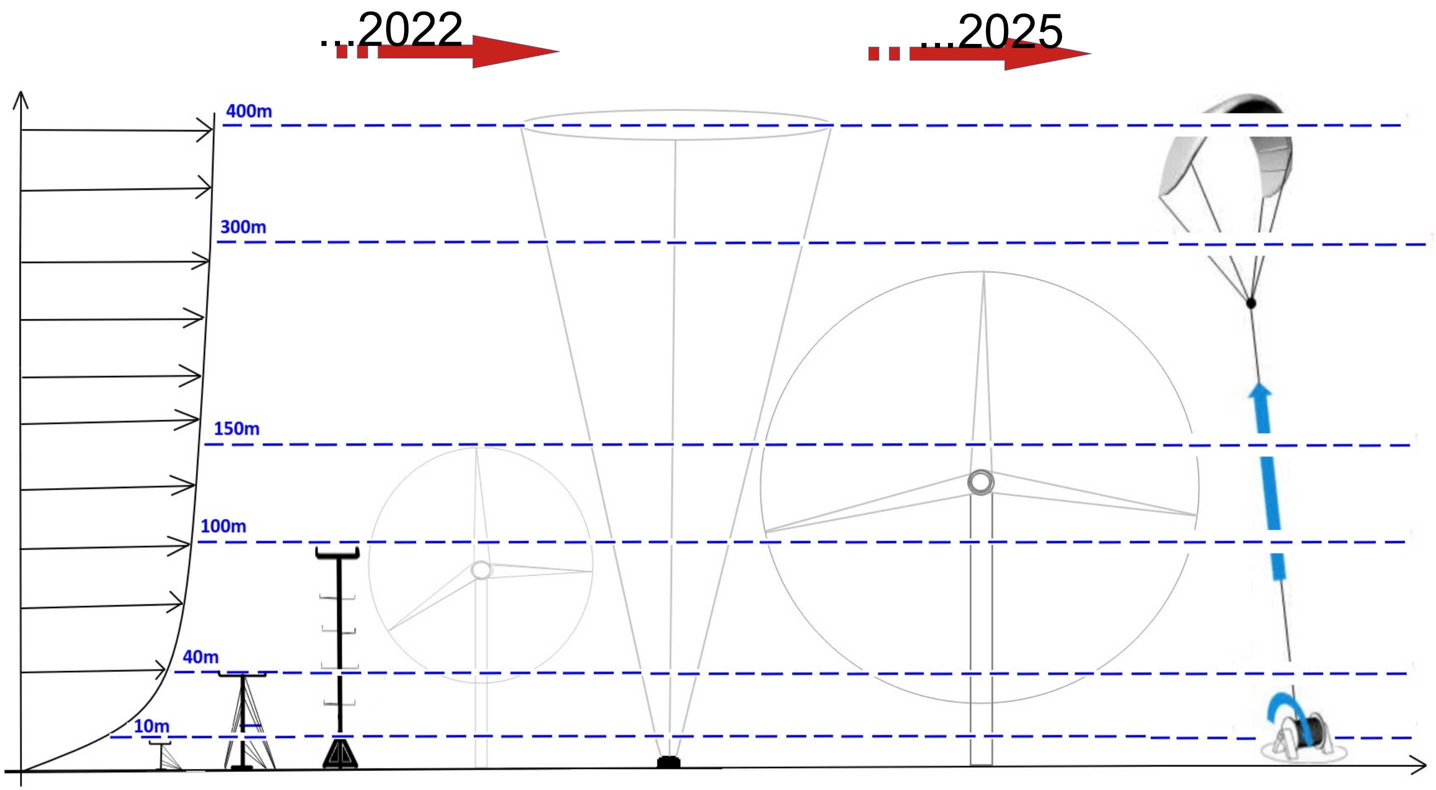
2019-2021



2022-2025

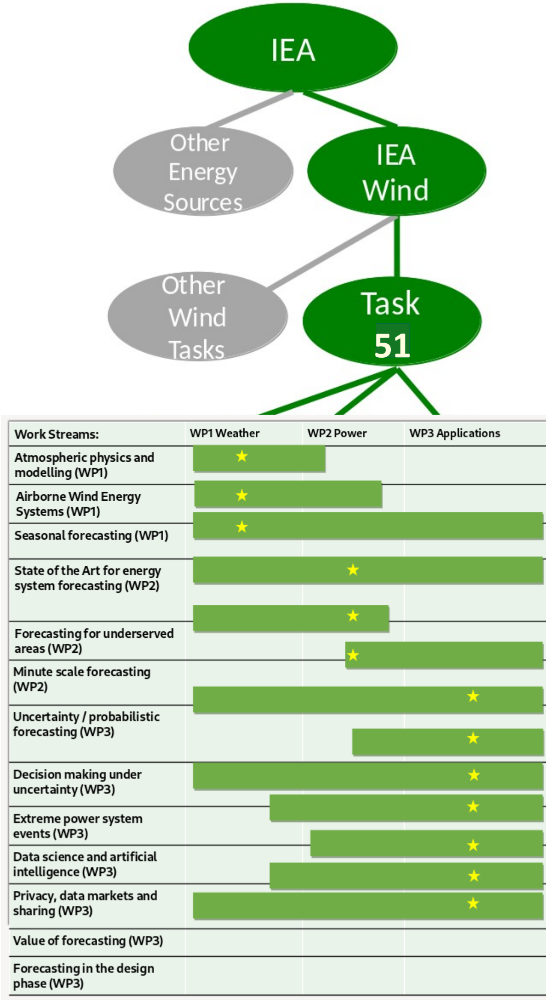
Forecasting for the weather-driven Energy System

From groups of single wind turbines to large-scale Wind Energy Systems & Airborne Wind



Slide design: Corinna Möhrlen

IEA Wind Task 51: Forecasting for the weather-driven Energy System



What is the IEA (International Energy Agency)? (www.iea.org)

- International organization within OECD with 30 members countries and 8 associates
- Promotes global dialogue on energy, providing authoritative analysis through a wide range of publications
- **One activity: convenes panels of experts to address specific topics**

Task 51: Forecasting for the weather-driven Energy System:

- One of 17 Tasks of IEA Wind: https://iea-wind.org/
- Task 36: Phase 1: 2016-2018; Phase 2: 2019-2021 **Task 51: Phase 3: 2022-2025**
- Operating Agent: Gregor Giebel of DTU Wind Energy
- Objective: facilitate int. collaboration to **improve wind energy forecasts**
- Participants: (1) research organization and projects, (2) forecast providers, (3) policy-makers and (4) end-users & stakeholders

Task 51 Scope: 3 "Work Packages" distributed over 13 "Workstreams"

- WP1: Global Coordination in Forecast Model Improvement
- WP2: Benchmarking, Predictability and Model Uncertainty
- WP3: Optimal Use of Forecasting Solutions

Task homepage: https://iea-wind.org/task51

IEA Wind Task 51 Arbeitspakete

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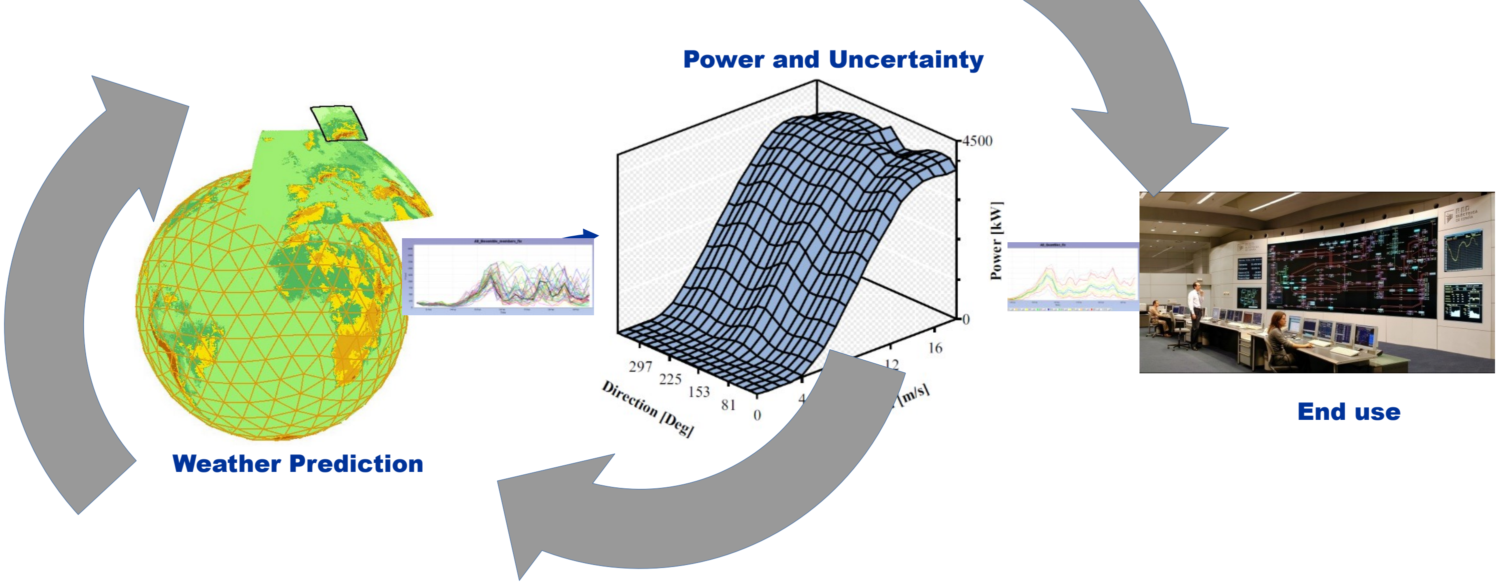
Task Arbeit ist in 3 Arbeitspakete aufgeteilt:
WP1: Wettervorhersage Verbesserungen und Entwicklung
WP2: Leistungsvorhersage
WP3: Optimale Anwendung von Vorhersagelösungen



Australian Government
Bureau of Meteorology

IEA Wind Task 51 Aufteilung in “Arbeitsflüsse”

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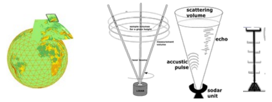
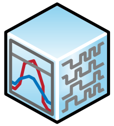
Work Streams:	WP1 Weather	WP2 Power	WP3 Applications
Atmospheric physics and modelling (WP1)			
Airborne Wind Energy Systems (WP1)			
Seasonal forecasting (WP1)			
State of the Art for energy system forecasting (WP2)			
Minute scale forecasting (WP2)			
Data science and artificial intelligence (WP3)			
Extreme power system events (WP3)			
Uncertainty / probabilistic forecasting (WP3) & for underserved areas			
Decision making under uncertainty (WP3)			
Privacy, data markets and sharing (WP3)			
Value of forecasting (WP3)			



Modellierung & Datenassimilierung

Workshops



Verifikations-plattform

Publikationen

Das Task 51 Informationsportal ist für Interessengruppen im Bereich der Wetter- Wind und Solarprognose und beinhaltet insbesondere Links zu öffentlich verfügbaren Daten für die Modellentwicklung.

https://iea-wind.org/task-51/t51-information-portal/

Information Portal

The Task members identified several issues which might be useful in an information portal for wind power forecasting. Those are:

- A list of meteorology masts with online data over 100m height, useful for verification of wind speed predictions
- A list of meteorological experiments going on currently or recently, either to participate or to verify a flow model against
- A list of publicly available wind power forecasting benchmarks, to test your model against
- A list of current or finished research projects in the field of wind power forecasting
- A list of future research issues
- A list of open weather data

For all of those, we would be happy to accept input, so head over to the site and see where you can help, or what you can use!

Please find the full text of the task description here.

The task is led by Gregor Giebel from DTU Wind Energy.

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Research projects

https://iea-wind.org/task-51/project-list/

Here are some ongoing and finished projects towards short-term prediction of wind power throughout the last two decades. In total, the public (and partly private) spending on this list exceeds 150 million euro.

Country	Project acronym	Full title	Sponsor	Total / Funded budget	Start – end date	Participants incl. those from IEA Task 36/51
DE	WindStore	Optimized system integration of offshore wind energy through intelligent linking of various forecast concepts and forward-looking management of distributed cascade storage systems.	BMWK (German Federal Ministry for Economics and Climate Protection)	1.76 M€ / 1.47 M€	Jan 2024 – Dec 2026	Fraunhofer IEE, DLR, 4Cast, SETrade, WEPROG, EnBW, Stadtwerke Hassfurt und Wunsiedel
BE	BeFORECAST	Wake-effect included offshore wind power forecasting for smooth operation of the Belgian electricity grid based on advanced data handling and sensor technology, including airborne systems.	Energy Transition Funds of the Federal Public Service Economy of the Belgian Federal Government	3.25 M€ / 2.74 M€	Nov 23 – Oct 25	von Karman Institute for Fluid Dynamics, Vrije Universiteit Brussel, KU Leuven, 3E, SABCA, Royal Meteorological Institute of Belgium
UK		Multi-variate forecasting for wind power integration in electricity markets	Shell/ETP Scotland	90k€/120k€	Oct 22 – Mar26	University of Glasgow, Jethro Browell

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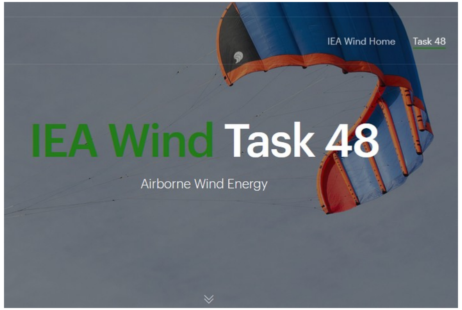
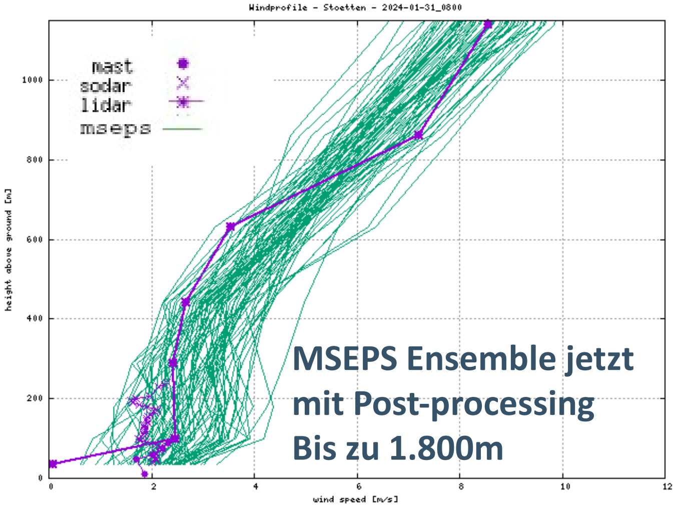
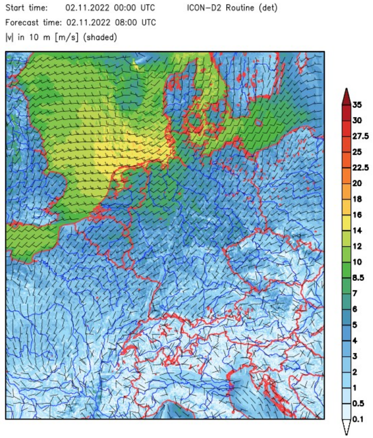
Workstream Atmospherische Modellierung und Physik & erste Simulationen für “airborne” Windenergie



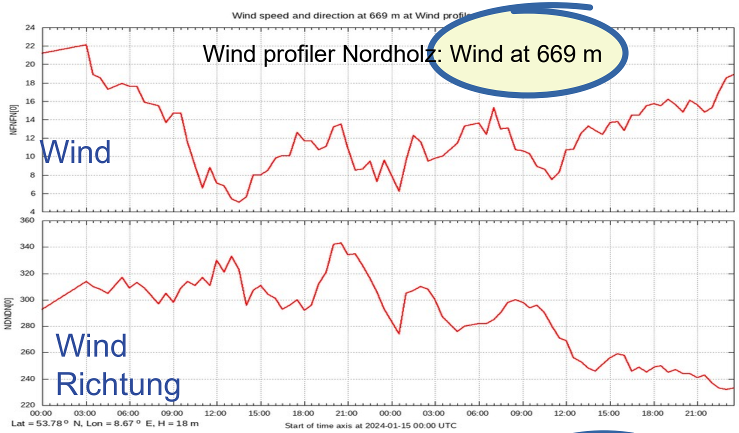
Vom rapid-update bis Langzeitvorhersagen

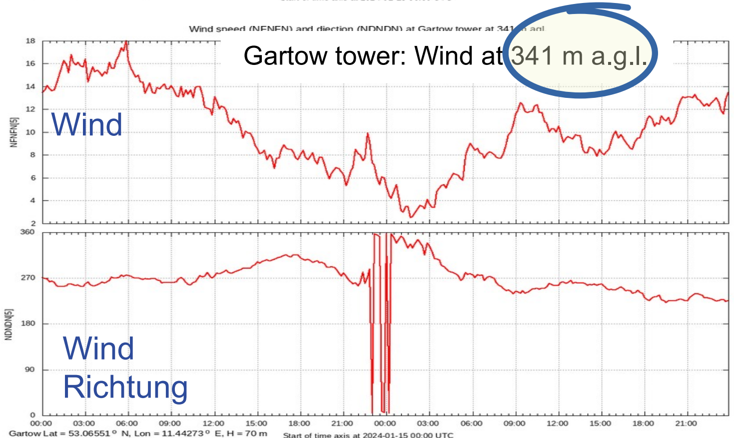


MSEPS Ensemble jetzt mit Post-processing Bis zu 1.800m



ICON-DE Modell ist jetzt auch in 15min Auflösung einmal pro Stunde erhältlich





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DISCOUNT: Non-serials

FORMAT: Paperback

Editors: Corinna Möhrlen, John W. Zack, and Gregor Giebel

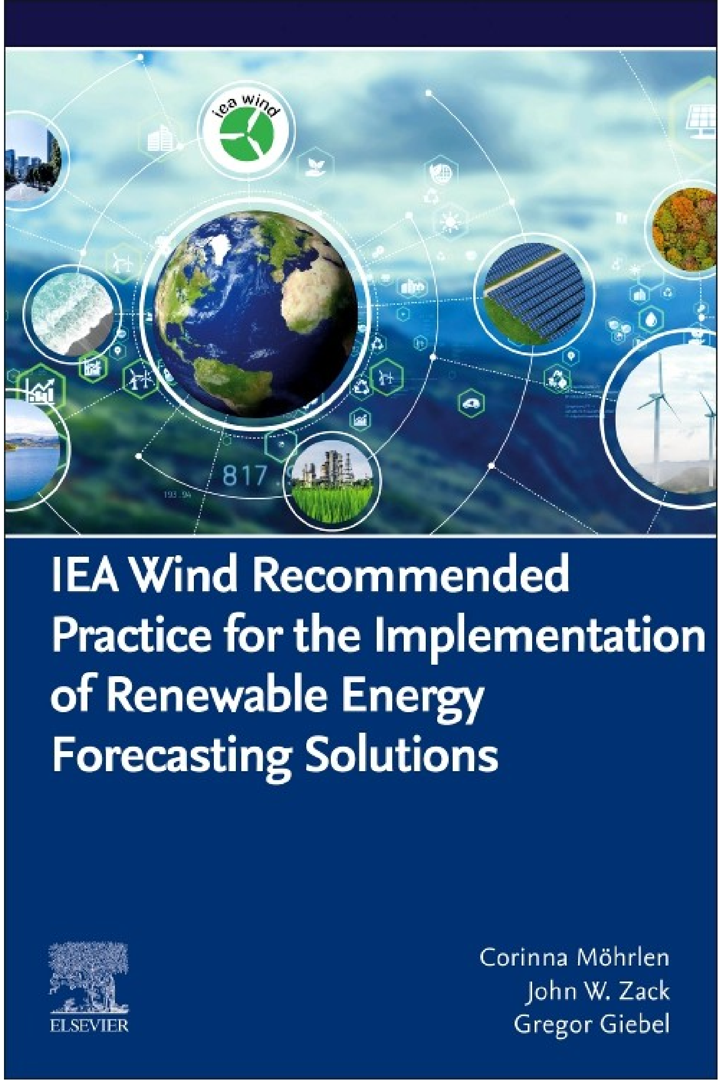
https://www.elsevier.com/books/iea-wind-recommended-practice-for-the-implementation-of-renewable-energy-forecasting-solutions/mohrlen/978-0-443-18681-3

Online OpenAccess:

https://www.sciencedirect.com/book/9780443186813/iea-wind-recommended-practice-for-the-implementation-of-renewable-energy-forecasting-solutions

IEA Wind Task 51 Information

iea-wind.org → Task 51 → Publications → Recommended Practice



IEA Industrierichtline für die Implementierung von Vorhersagelösungen für Erneuerbare Energien: Set of 4 Documents

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RECOMMENDED PRACTICE FOR THE IMPLEMENTATION OF RENEWABLE ENERGY FORECASTING SOLUTIONS

- Part 1: FORECAST SOLUTION SELECTION PROCESS -

2. EDITION

Draft for Review by the Executive Committee of the International Energy Agency Implementing Agreement

Prepared by IEA Wind Task 36

Part 1: Selection of an Optimal Forecast Solution

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RECOMMENDED PRACTICE FOR THE IMPLEMENTATION OF RENEWABLE ENERGY FORECASTING SOLUTIONS

- Part 2: DESIGNING AND EXECUTING FORECASTING BENCHMARKS AND TRIALS -

2. EDITION

Draft for Review by the Executive Committee of the International Energy Agency Implementing Agreement

Prepared by IEA Wind Task 36

Part 2: Design and Execution of Benchmarks and Trials

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RECOMMENDED PRACTICE FOR THE IMPLEMENTATION OF RENEWABLE ENERGY FORECASTING SOLUTIONS

- Part 3: Forecast Solution Evaluation -

2. EDITION

Draft for Review by Executive Committee of the International Energy Agency Implementing Agreement

Prepared by IEA Wind Task 36

Part 3: Evaluation of Forecasts and Forecast Solutions

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RECOMMENDED PRACTICE FOR THE IMPLEMENTATION OF RENEWABLE ENERGY FORECASTING SOLUTIONS

- Part 4: Meteorological and Power Data Requirements for real-time forecasting Applications-

1. EDITION

Draft for Review by the Executive Committee of the International Energy Agency Implementing Agreement

Prepared by IEA Wind Task 36

Part 4: Data Requirements for Real-time Applications

Now as OpenAccess book!

Introduction: https://www.youtube.com/watch?v=XVO37hLE03M

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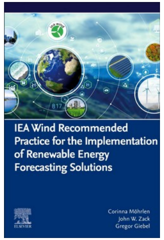
Validierung & Verifikation
Quellcode Beispiele

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

Wind Energy Engineering

2023, Pages 321-322



Appendix G - Validation and verification code examples

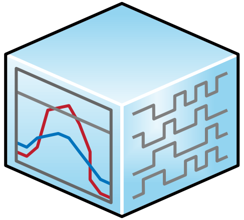
Frei zugängliche Beispiele aus Projekten des IEA Wind Task 36 und Task 51:

WE-validate

Available on GitHub: https://github.com/joejoeyjoseph/WE-Validate

Publication: https://www.sciencedirect.com/science/article/pii/S0960148122014707

Use Case: Demo Jupyter Notebook (U.S. Mountain Wave case):
https://nbviewer.jupyter.org/github/joejoeyjoseph/i-validate/blob/main/notebooks/demo_notebook.ipynb

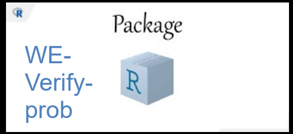


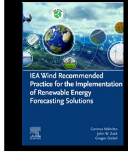
Verwendete Metriken: RMSE, cRMSE, mean bias, mean absolute error
Graphische Darstellung: time series, histogram, scatter plot

WE-verify-prob – R-package for probabilistic verification

Verwendete Metriken: CRPS, Brier Score, ROC curve, Histograms, Reliability Diagram, Contingency table

Graphische Darstellung: time series, histograms, ROC curve, CRPS





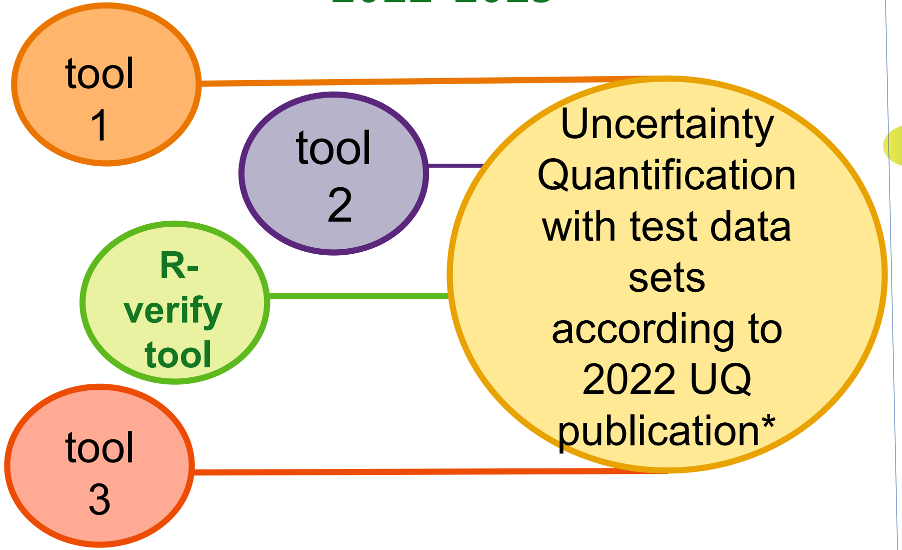
Chapter 14, Section 14.3 Assessment of forecast

See also our workshops & conference page:
https://iea-wind.org/task51/task51-publications/task51-workshops-and-special-sessions/

Workstream Unsicherheit :

Unsicherheitsverteilung in der gesamten Modellkette mit realen Daten

PHASE I
2022-2023



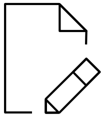
PHASE II
2024

Online Verification Platform

Diskussion & Test der Verificationsplatform

PHASE III
2025

Publication



Diskussion & Verfassen einer Publikation mit reellen Anwendungsbeispielen

* Uncovering wind power forecasting uncertainty sources and their propagation through the whole modelling chain
https://www.sciencedirect.com/science/article/pii/S1364032122004221

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Review der Verteilung von Unsicherheit

Arbeitsprogram Teil I

- **Qualitative Beschreibung** der Ursprung und Verteilung von Unsicherheit in der Prognose-prozesskette (D2.2)

→ Publiziert in *Renewable and Sustainable Energy Reviews* in 2022

Arbeitsprogram Teil II (2023-2025)

- **Quantifikation** des Ursprungs und der Verteilung von Unsicherheit in der Prognose-prozesskett

Uncovering wind power forecasting uncertainty origins and development through the whole modelling chain⋆,⋆⋆

Jie Yan[a], Corinna Möhrlen[b], Tuhfe Göçmen[c], Mark Kelly[c], Arne Wessel[d] and Gregor Giebel[c,*]

[a]North China Electric Power University, State Key Lab of Alternate Electrical Power System with Renewable Energy Sources, Beijing, P.R. China
[b]WEPROG, Dreijervaenget 8, 5610 Assens, Denmark
[c]Technical University of Denmark, Department of Wind Energy, Frederiksborgvej 399, 4000 Roskilde, Denmark
[d]Fraunhofer Institute for Energy Economics and Energy System Technology IEE, Kassel, Germany

ARTICLE INFO

Keywords:
wind power
forecast uncertainty
modelling chain

ABSTRACT

Wind power forecasting has been supporting operational decision-making for power system and electricity markets since 30 years. Efforts of improving the accuracy and/or certainty of wind power forecasts, either deterministic or probabilistic, are continuously exerted by academics and industries. Forecast errors and associated uncertainties, which propagate through the whole forecasting chain, from weather provider to the end user, cannot be eliminated completely due to many reasons; for instance, endogenetic randomness of weather systems and varying wind turbine performance. Therefore, understanding the sources of uncertainty and how these uncertainties propagate throughout the modelling chain is significant to implement more rational and targeted uncertainty mitigation strategies and standardise the uncertainty validation. This paper presents a thorough review of the uncertainty propagation through the modelling chain, from the planning phase of the wind farm and the forecasting system through the operational phase and market phase. Moreover, the definition of the uncertainty sources throughout these phases build the guiding line of uncertainty mitigation throughout this review. In the end, a discussion on uncertainty validation is provided along with some examples. Highlights of this paper include: 1) forecasting uncertainty exists and propagates everywhere throughout the entire modelling chain and from planning phase to market phase; 2) the mitigation efforts should be exerted in every modelling step; 3) standardised uncertainty validation practice and global data samples are required for forecasters to improve model performance and for forecast users to select and evaluate the model's output.

1. Introduction

High penetration of wind power has been recognised globally as one of the most important features of current and future sustainable power systems. The natural randomness and variability of the wind itself can aggravate negative impacts of wind power on power system operation and market trading, which strengthens the significance of forecasting technology. Wind power forecasting (WPF) started more than three decades ago [16], with the first operational forecasting tools arriving at system operation level some 10 years later at the Danish transmission system operator ELSAM [10]. Since then, researchers have been making continuous efforts to improve the forecasting accuracy and reliability.

It is impossible to achieve perfect predictions of wind power at any given time or location, due to chaotic atmospheric motions having temporal and spatial scales that typically span more than six orders of magnitude [17, 18, 19]. Along with the complex wind field, wind turbine performance creates nonlinear and time-varying uncertainties in wind power forecasting. To improve the value of forecasts and their usage, we practically consider three questions: why, when and to what extent the forecasting uncertainty will happen [20]. Accordingly, this further guides the mitigation of forecasting uncertainty. There is plenty of literature in this area, and can be clarified into following three categories.

* 'This paper was coordinated under the auspices of IEA Wind Task 36 'Forecasting for Wind Energy'. Corinna Mörlen, Tuhfe Göçmen, Mark Kelly and Gregor Giebel were funded by the Danish EUDP project "IEA Wind Task 36 Phase II Danish Consortium", Grant Number 64018-0515.
*Corresponding Author: Gregor Giebel
grg1@dtu.dk (G. Giebel)
www.dtu.dk (G. Giebel)
ORCID(s): 0000-0002-9412-0999{0000-0002-9412-0999} (J. Yan); 0000-0002-8842-1533{0000-0002-8842-1533} (C. Möhrlen); 0000-0002-4453-8756{0000-0002-4453-8756} (G. Giebel)

Workstream *Decision-making under Uncertainty*
Entscheidungs-Findung unter der Prämisse von Unsicherheit

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Decision making under uncertainty

Forecasting Games

Forecast Game	Short Description	Link
Wind Power Trading decisions for a Wind Park in complex Terrain	IEA Wind Task 36/51 and MPI for Human Development have released a forecast game at the European Meteorological Society Annual Conference 2021. The game investigates how ensemble forecasts showing forecast uncertainty can improve our ability to make informed decisions, also when the weather conditions are complex or extreme. In the experimental game, the player is asked to make trading decisions for a wind farm in complex terrain in a number of situations based on deterministic and probabilistic power and wind forecasts.	Forecast Game (choose "Play the Game" at top menu) Forecast Game Results Links to additional material: WIW2022: Key Note Presentation EMS 2022: Presentation AMS 2022: Presentation Electric-City 2021: Paper & award winning Poster EMS 2021: Presentation IEA Task 36 Webinar Youtube & Presentation
Wind Power Trading decisions for an Offshore Wind Park	IEA Wind Task 36 and MPI for Human Development have released a forecast game at the IEA Wind Task 36 Glasgow workshop in Jan 2020. The game investigates how useful different forecasts are for wind power trading decisions in a simplified way.In the game, the player is asked to make trading decisions for an offshore wind farm in the Northsea in a number of situations based on deterministic and probabilistic power and wind forecasts.	Forecast Game (offline version to come soon) Forecast Game Results Forecast game introduction presentation: IEA Wind Task 36 YouTube channel at time: 3:03:00 Presentation Download Publications: MetApplications, 2022 J.of Phys. Conf Series 2021
Call for Water Game	In the game the player is managing a water supply reservoir! Purpose of the Game is to train with forecast information and improve decision-making. The player is newly appointed water manager for a reservoir that serves water uses for a town and is responsible to secure sufficient water for the town at a specific time. The game is played in two rounds of 5 years each.	Forecast Game License conditions Creative Commons CC-BY-NC-ND 4.0
HEPEX Forecast Game "Pathways to running a flood forecasting centre: an adventure game"	The game simulates the responsibilities of a water management centre in charge of protecting a city against floods. The game is investigting what kind of information is needed and how many days in advance the forecast information is good enough to make a decision that could save lives and money.	Forecast Game A blog post on the game was published in the Imprex project website Reference: Arnal et al. (EGU 2017 abstract)
Feuerwache (only available in German)	The game's aim is to well users understand and are able to make use of the uncertainty of weather forecasts The task of the game is to decide on 16 days, whether or not to request more firefighters for the next 21 hours to handle additional missions in predicted storm events.	Forecast Game

Offline Games

HEPEX Forecast Games		
Water Management Game	The game experiment focuses on risk-based decision-making in water management using probabilistic forecasts of inflows to a reservoir	Download: English (original version), German Reference: Crochemore et al., 2015 HEPEX blog post
Peak Box Game	The "Peak Box" game supports interpretation and verification of operational ensemble peak-flow forecasts, proposed by Zappa and colleagues, and encourages discussions of the use of ensemble predictions in operational hydrology. **The Peak-Box defines the "best estimate" of a flood event's timing and magnitude by framing the discharge peaks of all members of an ensemble forecast and taking their median in timing and magnitude.**	**Download: Peak Box Game** **Reference: Zappa et al., 2013** **HEPEX blog post**

Tabelle mit Vorhersagespielen und Experimenten:
iea-wind.org/taks 51
→ Workstreams → Decision Making under Uncertainty

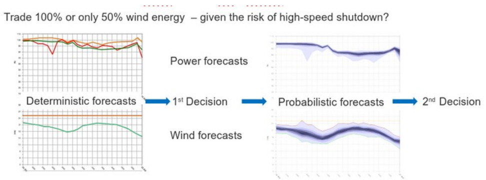
https://iea-wind.org/task51/task51-work-streams/ws-decision-making-under-uncertainty/

Decision-making under Uncertainty

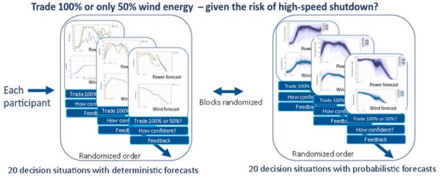
Entscheidungs-Findung unter der Prämisse von Unsicherheit

Initiative "probabilistische Vorhersagespiele & Experimente"

1. Experiment (2020)



Spiel: 12 Fälle
Entscheidungsstruktur: 12 deterministische Vorhersagen gefolgt von probabilistischen Vorhersagen
Nach jeder Entscheidung, konnte die Entscheidung geändert werden aufgrund der zusätzlichen Information



2. Experiment (2021-2024*)

Game: 40 cases

Entscheidungsstruktur: jeweils 20 deterministische Fälle + Entscheidungskonfidenzabfrage und 20 probabilistische Fälle + Entscheidungskonfidenzabfrage

* immer noch offen...: https://meteorology.mpib.dev/wind-power-decisions/about.html

Workstream Data Science and AI – *EDV und KI*

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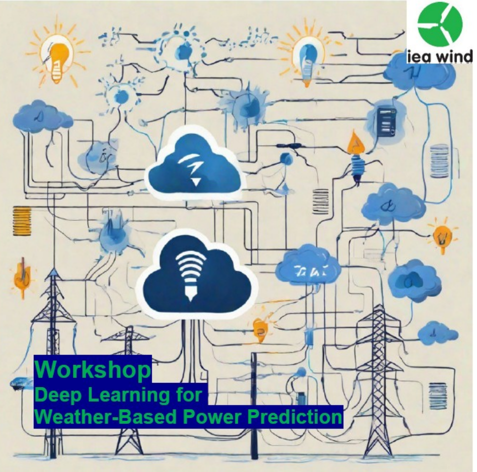


Webinar now available in our YouTube channel

IEAWindForecasting

https://youtu.be/t6H7diavQdg

Künstliche Intelligenz (KI) ist **die am schnellsten wachsende Technologie der Welt** und prägt Branchen wie Energie und Meteorologie rasant.

Die Auswirkungen der **zunehmenden Einbeziehung von KI** und maschinellem Lernen in Wetter- und Stromvorhersagemodelle schürt viele **Sicheheitsbedenken** in der Branche.

Um diese zu diskutieren und Experten, die neuesten Fortschritte im Bereich ML/DL für die Wettervorhersage erklären zu lassen, organisierten wir im Januar 2024 ein Webinar zum Thema „**Deep Learning für Wetter – und wetterbasierte Leistungsvorhersage**“.

Wichtige Erkenntnisse aus dem Webinar:

\+ Positive Entwicklungen:
\+ Die Modelle zeigen erste Ergebnisse
\+ Die Modelle legen einen neuen Ansatz für meteorologische Fragen nahe
\+ Schnelle Hypothesentests und Einschränkung des Umfangs für Simulationen mit Physikmodellen
\+ Die Modelle entwickeln sich schnell, da große Ressourcen in neue Funktionen investiert werden
\+ Riesige Ensembles (>1000 Mitglieder) sind in Sicht
\+ Es wird daran gearbeitet, die KI-Modelle allein auf Basis von Messungen zu starten

Zu lösende Herausforderungen:
- Qualitätskontrolle der Eingabedaten ist unzureichend – Ausreißer, fehlende oder korupte Daten
- Hohe Komplexität und Vielfalt der Daten zum Trainieren der Modelle ist eine Herausforderung
- Feature-Entwicklung erfordert Funktionen – ohne Physik wird dies schwierig
- Datengesteuerte Modelle erfordern einen neuen Blick auf die Datenfreigabe, was bisher eine Herausforderung war

Workstream Data Sharing - *Datenaustausch*

Workplan

Ein kürzlich für die Europäische Kommission erstelltes **Strategiepapier zur Transformation des Energiesystems**, das Digitalisierung und Datenaustausch umfasst, bezog sich im Allgemeinen auf den Energiesektor – **erneuerbare Energien wurden nur oberflächlich behandelt**.

Status: Entwicklung eines Positionspapiers zum Datenaustausch für den Sektor der erneuerbaren Energien wurde begonnen

Eine Gruppe von Mitwirkenden behandelt verschiedene Aspekte erneuerbarer Energien: Ressourcenbewertung/Standortbestimmung, Prognosen, Handel, Betrieb und Wartung usw.

* https://op.europa.eu/en/publication-detail/-/publication/21b0260e-a2d5-11ee-b164-01aa75ed71a1/language-en/format-PDF/source-300344208

WS Extreme Power System Events – *Workshops*

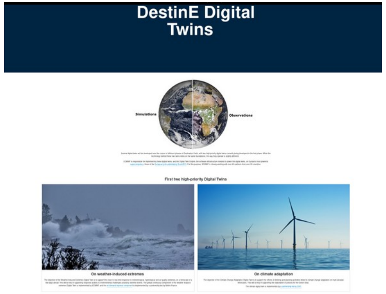
Join us at the Wind & Solar Integration Workshop Session 4D and 8D on 8.-9. October 2024

Join us at the North American Wind Energy Association's Annual Conference on October 29, 2024, 1-5pm

IEA Wind Task 51 Austria Workshop at the NH Danube City Hotel in Vienna on November 6, 2024

IEA Wind TCPTask 51
"Forecasting for the weather driven energy system"

Collaboration



<u>Collaboration with Subtask</u>:
On-demand digital twin extremes forecasting system for renewables - Destination Earth Extremes digital twin

https://destine.ecmwf.int/news/meteo-france-led-international-partnership-wins-bid-to-develop-destination-earths-on-demand-extremes-digital-twin/

Workshop on
Extreme Power System Events
Boulder, April 2025

WS Value of Forecasting – *Wertschöpfung durch Vorhersagen*

Quantifizierung des Werts probabilistischer Prognosen für die Betriebsplanung von Stromnetzen

Die Highlights des OPTSUN-Projekts:

- Entwicklung verbesserter probabilistischer Leistungsprognosen im Versorgungsmaßstab und hinter dem Zähler (BTM)
- Identifizierung fortschrittlicher Methoden zur Verwaltung von Unsicherheiten im Versorgungsbetrieb
- Validierung von Methoden durch detaillierte Simulation des Stromnetzbetriebs
- Demonstration einer Planungsmanagementplattform zur Integration probabilistischer Prognosen und Planungsentscheidungen mit als OpenSource Quellcode

Schlussbericht:
https://www.epri.com/research/products/000000003002025442

Projekt-Home[page: https://www.epri.com/optsun

Veröffentlichung:
"Quantifying the value of probabilistic fore-casting for power system operation planning":
https://doi.org/10.1016/j.apenergy.2023.121254

Mehr Info: iea-wind.org/task51 → Workstreams→ Value of Forecasting
Direkt: iea-wind.org/task51/task51-work-streams/ws-value-of-forecasting/

WS Value of Forecasting – *Wertschöpfung durch Vorhersagen*

Der Status wird durch Betrachtung und Diskussion der Nutzung von Windkraftprognosen überwacht

+++ in Zusammenarbeit mit Task 50 Hybrid Power Plants +++

See iea-wind.org/task51

→ Publications

→ Workshops & Special Sessions

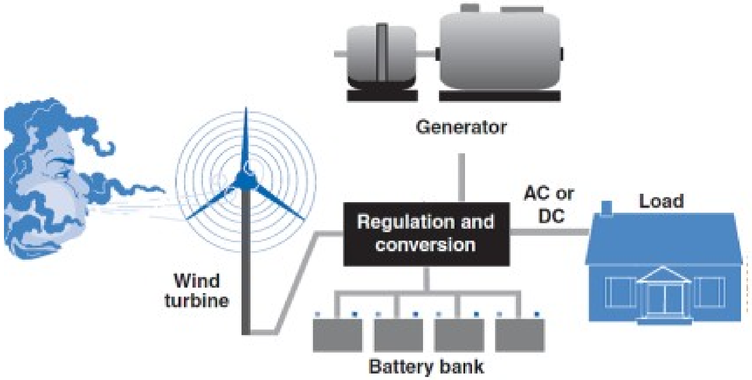
Kleine Auswahl an vorgestellten Anwendungsfälle + Berichte

Dimitrios Eleftheriou, Ea Energianalyse: *use of wind power forecasts in scheduling a hybrid energy asset consisting of wind turbines, electrolyser and hydrogen storage*

Honglin Wen, Shanghai Jiao Tong University: *Value-oriented Renewable Energy Forecasting for Coordinated Energy Dispatch Problems at Two Stages*

Antonio Couto, LNEG, Portugal: *Addressing the challenges of wind power plants hybridised with solar power: A generation forecast perspective. (see also publication)*

Rujie Zhu, Technical University of Denmark: *Value of forecasting for hybrid Energy Management*



Zusammenarbeite und Liaison mit dem IEC Wissenschaftlichen Kommitte 8A für Netz*integration Erneuerbarer Energien*

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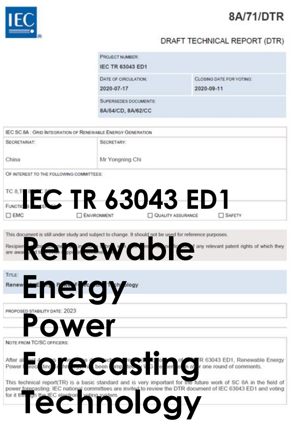
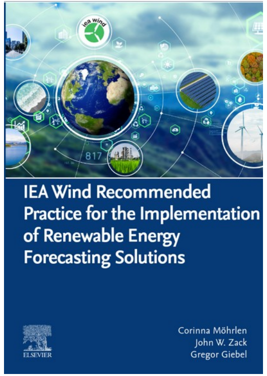
Frühere gemeinsame Arbeit: IEC Technischer Bericht TR63043 – Leistungsvorhersage-Technologien Erneuerbarer Energien

- Technischer Bericht TR63043 wurde in 2020 publiziert vomSub-Committee 8A Grid Integration of Renewable Energy Generation, Working Group 2 Renewable energy power prediction
  https://webstore.iec.ch/publication/26529 - Link to IEC SC8A WG2


8A/71/DTR
DRAFT TECHNICAL REPORT (DTR)
PROJECT NUMBER: IEC TR 63043 ED1
DATE OF CIRCULATION: 2020-07-17
CLOSING DATE FOR VOTING: 2020-09-11
SUPERSEDES DOCUMENTS: 8A/54/CD, 8A/62/CC
IEC SC 8A : Grid Integration of Renewable Energy Generation
SECRETARIAT: China
SECRETARY: Mr Yongning Chi
PROPOSED STABILITY DATE: 2023

IEC TR 63043 ED1 Renewable Energy Power Forecasting Technology



- *New Work Item* für die Entwicklung eines IEC Standard in Oct. 2023 akzeptiert mit 100% der P-Member

See Presentations from WIW2024 session 9D*

https://iea-wind.org/task51/task51-publications/task51-workshops-and-special-sessions/

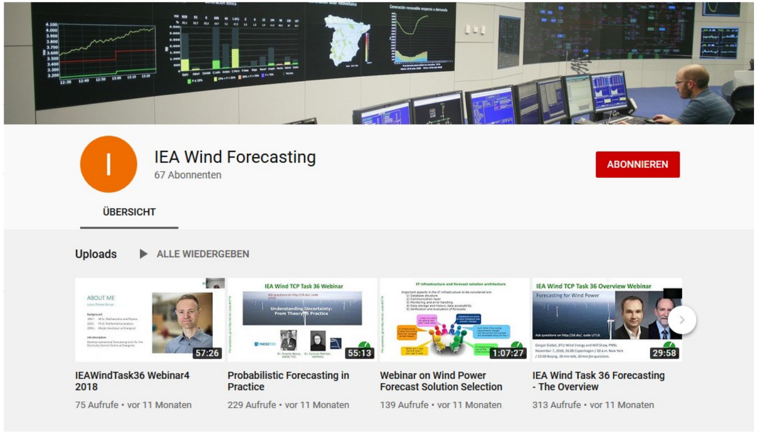
Task 51 Web Presence

Website

https://iea-wind.org/task51

YouTube Channel

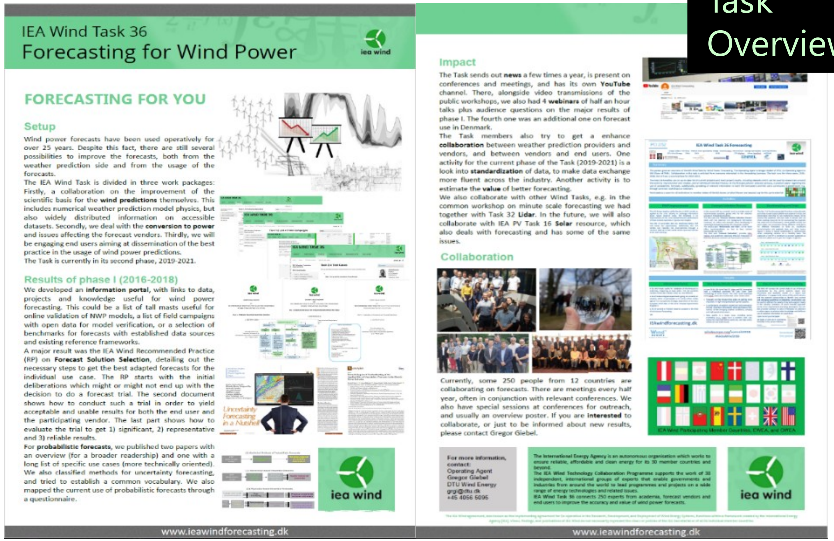
https://www.youtube.com/c/IEAWindForecasting



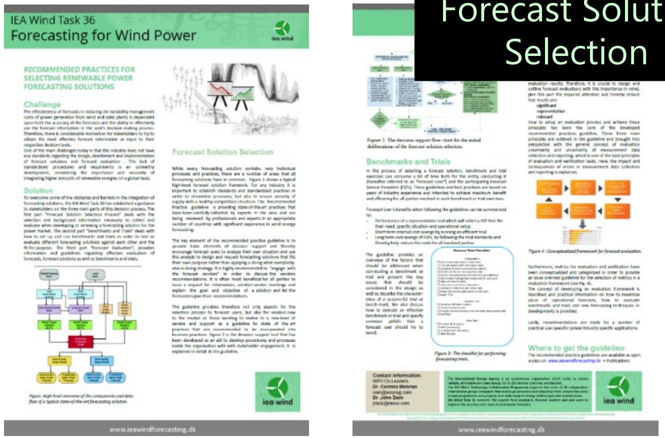
Handouts

- 2-page handouts: quick overview of major results
- 3 currently available; can be obtained from:

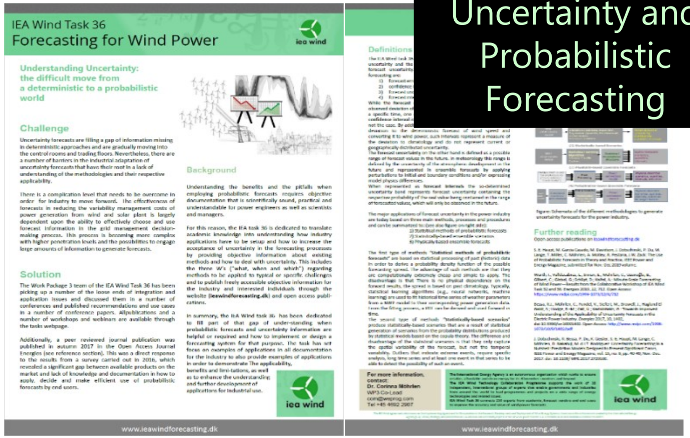
  https://iea-wind.org/task51/task51-publications/task51-posters-and-handouts/



Task Overview



Forecast Solution Selection



Uncertainty and Probabilistic Forecasting

Task 51 - "Forecasting for the weather-driven Energy System"

Zusammenfassung

Rahmenbedingungen haben sich seit der ersten Phase von Task 36 geändert:

Erneuerbare sind nicht länger eine Ergänzung zum System, sondern SIND das System

Sektorkopplung an Verkehr, Wärme, Power2X…

→ Neue Herausforderungen durch Anwendungen in verschiedenen Prognosehorizonte (ultra-kurz zu saisonal)

→ Extreme und Auswirkung wettergesteuerter Energie benötigen Unsicherheit, probabilistische Prognosen und datengesteuerte KI-Modellierung & stehen im Fokus unserer Arbeit

→ Workshops & Webinare helfen uns zu vernetzen, Informationen und Erfahrung zu teilen und objektiv und transparent in die Industrie zu kommuniziere…

Heutige Herausforderungen benötigen starke int. Zusammenarbeit mit

- verwandten TCPs (Solar, Wasser, Wasserstoff, …)
- verwandten Tasks (Integration, Lidar, Farm Flow Control, Hybride, Wind aus der Luft …)
- Standardisierung (IEC), Datenmärkte, Datenkontrolle und -qualitätsbewertung (WMO)

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Task 51 – *"Forecasting for the weather-driven Energy System"*

iea-wind.org/task51

Fragen ?

Neugierig geworden ?

- **Mitmachen ist erwünscht!!!**
- **Unser Task Newsletter orientiert und verbindet...**

→ einfach eine Email an **Gregor Giebel** schicken mit "Newsletter Anmeldung" im Betreff...

Operating Agent & Task Managers

Dr. Gregor Giebel — grgi@dtu.dk

Dr. Caroline Draxl — caroline.draxl@epri.com

Dr. Corinna Möhrlen — com@weprog.com