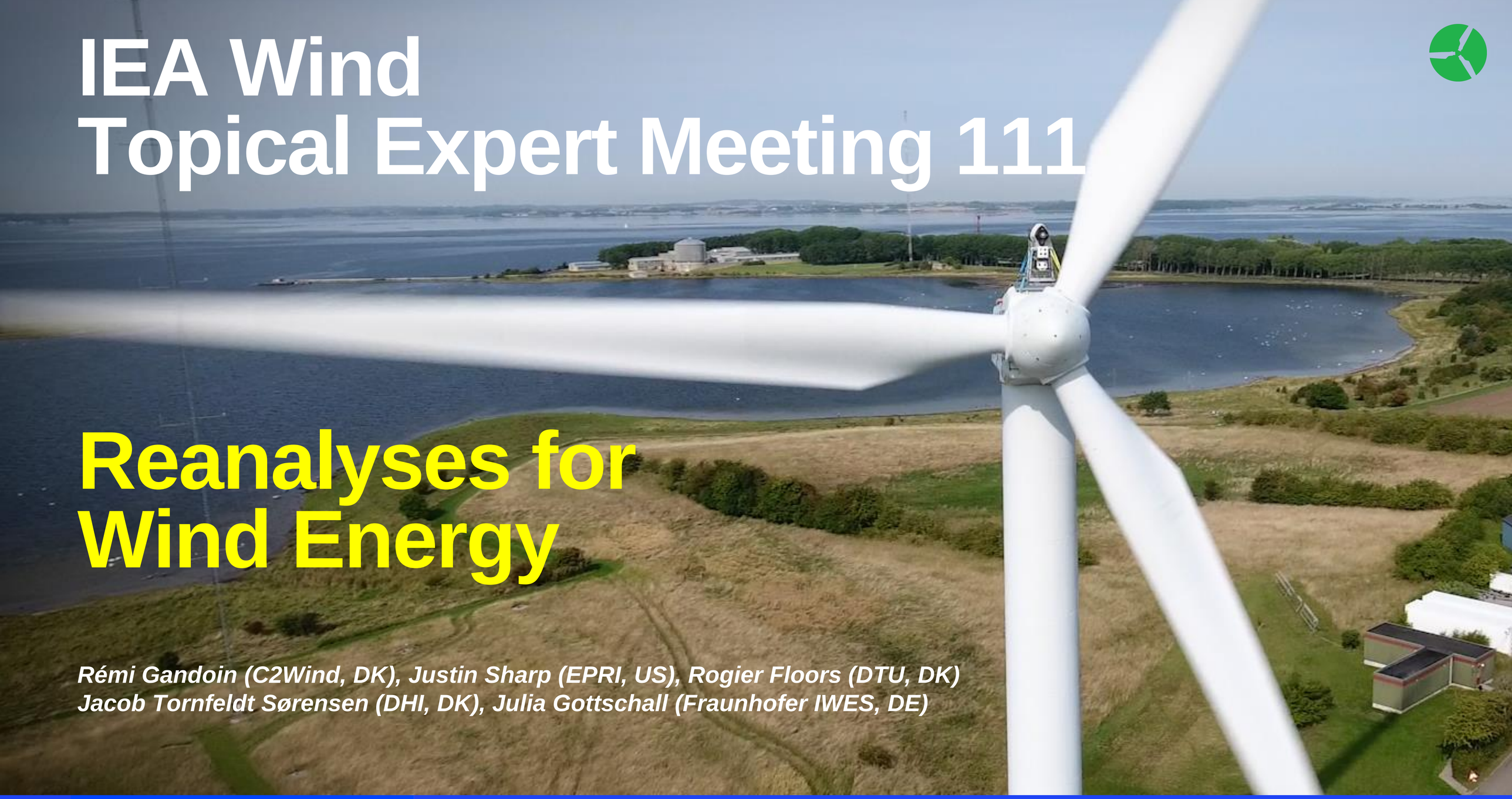
IEA Wind
Topical Expert Meeting 111



Reanalyses for Wind Energy

Rémi Gandoin (C2Wind, DK), Justin Sharp (EPRI, US), Rogier Floors (DTU, DK)
Jacob Tornfeldt Sørensen (DHI, DK), Julia Gottschall (Fraunhofer IWES, DE)

Outline

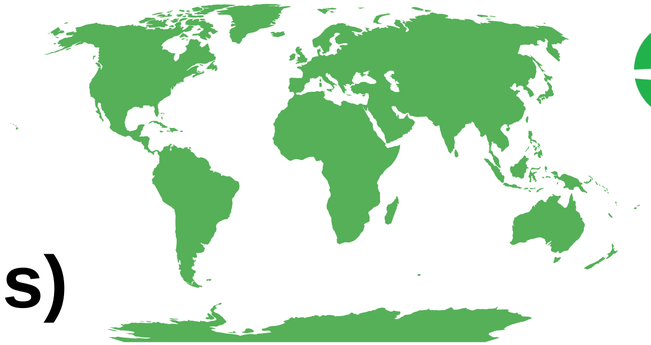
1) **Who we are**

2) **Reanalyses: workhorses of Wind Energy + Power Grid engineering**

3) **TEM#111: connecting reanalysis and Wind + Power Grid communities**

4) **Way forward: how *you* can get involved!**

IEA Wind TCP



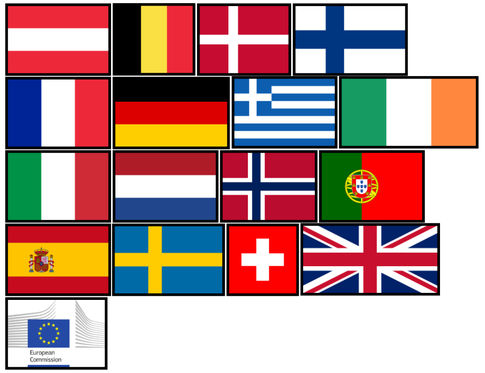
23 members + 2 sponsors (industry associations)

- **Vision:** Wind energy leads the global transition to a decarbonized energy supply.
- **Mission:** Promote high impact wind energy research and communication through international collaboration.

Americas

Asia

Europe



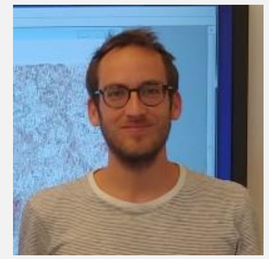
Members of the ExCo are government representatives like energy agencies, DOE, energy ministries and wind energy associations
Participants in Tasks include universities, industry, certification bodies, etc

Sponsors

Under the umbrella of the International Energy Agency

1) Who we are

Wind, Marine and Power Grid engineers and scientists

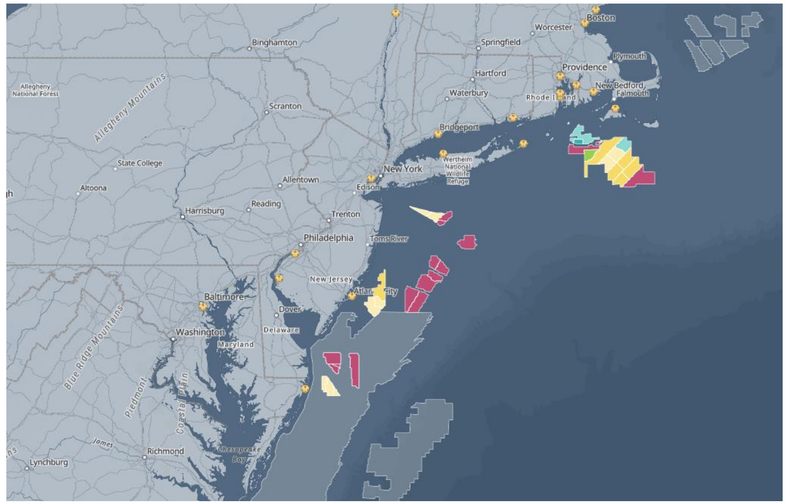
Rémi Gandoin ***C2Wind, Denmark***	**Jacob Tornfeldt Sørensen** ***DHI, Denmark***	**Justin Sharp** ***EPRI, USA***	**Julia Gottschall** ***Fraunhofer IWES, Germany***	**Rogier Floors** ***DTU, Denmark***
				
Offshore wind engineer Yield Assessment, Site Conditions, Integrated Load Analysis	Innovation and Product Portfolio Manager, Energy and Ports Metocean (waves hydrodynamics) hindcast modelling	Renewable Energy and Meteorology Subject Matter Expert Energy Meteorology	Chief Scientist Wind Farm Development Operating Agent of IEA Wind Task 52 'Wind Lidar' https://iea-wind.org/task52/	Senior Researcher at DTU Wind Energy ABL meteorology and flow modelling.

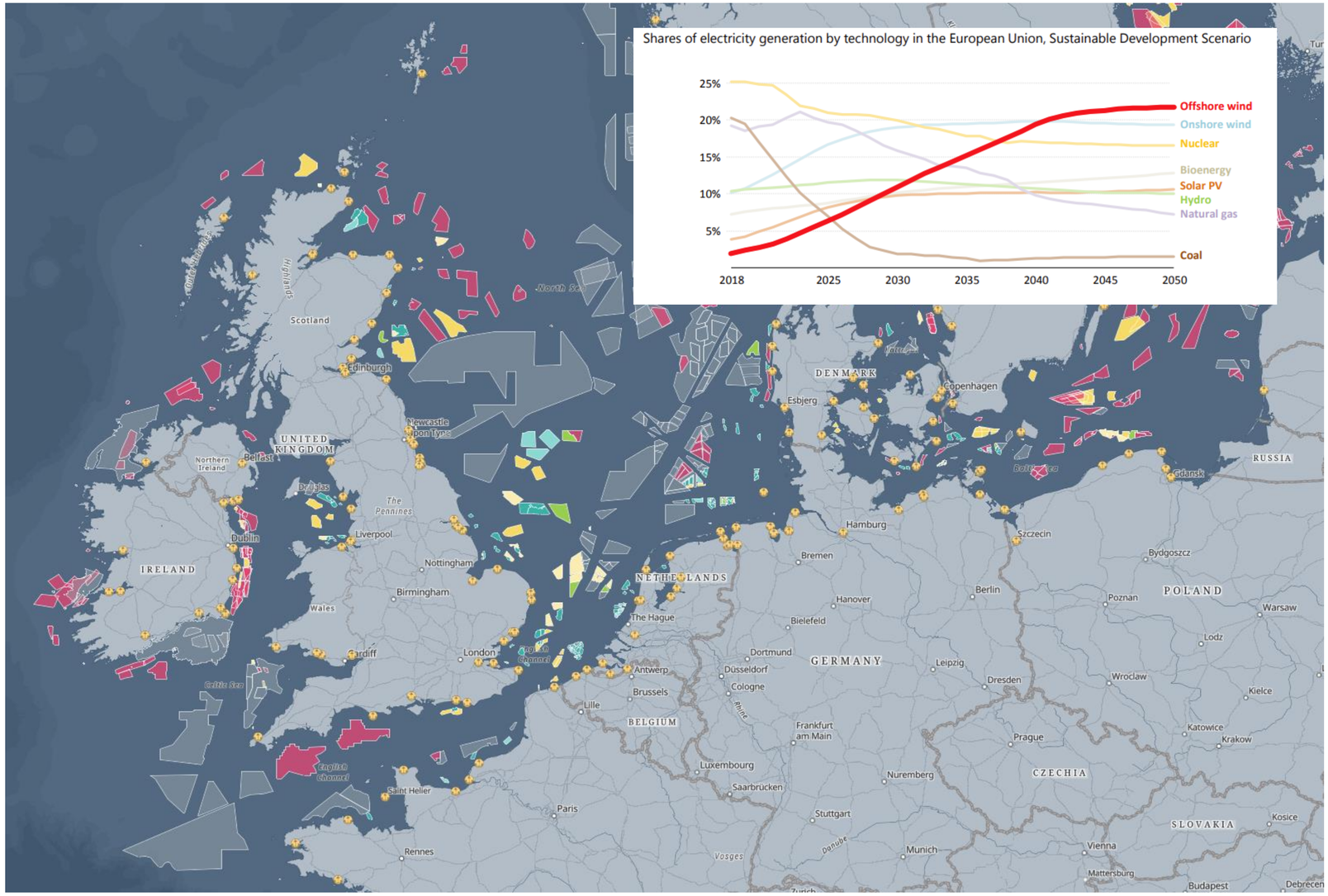
2) Reanalysis matters.

Reliable workhorses for wind farms- and power grids

- Reanalysis datasets are necessary to the success of these projects
  - Weather- and climate are key drivers for design and operation
  - Used directly, or downscaled
- Reanalysis datasets are used for:
  - Characterising wind, waves, water levels and currents for offshore wind farms design
  - Predicting long-term wind farm production
  - Planning and modelling power grids

2) Reanalysis matters: offshore wind





https://energy.ec.europa.eu/topics/renewable-energy/offshore-renewable-energy_en
https://map.4coffshore.com/offshorewind/

2) Reanalysis matters: power grids

https://www.esig.energy/weather-data-for-power-system-planning/

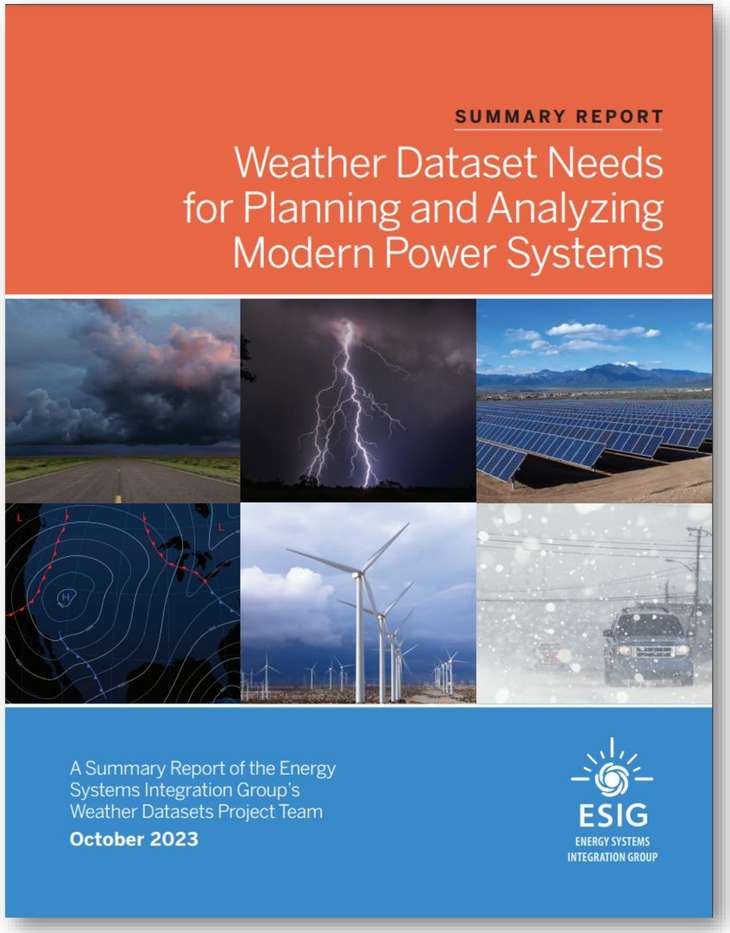


TABLE ES-1

The Main Attributes of Time Series Data Necessary to Meet General Power System Modeling Needs

Including the necessary variables	Include the necessary variables at sufficient spatio-temporal resolution and accuracy to reflect actual conditions that define the generation potential at current and future wind/solar sites and temperature at load centers
Covering multiple decades with ongoing extension	Cover multiple decades with consistent methodology and be extended on an ongoing basis to capture the most recent conditions and allow climate trends to be identified
Coincident and physically consistent	Are coincident and physically consistent, in space and time, across weather variables
Validated	Are validated against real conditions with uncertainty quantified
Documented	Are documented transparently and in detail, including limitations and a guide for usage
Periodically refreshed	Are periodically refreshed to account for scientific and technological advancements
Available and accessible	Publicly available, expertly curated, and easily accessible

Source: Energy Systems Integration Group.

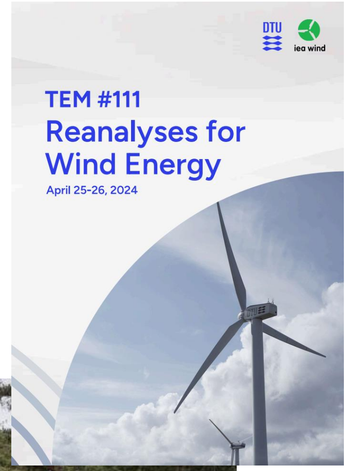
An *organic* success story …

… but a risky journey

- ❑ Will reanalysis keep being produced and continuously updated?
- ❑ Which ones? Where? When? What data?
- ❑ Will known biases be fixed?
- ❑ Who should take care of validation and applicability checks, where should these be reported?

3) The TEM#111

Connecting Reanalysis & Wind/Power Grid practitioners



- Improve access and documentation of reanalysis datasets.
- Promote and foster validation and advertise successful applications of reanalysis datasets for Wind Energy / Power Grid applications, and thereby improve their value.
- Act as a point of contact / collaboration forum between reanalysis providers and the Wind Energy communities.

ECMWF · NASA · NOAA · Deutscher Wetterdienst Wetter und Klima aus einer Hand · DWD · Meteorologisk institutt · DTU · Fraunhofer IWES · And many others..

Proceedings: https://iea-wind.org/task11/tems/

3) The TEM#111

Connecting Reanalysis & Wind/Power Grid practitioners

The TEM#111 succeeded in:

- **Connecting Wind Energy / Global & Regional Reanalysis communities**
- **Summarizing state of the art (use cases, reanalysis advancement)**
- **Agreeing on follow-up actions:**
  - ✓ **Testing of new reanalyses (*ERA6 testing*)**
  - ✓ **Keep both communities up to date (*newsletter*)**
  - ✓ **Collecting user requirements for future datasets (*workshops*)**
  - ✓ **Validation using high quality in-situ datasets (*catalog of public data*)**

4) Way forward: how *you* can get involved!

Connecting Reanalysis & Wind/Power Grid practitioners

Are you **doing reanalysis**?

- **Ask** for user requirements
- **Validate** your model results
- **Plan** for the next steps

Are you **using reanalysis**?

- **Provide** user requirements
- **Know** what's coming
- **De-risk** future data and use cases

4) Way forward: how *you* can get involved!

Connecting Reanalysis & Wind/Power Grid practitioners

Get in touch!

Write to us:

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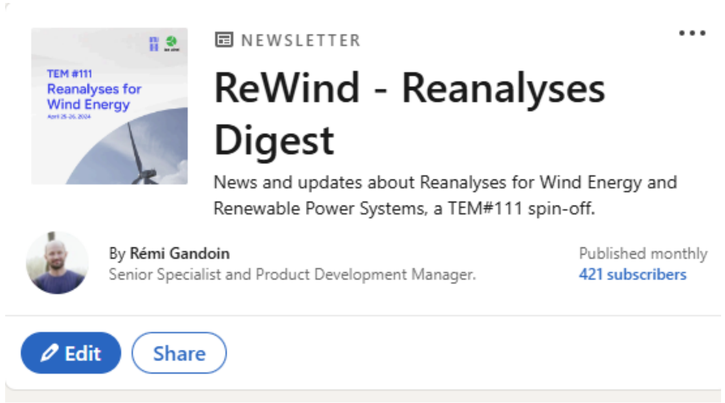
- Julia Gottschall julia.gottschall@iwes.fraunhofer.de
- Rogier Floors rofl@dtu.dk

Newsletter:
https://www.linkedin.com/newsletters/7231744153947144194/



We shall soon find a "home" outside of Wind / Power Grid silos …

… check this space and reach out if you are interested in joining us!

Thank you.