IGW Wind Industry Stakeholder Meeting – Afternoon Session

The Wind Technology Collaboration Programme of the International Energy Agency

18.10.2022, 14:00 – 18:00

Short presentations about the Task's work and current topics of interest. Time for discussions after each presentation and after the conference session.

14:00 – 14:25 Introduction

- Florian Maringer, Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology — 5 min

  Welcome and Introduction

- Theodor Zillner, Austrian Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology — 10 min

  The IEA Technology Collaboration Programme

- Andreas Krenn, Energiewerkstatt Verein — 10 min

  The IEA Wind TCP Tasks, Tasks with Austrian participation in particular

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14:25 – 15:05 Large-Scale Deployment of Wind LiDAR, Task 52

- Julia Gottschall, Fraunhofer IWES, Germany — 20 min

  Making wind LiDAR the best and preferred wind measurement tool for wind energy applications

  IEA Wind Task 52, also referred to as Wind LiDAR Task, is a relaunch of Task 32, which in the last nine years supported successfully international collaboration on different Wind LiDAR related topics and applications. Task 52 aims to make sure that Wind LiDAR is used by the industry in the best way and by this supports the growth of onshore and offshore wind equally.
  In the current phase, Task 52 has specified four central themes with dedicated deliverables planned for the upcoming 4-year period of the task:
  Universal inflow characterization, mainly covering the use of nacelle-mounted Wind LiDAR systems.
  Replacing met masts. This particularly includes activities with applications of Wind LiDAR technology in both complex terrain and cold climate.
  Connecting Wind LiDAR, covers digitalization and amongst others FAIR data principles for the application of Wind LiDAR.
  Accelerating offshore wind deployment. Here, applications of both vertically profiling, floating LiDAR systems and scanning Wind LiDAR are considered.

- Alexander Stökl, Energiewerkstatt Verein — 20 min

  Ground Based Wind LiDAR in Complex Terrain

  Wind LiDAR measurements have become an accepted and useful tool for many applications in the wind energy. However, one of the main obstacles to more widespread and standalone applications of wind LIDAR systems are the uncertainties involved with LIDAR measurements on complex terrain sites. In the framework of the Task 52 Wind LiDAR task, there is thus a working group focusing on the challenges of LiDAR measurements in complex terrain.
  In the current phase of the Task 52, the activities in the complex terrain working group will focus on the utilization of a broader data base of LiDAR measurements in complex terrain, covering a range of different terrain characteristics, wind conditions, and geographical regions, in order to find robust limits for the application of Wind LiDAR systems and LiDAR correction methods in complex terrain. The results of this investigation will then form the basis for a published recommendation for the deployment of Wind LiDAR in complex terrain.

15:05 – 15:35 **Coffee Break** — 30 min

15:35 – 15:55 **Forecasting for the weather driven energy system, Task 51**

- Irene Schicker, ZAMG — 20 min

  Probabilistic Wind and Power Forecasts from Nowcasting to Sub-seasonal and how to better predict meteorologically induced Extreme Events

  With the increasing feed-in of electricity from renewable energy sources, especially highly weather-driven sources such as wind and solar, weather and power forecasts that can cover the associated uncertainties are becoming more and more important. The same goes for the increase in extreme weather events or meteorologically induced events, calling for improved forecasting in all areas, from nowcasting to day-ahead and sub-seasonal forecasts.
  In weather forecasting, the ensembles of numerical weather prediction models generate the uncertainties. However, these models are computationally expensive, time-consuming and require further post-processing models to fit site-optimized but also large-scale forecasts for wind energy. The models are based on statistical methods and in recent years more and more on machine learning methods due to the quick availability of predictions coming with their computational resource saving environment. Furthermore, these methods have shown their strength in the detection of meteorologically induced extreme events (dark lull etc.).

15:55 – 16:40 Cold Climate Wind Power, Task 54

- Charles Godreau, Nergica, Canada 15 min

  Tackling Icing on Wind Turbines with Ice Protection Systems

  With ice protection systems (IPS) being available from all major wind turbine OEMs, this technology has matured quickly and is now widely adopted in the cold climate wind markets. The performance of those systems has been demonstrated in large-scale studies and has a clear impact on the profitability of a wind farm in icing climate. OEMs are now keen to provide performance warranties for those systems but in specific testing conditions. How those systems behave in different atmospheric conditions remains to be demonstrated in a standardized way. This is why IEA Wind TCP Task 54 will look into the definition of the IPS performance envelope in its next term. The presentation will cover an overview of the cold climate wind market, a summary of the IPS technology, state-of-the-art IPS performance assessment methodology and results as well as the upcoming work on the performance envelope.

- Franziska Gerber, Meteotest AG, Switzerland 15 min

  A Smart Algorithm for Wind Turbine Controlling under Icing Conditions

  In cold climate regions, icing of wind turbines is a common issue that affects production and turbine lifetime. Icing also generates ice throw risk that must be managed and mitigated. In this context, optimizing turbine control is crucial to maximize production, while keeping the wind turbines healthy and the surroundings safe. The two collaborating research projects "Smart Operation of Wind Turbines under Icing Conditions" (SOWINDIC) and “Smart Operation of Wind Power Plants in Cold Climate” (SOPWICO) aim at controlling wind turbines in a smart way under icing conditions by making the best usage of available information. From turbine data and in-situ meteorological measurements to observations of blade icing, as well as weather forecasts, including icing forecasts. An automated algorithm will process this information in real time to determine the best timing for turbine stops and restarts, and to identify the best timing for blade heating cycles.

- Claas Rittinghaus, Energiewerkstatt Verein 15 min

  Task Work as Vantage Point for Standardization using the Example of Risk Assessment

  In recent years much of the work of former Task 19 laid the foundation for standardization of certain aspects of cold climate wind power, either by technical reports and recommendations published or by contributing to IEC or ISO committees and working groups.
  An example for the first category are the “International Recommendations on Ice Fall and Ice Throw Risk Assessment”. Former, rather restrictive rules of thumb for distances to be kept to exclude the risk of ice fall and/or throw are now replaced by site-specific simulation and risk assessment.
  An example for the latter category is the “IEC 61400-31 Wind energy generation systems - Part 31: Siting Risk Assessment”, which is currently being developed. Different types of risk events and the general process of risk assessment and management will be described and incorporate relevant cold climate aspects, such as icing, as well.

16:40 – 16:55 Distributed Wind, Task 41

- Ian Baring-Gould, NREL, USA 15 min

  Distributed Wind in the Energy Transition

  Distributed wind can play a significant role in the transition away from fossil fuels and the adoption of more renewable energy. Distributed generation in general can provide large benefits for future electricity grids and markets. Increased efficiency through reduced transmission losses and stronger reliability compared to centralized generation are only two of them. Wind energy in particular can add beneficial resource diversity to distribution grid systems with high levels of renewable energy electrification, especially systems with a lot of solar PV capacity already. The use of local wind energy is also relevant to the new REPowerEU Plan, given the role that distributed generation in general could play in meeting that plan. Using free grid capacity in a distributed manner on the one hand and facilitating local generation in hybrid power plants on the other hand allow for a coherent and fast transition of energy generation, distribution and consumption into a sustainable future.

16:55 – 17:00 Closing remarks

- Andreas Krenn, Energiewerkstatt Verein 5 min