

A Guide to Optimal Renewable Energy Solutions: IEA Recommended Practice for the Implementation of Renewable Energy Forecast Solutions

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Objective & Background

Short-term forecasts of renewable energy generation are used by many participants in electric systems with even modest penetrations of wind and solar generation. It has been demonstrated that these forecasts provide considerable value for the economic and reliable operation of electric grid systems. However, there is considerable evidence that for many applications, the optimal forecast solutions are often not used and therefore some of the potential forecast value is not realized. The primary factors that contribute to this are: (1) specification of the wrong forecast objectives in the solution selection process, (2) use of a poorly designed or executed trials of candidate solutions, (3) the use of performance metrics that are not well-aligned with the application objectives and (4) issues with the quality, representativeness and timeliness of the data from the forecast target facilities that is provided as input to the forecast production process.

Method

In order to address this issue and ultimately realize more value from renewable energy forecasts, an international group of experts was convened under Task 36 of the International Energy Agency's (IEA) Wind Technology Collaboration Program (TCP). In Phase 1 (2016-2018) of Task 36, the first version of a Recommended Practice for the Implementation of Renewable Energy Forecast Solution (RP) was made publicly available in early 2019. Feedback was obtained through presentations at industry conferences, dedicated sessions at technical workshops and electronic and in-person interactions with users, forecast providers and researchers. The information obtained in this process provided the basis for the revisions and additions that led to a second version of the RP that was released at the end of Task 36 Phase 2 (2019-2021). The second version was transformed into a book that was published in November 2022 [1].

Principal Findings

The RP is intended to be a practical guide to the selection of optimal renewable energy forecast solutions. The second version of the RP consists of four parts. Part 1 addresses the process of selecting an optimal forecasting solution for a specific applications. Here, it is intended to provide guidance for the design of an economically viable process that will maximize the probability of obtaining an optimal forecast solution for a user's applications. The second part provides guidance for the design and execution of representative benchmarks or trials. Part 3 of the RP provides guidance on the evaluation of forecasts. Part 4 is designed to provide background information on meteorological instrumentation and their recommended setup, maintenance, quality control to facilitate real-time data flow from generation facilities for optimal input into forecast production processes.

Conclusion

The presentation will provide an overview of the objectives and contents of the four parts of the RP. The specific focus will be on providing examples of the forecast solution selection issues that typically result in the selection of non-optimal solutions for a user's application. Feedback on version 2 of the RP will be gathered under the new IEA Wind Task 51(<https://iea-wind.org/task51/>) with the vision of developing an updated version.

1. [1] Möhrle, C., J. Zack, G. Giebel, 2022: IEA Wind Recommended Practice for the Implementation of Renewable Energy Forecasting Solutions. DOI: <https://doi.org/10.1016/C2021-0-03549-5>, ISBN: 978-0-443-18681-3. Academic Press.